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Continuing Issues in the Use of Pesticides for Procuring Life in Developing Countries

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Abstract – The basis for pesticide use in agriculture is that costs related with pesticide pollution are to be reasonable by its benefits, but this is not so apparent. Regarding the benefits by simple economic analysis has improved pesticide use in agriculture and thus produced pesticide persuaded public harms. This paper effort to explore the research gaps of the economic and social concerns of pesticide use in developing countries, predominantly with an example of India. We contend that although the negative sides of agricultural development. We assume that, if these difficulties are grasped and accounted for, the remunerations from the current use of pesticides could be remunerated by the costs of pollution and ill human health. This paper also explains different pathways and mechanisms for disregarding. In view of prospective and overall negative impacts of pesticide use, we recommend alternate ways of controlling pests such as unrestricted unified pest management along with education and training activities.

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Keywords: cost-analysis, developing countries, interdisciplinary, integrated pest management, relegation, pesticides.

1. INTRODUCTION

Pesticide use in agriculture offers yield benefits. Also pesticide use is likely to raise risks to human health, the natural environment, and social capital. The profits of pesticide use in agricultural crop production are often estimated by the yield increase gained versus the cost of buying inputs like seed, fertilizers, pesticide, and labor. But genuine valuations must take broader social and environmental influences into account. First, pesticide use may reduce people's well-being and, because of sickness, result in loss of yield, wages, and an increase in medical expenses. Second, deprivation of the environment or ecosystems also ultimately raises costs. There could be substantial costs of, for example, bioaccumulation, bio intensification, pest resistance and resurgence, mishandling of toxic chemicals and its effects for contamination of ground water, among others. This paper tries to explore the research gaps of the fiscal and social significances of pesticide use in developing countries, mainly with an example of India.

We hypothesize that, if these difficulties are recognized and accounted for, the benefits from the contemporary use of pesticides could be compensated by the costs of pollution and ill human health. We argue that traditional economics “generalized the complex world” in valuing benefits of pesticide use, which increased pesticide use and thus pesticide-induced public troubles, and marginalized third world subsistence farmers.

2. INTRICACY OF PESTICIDE USE

The Brundtland Report has already addressed the prominence of economic development without humiliating the environment and ecological reliability. But the use of certain pesticides may damage both environment and ecology and has major allegations for our common future. Then why are toxic chemical pesticides still in use despite its social and environmental impacts? It is highly doubtful that we can find a simple answer due to the related nature and intricacy of agricultural change. Valuing benefits of

insecticide use through simple economic analysis may raise pesticide use in crop production. The economic study weighs the predictable costs and benefits of pesticide use and claims that pesticide use is valuable. It maintains that pesticide use has reformed food production and the benefits of production far outweigh negative externalities caused to human beings and the environment. This position claims that the technologies embody the positive values to the human society, with population growth, hunger, deficiency, and starvation providing the basis for the dispute.

Pesticide use cannot be viewed out of perspective, but rather should be addressed from a complete system perspective. Several studies argue that insecticide use produces overall low economic returns if social and ecosystem health impacts are accounted for. As deliberated earlier, the estimates of benefits are, first, predictable and confined; second, do not take into account environmental influences like pollution of natural resources and ecosystems disturbances. It does not admit long term low dose recurrent exposures to pesticides and its connections to hormone interruption, reduced intelligence, reproductive aberrations, and cancer. In addition, clearance of outdated insecticides is likewise a major health threat; and possible linkages among pesticide use, international transport, and arctic ruin are emerging issues. Third, public health effects and social consequences (like suicide stabs by consuming pesticides, unintended poisoning by polluted foods, etc.) of pesticides are also not sufficiently considered. Moreover, the estimate does not arrest the physical and psychological pain and distress experienced as a result of critical and long-term illnesses. Furthermore, the causes of hunger and starvation in developing countries can, in fact, be elucidated by an interface of many biophysical, political, economic, and social factors and forces that are moderately external to these countries. A recent and straightforward example is the ambitious Millennium Development Goals that have been prepared almost exclusively by advanced nations and thrust upon developing countries without sufficiently addressing their interests, capacity, and viability of the goals. This efficiently amounts to goals set for the poor, uprights set by the rich.

We recommend perceiving the pesticide problem through an interdisciplinary perspective. Interdisciplinary is an approach to studying a specific complex problem at different levels with specific theories/methods, and tries to find the best possible solution to the problem. For example, growth of, or overview of concepts like IPM, Integrated Crop Management, Integrated Plant Nutrient Management System, etc. have, to some extent tried to diminish their respective problems by addressing both a communal and biological approach. These concepts are envisioned

to recognize optimum levels of insecticide usage with respect to human society as a whole. Because of the intricate nature of pesticides impacts, a simple benefit cost analysis is an inadequate measure of pesticide efficiency. Interdisciplinary complete systems analyses, taking a multitude of interrelating factors into account, while assessing the costs of pesticide use, are needed. We believe that crediting values for a multitude of interacting impacts (for example, human health, environmental and ecosystems, etc.) is difficult and much more subject to disagreement as the true costs of these impacts may not be computable in a single monetary unit. However, different methods established in a wide range of corrective sciences are rarely grouped for estimating the costs of pesticide pollution. Here, we are not only suggesting a group of people working together and to just adding different ideas from different disciplines, but rather we are proposing to a compromise through developing a well-defined theoretical perspective on cost effectiveness analysis by mutual proficient respects and creative tension. Otherwise, the estimates for complex problems are always underrated. Despite the enduring vestibule for interdisciplinary to study any complex phenomenon; the development within the academic world has advanced in the opposite direction, which might have enhanced adverse health and ecological concerns relegating existence farmers, especially in developing countries.

2.1 Insecticide Use and Relegation:

It is evident that increased pesticide inputs have a negligible effect on total agricultural produce. But pesticide use causes 5 million poisonings and 320 thousand deaths and about 620 thousand chronic illnesses every year worldwide. The majority of these are informed in developing countries. Moreover, it is said that these emerging nations use only one-fifth of the pesticides useful in the world and the numbers of victims due to pesticides are further undervalued as many such cases are not described. Millions of farmers, millions of other people living in farming groups and the uncountable consumers are unprotected to the chemical insecticides through gasping polluted air, drinking polluted water, consuming contaminated food, etc. Irrespective of the normal realism, farmers from developing nations continue to use pesticides at an increasing rate. Before looking at the probable reasons, it is valuable mentioning how the World Bank has defined the reality of agrarian society of developing countries. It demonstrates the harsh reality of the rural scrap for livelihood and existence. Farmers are directly or indirectly forced by strangers to use chemical pesticides on their farms. Farmers in developing nations are often not well educated, trained, or conscious of danger, and they also lack assets and have limited power to control the outside forces like markets and

trade liberalization, universal policies, treaties, etc. The agrarian pest control system, which was established and advertised as a fractional by the outsiders, has in fact, locked farmers in pesticide technology. The responsible use of insecticides requires the capacity to read and follow label directions. Farmers also often lack the possessions to purchase equipment and supplies specified on the label to properly apply a pesticide. Pest identification is lacking and risks from pests are often not properly judged. Pesticide and application equipment disposal is too often determined by government or aid agency use of surplus goods from elsewhere and often not well suited to solve the problems at hand. We briefly discuss regional and global outsiders that are likely to augment pesticide use and intensify marginalization, and secondly, we try to elaborate the pathways of marginalization (Fig. 1) by ruin of human health at local level.

2.2 Macro-level Forces for Relegation

There is a deceptive lack of proper institutions prevailing the production and sales of insecticides in developing countries. Pesticides are some of the most toughly regulated chemicals in the world. But emerging countries lack laws and regulations that appropriately regulate pesticide imports/exports and use. The countries having such mechanisms may still lack strict execution. Additionally, export of chemicals banned in Western countries to developing countries without acceptable warnings and insurances would cause people to become downgraded.

Indeed, developed nations have, in the past, intentionally or otherwise, dumped highly toxic and deceased chemicals into less developed countries as aid. For instance, more than 74 metric tons of highly toxic and obstinate chemical pesticides were donated by multinational companies to India, essentially becoming an ecological time bomb that could go off in the near future. The ingredients of this ecological time bomb include DDT, dieldrin, and chlorinated organo-mercury compounds. A global investigation of DDT levels in human tissues exposed higher levels in Africa, Asia, and Latin America than in Europe and the United States. The use of these compounds has been either excluded or limited in many developed countries; however, still many industries from these countries market these products to the developing world. For example, from 1997 to 2000, the US pesticide companies disseminated over 30,500 metric tons of pesticides banned from use in the United States. Frey has examined the problem of the flow of pesticides from developed countries to less developed countries in terms of improved human and environmental health risks, and social and economic costs, and argued that political-economic forces characterized the increased flow to the less developed countries. Furthermore, while there is easy access to information about these

toxic chemicals in the developed world, very few farmers in developing countries are well informed or made aware of the risks. It is also a fact that farmers in developing countries adopt considerably fewer safety insurances while using pesticides. In spite of this, there are numerous companies advertising chemical pesticides through the media in developing countries, but very few promoting safety precautions while handling and applying pesticides.

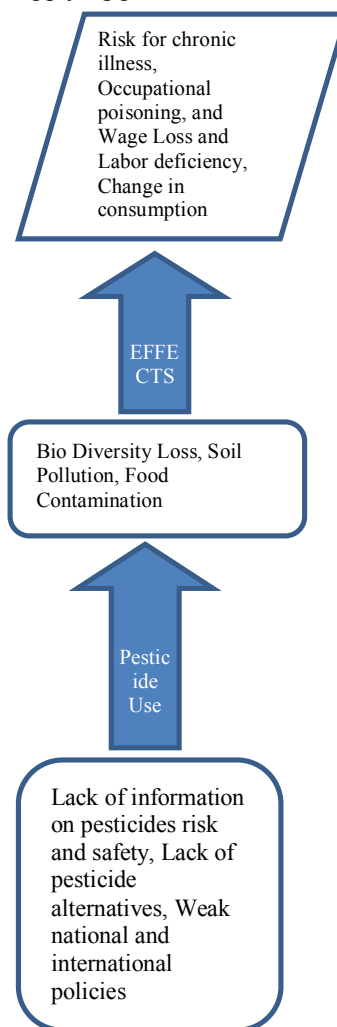


Fig 1: Effect of Pesticide Consumption

Indeed, the intelligent communities, including research scholars and scientists, have not yet accomplished adequate accuracy in estimating the potential health and environment damage and consequently in estimating its impacts. Scholars who tried to evaluate the pollution costs of pesticide use have also undervalued the effects because of incomplete accounting of the range of negative externalities. For instance, Devi designed the costs of pesticide pollution in India to be US \$ 37 per person per year. Further, studies in Africa have also generated a

similar range of costs. This cost appears very small compared to the increase in farm production, thus when a farmer is faced with a choice between the pollution costs and rises in farm production, they underestimate pesticide's effects and continues to use pesticides without proper safety provisions. The costs of pesticide pollution for the society is likely to be significantly higher than the costs assessed in many studies because most of them consider only a fraction of the full effects of pesticide use. For example, the World Development Report 2008 of the World Bank, which is regarded as a key document of global action for development, recommends a new vision to reform agricultural production at household level through aids to inputs like chemical pesticides. Such a policy move is likely to increase use of pesticides in the future, causing yet more hostile concerns.

2.3 Micro-level Pathways for Relegation:

Now let us consider mechanisms that cause farmers to be disregarded by pesticide use. These are site-specific, therefore, related even within a country, local environment, or household. Ruin of the local environment may lead to marginalization. For micro-level mechanisms of marginalization, three pathways are discussed, namely: decay in health and yield, direct and indirect economic loss, and in extreme cases, changes in household social behaviour.

2.4 Decline in Health and Productivity:

It is predictable that agricultural work related to insecticide use carries significant risk for injury and illness, and it is only recently that these matters have been addressed. As conversed earlier, pesticide use is associated to acute and chronic illness, suicide attempts, professional destroying, and lead to significant death and disease. Mortality is a complete health tragedy, but in case of illness, a farmer is unable to work with full energy; and, either takes rests at frequent intervals or takes bed rest with total loss of labor. In addition, sickness may decrease administrative or analytical skills of farmers affecting the decisions-making process. Thus, labor output loss due to pesticide-related illness, loss of time and labor of family member(s) nursing the fatality, and leisure time loss are some of the micro-level health-related ways of relegation.

2.5 Financial Loss:

The World Bank acknowledges that out-of-pocket payments for health services specifically hospital care can make a difference between a household being poor or not. The medical expenses, transportation costs, value of time on traveling, and dietetic expenses due to illness are the payments when a person is offended with pesticide poisoning. Similarly, cost of defensive clothing, gloves, mouth and nose protection, etc., add prevention costs against pesticide risks. Additionally, crop losses/damage due to failure to look after the farm, costs related with hiring labor due to inability to work

on the farm, and any income unavoidable due to illness further increases the total losses and marginalizes the weak groups.

3. TACTICS TO DIMINISH PESTICIDE USE IN AGRICULTURE

Illiteracy of pesticide induced developmental problems and the public evils have triggered serious damage to human society, therefore, during 1960s, at its very early stages, a new concept of pest control called Integrated Pest Management emerged. This was actually recognition of the public evils of pesticide use. The initial objective of Pest Management changed to the concept of pest control to that of crop and eco-health. Nowadays, Pest Management is alleged to enhance capability of local people for decision making in response to context-dependent pest problems, and also to their capability for adaptive management. Only a few scholars have deliberated the environmental and ecological aspects in evaluating the Pest Management benefits. Cuyno et al. measured Pest Management induced reduction not only to pesticide usage and yield, but also to risks to humans, birds, aquatic species, beneficial insects, and other animals. Recently, van den Berg and Jiggins broadly characterized the benefits of Pest Management into two types: instant and progressive. They argue that the changes of the Pest Management concept, from pest control to crop health and the recognition of its capabilities for managing agro-ecosystems, should now look beyond the immediate effects to broader developmental impacts such as revolution, community agenda setting, or policy changes. Yet, the adoption and coverage is not sufficient to meet the universal objective. Pest Management is knowledge exhaustive and ideally planned for literate farmers of the developing world. This could be a reason why some researchers have suggested reviewing the Pest Management curriculum and implementation strategies.

Pest Management programs such as FFS in developing countries are often donor-driven, which might not last for a long time. At first, the trained individuals are socially varied and physically scattered so they could not often disseminate the practices learnt in FFS; second, farmers face peer pressure for pesticide use on the farm as the neighbors always apply it to minimize crop failure risks; third, "top-down" approach has been used for picking entities for the IPM programs. Therefore, a "bottom-up" approach-the community Pest Management program-is suggested for introduction of Pest Management in low-income countries. Community Pest Management is a approach for viable agriculture development where farmers act on their own edge and analysis, identify and resolve applicable pest and crop-related problems, conduct their own local Pest Management research and education, establish or adapt local organizations that augment the

influence of farmers in local decision making, employ problem solving and decision-making processes, create opportunities for all farmers in their societies to develop themselves, and promote a justifiable agricultural system.

Although the methodology for impact assessment of the FFS is still under development, benefits to participants from instantaneous and developmental impacts of IPM training are likely to be higher than the costs of involvement. For other countries, studies such as Kishi et al., van der Hoek et al., Konradsen et al. have suggested either a shift from highly toxic pesticides to less toxic or to control the disposal of highly toxic pesticides. But in Nepal, farmers have been using relatively less toxic pesticides frequently without defensive measures. So, the adoption of community Pest Management as an alternative to chemical control, along with refining the population to make them aware of the safe handling of pesticides and safety gear and its impacts to health and environment, are the possible options to reduce pesticide use. Current national strategy of IPM-FFS extension approach is to curtail chemical pesticide use by altering cultivation practices (intercropping, rotation, fertilization, etc.); using natural control agents, selective breeding, etc. But for its long term sustainability, we should also look at the institutionalizing FFS groups, exploring continuous economic sources, involving crews of experts in training/evaluation, launching public-private partnership for extension and research, and searching markets for nontoxic agricultural products.

4. CONCLUSION

The supremacy of simple economic analysis for estimating benefits of pesticide use seems to have had improved public troubles. If these public evils are not recognized and accounted for through a holistic systems view in the analysis of economic returns, susceptible communities or societies may be constantly marginalized. The paper mentions significant importance to substitute's ways of controlling pests, for instance Pest Management, along with education and training events. In a situation where the entire earth has become one via globalization and trade liberalization, it would be very useful to get farmers accustomed with ecological management of the local agro-ecosystems with a major focus on pesticide-induced unplanned developmental problems. And it also allow farmers to be up-to-date of the changes in market demands, opportunities, and threats arising from worldwide and national rules, principles, policies, treaties, etc.

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Advanced esophageal carcinoma without obvious superficial mucosal alteration

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Abstract: Objective: To explore the diagnosis, etiology, clinical feature and treatment of advanced esophageal carcinoma with no obvious superficial mucosal alteration. Method: Between December 2004 to December 2009, we treated eight patients who suffered advanced esophageal cancer but were not found obvious superficial mucosal alteration by fiber-esophagoscopy. The bulging mucosa was smooth and biopsy examination showed chronic mucosal inflammatory. Without definite diagnosis, the patients (five men and three women) underwent esophagectomy in our department. Clinic data and tumor characteristics of them were analyzed retrospectively. Result: Two patients died after the operation, while the other six recovered uneventfully. Postoperative histological examination confirmed six squamous carcinoma (SCC) and two adenocarcinoma (ADC) and the tumor originated in the lamina propria mucosa, muscularis mucosae or submucosa, while mucous epithelium found no tumor cells. Until now, one patient is still alive more than five years, one survived about five years, three survived less than five years, and another one had been dead within two years. Conclusion: As the symptom of this kind tumor is mild and the diagnosis is difficult before surgery, the surgeons should be patient when they encounter these patients. Long time follow up is very important.

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Keywords: Esophageal carcinoma; submucosal carcinoma; surgery

1. Introduction

Esophageal carcinoma mainly originates from the mucosal epithelium. The mucosal alteration is always obvious under the fiber-esophagoscopy or upper gastrointestinal barium meal, especially in advanced esophageal carcinoma. But in clinic, there are a small number of patients having no obvious superficial mucosal alteration that can lead to misdiagnosis or missed diagnosis. The cases are rarely reported in medical literature. In this text, we will analyze our patients' data and explore this issue.

2. Material and Methods

From 2004 to 2009, we treated a total of 936 cases with advanced esophageal carcinoma and underwent esophagectomy with lymph node dissection on them. Eight patients (5 men and 3 women) were found no significant changes on the surface of the esophageal mucosa, accounting for 0.85%. The mean age was 59.7 years (range from 49 to 72 years). None had received preoperative treatment, including irradiation and chemotherapy. One case had no subjective symptom, while four suffered progressive dysphagia sensation for 7-10 months (mean 8.5 months). Other three patients complained retrosternal pain in chest after eating for 1-7 months (mean 6 months).

All these eight patients underwent fiber-esophagoscopy performed by an experienced

endoscopist. He found unilateral esophageal wall bulging in five cases with lumen stenosis. Three cases showed esophageal wall circular stenosis, accompanied with mucous membrane stiffness and poor expanding ability. However, all eight cases' mucosa were smooth and in normal color. The endoscopist couldn't find pallor, congestion or ulcer mass under the high solution endoscope. Their biopsy examination indicated chronic mucosal inflammatory. To make the clearly diagnosis, another fiber-esophagoscopy biopsy was taken in 5 patients, in which we still couldn't find mucosal tumor tissue. Other three patients took the endoscopic ultrasonography (EUS), which showed the lesions were hypo-echoic changing, seemingly originating from the submucosa or muscularis.

Upper gastrointestinal barium meal showed five cases' esophageal lumen external pressed changing with the esophageal mucosa surface smooth. We also performed preoperative computed tomography scan which indicated five cases could see that tumors were related to the esophagus and the mass were close to the esophagus lumen or the wall, while the other three showed wall thickening. Because of the indeterminate performances, we considered five patients of esophageal carcinomas, while the other three were misdiagnosed as esophageal leiomyoma.

One case's tumor was located at the upper thoracic esophagus, three were at the middle thoracic esophagus and others were at the lower thoracic esophagus. We took some tissue of the mass and sent the intraoperative frozen section which indicated tumors, so all eight patients underwent surgical resection by left transthoracic approach, including subtotal esophagectomy with stapled anastomosis after aortic arch in four cases and esophagogastric resection, staple anastomosis under the aortic arch in three cases. One case underwent hand-sewn anastomosis at the left neck. The surgery procedure was successful.

3. Results

There were two in-hospital deaths after the operation. One patient had a sequence of pneumonia, respiratory failure while another patient died as a result of anastomotic leak that led to mediastinitis during the hospital stay. The other six recovered uneventfully. All the resected specimens with intact mucous membrane were fixed in formalin, and cut into 5mm sections along the mid portion of the tumor. Then they were stained with hematoxylin and eosin and examined by light microscopy to find the relationship between the tumor and the epithelia of mucous membrane. All lymph nodes were examined at the long axis. Histological examination confirmed six of squamous carcinomas (SCC) and two of adenocarcinoma (ADC). Five patients had para-esophageal lymph nodes metastasis and one case had perigastric lymph nodes metastasis with no cervical lymph node metastasis. According to the TNM (UICC 2009) classification, the tumors were categorized as the followings: one patient was at Stage I b (T2 N0 M0), 3 at the Stage II b (T2 N1 M0), 2 patients at Stage II a (T3N0 M0) and 2 at the Stage IIIa (T3N1M0). The tumor originated from lamina propria mucosa, mucosae muscularis or submucosa, while the epithelium of superficial mucous found no obvious lesion or tumor cell.

One month later, all of them took four cycle neoadjuvant chemotherapy: Oxaliplatin (130mg/m²) and Tegafur (500mg/m²), which repeated every 21 days. All patients were followed up regularly at our hospital with routine physical and laboratory examination after discharge. Until now, one case still be alive more than 5 year, one patients survived about five years, three cases survived less than 5 years, and one patients had been dead within 2 years.

4. Discussions

As we all know, esophageal carcinoma is a major cause of cancer-related deaths around the world (Parkin and Bray, 2005), the depth of the tumor penetration is a crucial factor determining the

prognosis of patients with carcinoma (Tachibana et al, 1999, Ando et al, 2000, Ando et al, 1999). The majority of the carcinoma mucous membrane has obvious pathological changes, especially in advanced esophageal cancer. However, the tumor originated and grew from the lamina propria mucosa, mucosae muscularis and submucosa, mucous membrane has no obvious alteration in these eight cases. The reason of these particular cases is associated with tumor growth pattern (Ohno et al, 1991). Tumor originates in the lamina propria mucosa or submucosa and grows in a down growth pattern locating on one side of the wall. They don't grow into the lumen, but in contrast to the submucosa and muscularis. Cancer cells grow and reproduce in the submucosa and form a submucosa mass which oppresses the esophageal membrane wall. They further invade the esophageal muscle. At last, it can be seen the distant metastasis of lymph or invasion of vessels. As a result of this growth, the membrane surface is often smooth without pale color, so we can't find any significant changing in esophageal mucous membrane surface. They were called late submucosal esophageal cancer which is extremely uncommon type.

Esophageal peristalsis is less affected by early lesion and the contra-lateral esophageal wall can still expand without causing serious difficulty in swallowing. So the dysphagia sensation of this type is slight, the average medical history is 10 months or more. The mucous membrane can be motivated which is similar to the esophageal leiomyoma.

The diagnosis rate of upper gastrointestinal barium meal is more than 95% in terminal cancer patients. X-ray characteristics can be the followings: The tumor is hemispherical with the ramp-like filling defect because part of the tumor is located in one side wall with smooth surface and clear boundary, this can easily be mistaken as leiomyoma. As the cancer cells infiltrate surrounding tissue in varying degrees, the dynamic observation of X-ray barium meal examination shows lack of obvious "acute angle" sign with local stiffness and peristalsis limited. If there is no obvious mucosa bulging to the esophagus lumen, x-ray diagnosis is more difficult. CT scan can determine the relationship between the esophageal wall and its surrounding tissue, but the CT scan examination can't be used in the qualitative diagnosis of the tumor.

Long-term prognosis of early esophageal cancer surgery is fine, but these patients' 5-year survival rate after surgery is not high, probably due to the delay in diagnosis and tumor biological behavior. Ohno have also reported that the esophageal submucosal cancer has poor prognosis.

Esophageal mucosa with no significant changing in esophageal cancer is easy to

misdiagnosis and missed diagnosis. No pathology in this group has been preoperative taken. Through intraoperative frozen sections or postoperative paraffin sections, we can obtain a pathological diagnosis. Vigilance is the key to prevent misdiagnosis and missed diagnosis, especially the patients who are more than 40 years old from esophageal cancer-prone areas, as well as the patients whose esophageal barium meal and CT scan are positive. They shouldn't easily be let go. Gastroscopy or fiber -esophagoscopy should be repeated more than one time if the result is not satisfied. When taking a pathological specimen, the biopsy forceps should take deeper than ordinary, trying to get to the esophageal submucosa. EUS contributes to the identification of esophageal leiomyoma or submucosal cancer (May et al. 2004). Patients with positive findings of esophageal barium meal or CT examinations should be persuaded to take surgery. To some patients who refuse surgery, we should establish a strict follow-up study. In other 10 patients (this 8 cases not included), the surface of the esophageal mucosa was normal at first, but after months of observation, the esophageal mucosa grew into the typical esophageal cancer.

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Semi-Settled Pastoralists' Knowledge And Utilisation Of Hiv/Aids Prevention Techniques

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Abstract: This paper examined Semi- Settled Pastoralists' knowledge and Utilisation of HIV/AIDS Prevention Techniques in South West Nigeria. The derived savannah areas of Oyo and Ogun states of Nigeria were selected for the study due to high concentration of semi-settled pastoralists who are distributed within 5 and 10 Local Governments Areas (LGAs) in Ogun and Oyo States respectively. Fifty percent of the LGAs were randomly selected from each state. Ninety-four semi-settled pastoralists' households were randomly selected from 1,174 in Ogun State, while 236 households were selected from 2,942 in Oyo State. An adult respondent was selected in each of the households to give a total of 330 respondents for the study. Structured interview schedule was used to collect data relating personal characteristics, sources of HIV information and utilisation of HIV/AIDS prevention techniques. The result shows that the mean age of the respondents in Ogun State, Oyo State and across the states were 36.3, 38.7 and 38.0 respectively. Across the states, about 83.0% of the semi-settled pastoralists were below 51 years of age. In terms of knowledge on HIV/AIDS prevention techniques were presented. Semi-settled pastoralists had high knowledge on 15 items. These include, sharing syringes / needles ($\bar{x} = 0.9$), sharing of spouse ($\bar{x} = 0.9$), sharing tattooing instrument ($\bar{x} = 0.9$) and screening blood before transfusion ($\bar{x} = 0.8$). On the other hand, semi-settled pastoralists had low knowledge about items such as HIV can be transmitted through air ($\bar{x} = 0.1$), HIV transmission through food ($\bar{x} = 0.1$), pre-marital sex ($\bar{x} = 0.2$) and use of condoms ($\bar{x} = 0.4$) among others. Semi-settled pastoralists had high utilisation in 10 HIV/AIDS prevention techniques across the states. These include, screening of blood before transfusion ($\bar{x}=0.8$); usage of new needles for tattooing ($\bar{x}=0.7$); usage of new syringes and needles for injection ($\bar{x}=0.7$) and use of personal blade / razor for cutting my nails ($\bar{x} =0.7$).

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Keywords: Pastoralists Information Sources, HIV/AIDS Prevention Techniques, Nigeria

Introduction

HIV/AIDS is one of the greatest natural challenges that has given humans concern in recent times. It started in the mid-1980s in Africa and it has evolved from a medical curiosity to a worldwide human tragedy and international emergency (UNESCO 2007). Idoko (2004) calls it a disease starting as a single infection at the point of contact and then progressing to a wasting disease known as AIDS. According to UNAIDS/WHO (2007), 38 million people were living with HIV in 2004 and 20 million had died in the sub-Saharan Africa. It is a developmental disaster and a security crisis with social impact more devastating than any war. It has reduced life expectancy by 15 years in sub-Saharan Africa and created more than 14 million orphans. Its impact is wide reaching and even in those parts of the world where the epidemic has been relatively slow to evolve, there are worrying signs of its gathering strength. It has spread nearly everywhere beyond the first so-called high-risk groups, today principally affecting vulnerable populations: the poor, the marginalized, young women and children. It both thrives on and fuels inequalities. The worldwide epidemic of HIV/AIDS has dramatically affected

livelihoods in rural areas of the developing world, especially in Africa. In response to this, there has from the 1980 been research on how AIDS affect agricultural systems and livelihood in Africa, by mechanisms such as sale of capital assets to meet medical and funeral costs and removal of adult labour (Gillespie 1989, Barnett and Balarkie 1992, Barnett and Whiteside 2003). More recently, the two-way nature of linkages between HIV/AIDS and rural livelihood has received more attention (Loevinsolin and Gillespie, 2003).

However, there has been very little research on linkages between HIV/AIDS and livestock-related livelihoods and especially the pastoralists (White and Robanson, 2000) whose livelihood is shaped by their dependence on livestock. This is despite the fact that pastoralists represent a significant proportion of the rural population in many countries where the effects of HIV/AIDS have long been felt, such as Kenya and Uganda. Salma (2010) pointed out that in Nigeria, living in the rural areas has left the rural dwellers inadequately informed about HIV/AIDS and how the virus is contracted. This can be attributed to the fact that pastoral communities have limited access to information and where this is available; it may not be

properly packaged and delivered. Anecdotal evidences suggest that pastoralists are highly susceptible to HIV/AIDS due to the factors such as casual sexual networking, frequent conflict with other pastoralists and crop farmers along the pastoral corridor (that usually involve shedding of blood), tattooing practices, using of knives for body scarification for medicinal purposes and being a socially marginalised (isolated) group that are not usually the reached in many health intervention programmes. The migratory pattern of semi-settled pastoralists was identified one of the major factors that make semi-settled pastoralists susceptible to HIV risk (Abdulrazaq and Jibril, 2008). Prevention will help reduce the loss of lives and adverse social and economic effects on the nation. The general objective of this study is to ascertain the knowledge and utilisation of HIV/AIDS prevention techniques among semi-settled pastoralists in south west Nigeria.

Materials and Methods

The study area is south west Nigeria The western zone lies between latitude 5° N and 9° N with an area of 114, 271 square kilometres. This comprises of Oyo, Ogun, Ondo, Osun, Ekiti. This area is rich in green vegetation populated. It has rainforest, swampy and it is also a savanna region. It has a large population density that supports market opportunities. This area produces foodstuffs, and cash crops for local consumption and export to other parts of the country as well as abroad. The cash and staple crops in the area include cocoa, kolanut, cassava, maize, palm tree among others, while the area 'import' cattle from the north. There are six states in the southwest, they are; Ekiti, Lagos, Ogun, Ondo, Osun and Oyo. These states share homogenous culture and tradition. The inhabitants of this region are direct descendants of Oduduwa-the progenitor of Yoruba race. It has heterogeneous population of Yoruba, Tiv, Agatu, Ibo, Hausa and Fulani (Igbinsosa, 1994). The main occupation of majority of the indigenes in the area are farming and trading. The abundance of savanna region especially in Oyo and Ogun states of southwest favours the rearing of ruminant animals in the area. Pastoralism is practiced majorly by the Fulanis and Hausas. The population of this region is about sixty million (Nigeria Population Census Reports 2006).

The semi-settled pastoralists in the south west Nigeria are the population of the study

The study was carried out in South west Nigeria. Oyo and Ogun states were purposively

selected for the study due to high concentration of semi-settled pastoralists in the two states in south west Nigeria (Ogunsumi, and Ogbosuka, 2009 and Francis, 2000). In Oyo state, the concentration of semi-settled pastoralists is highest in 10 local government areas (LGAS) (Saki West, Saki East, Atisbo, Kajola, Oorelope, Olorunsogo, Itesiwaju, Iwajowa, Irepo and Iseyin); while in Ogun state, the concentration of semi-settled pastoralists is highest in 5 LGAS (Odeda, Yewa North, Yewa South, Imeko Afon and Abeokuta North).

Fifty percent of the LGAS where the semi-settled pastoralists' concentration is highest was selected using simple random sampling method. House listing revealed a total of 4116 semi-settled pastoralists' households in the study area. Eight percent of the households were randomly selected to give a total sample size of 330 respondents. An interview schedule for semi-settled pastoralists was developed, validated and employed for data collection. The interview was organised in sections to reflect specific objectives namely; personal characteristics, semi-pastoralists' knowledge of HIV/AIDS prevention techniques and utilisation of HIV/AIDS prevention techniques. The respondents were asked to state their actual age, sex marital status, educational status religion, social organisation they belong and their level of language understanding. On Knowledge of HIV/AIDS prevention techniques, respondents were asked to respond to appropriate questions using yes and no. The scoring was Yes = 1; No = 0 for positively constructed questions while it was reversed for negatively constructed questions. Respondents were asked to indicate which of the HIV/AIDS prevention techniques they make use. The scoring was Utilised = 1; Not Utilised = 0

Results

Table 1 presents the personal characteristic of respondents; Table 2 shows the distribution of respondents based on knowledge of HIV/AIDS prevention techniques, while the Distribution of respondents based on utilisation of HIV/AIDS Prevention Techniques in Table 3. Table 4 shows the Chi-square analysis of respondents' personal characteristics and utilisation of HIV/AIDS prevention techniques and Table 5 presets the correlation analysis of relationship between semi-settled pastoralists' knowledge and utilisation of HIV/AIDS prevention techniques.

Table 1 Personal characteristic of respondents

Variables description		Ogun n=94	Oyo n=236	Pooled data
Variables	Response options			
Age (Years)				
	≤ 20	3 (3.2)	23 (9.7)	26 (7.9)
	21-30	29 (30.9)	50 (21.2)	79 (23.9)
	31-40	38 (40.4)	73 (30.9)	111 (33.6)
	41-50	16 (17.0)	41 (17.4)	57 (17.3)
	51-60	7 (7.4)	34 (14.4)	41 (12.4)
	≥ 61	1 (1.1)	15 (6.4)	16 (4.9)
	\bar{x}	36.3	38.7	38.0
Sex				
	Male	47 (50)	118 (50)	165 (50)
	Female	47 (50)	118 (50)	165 (50)
Marital status				
	Single	6 (6.4)	21 (8.9)	27 (8.2)
	Married	88 (93.6)	215 (91.1)	303 (91.8)
Religion				
	Islam	94 (100)	236 (100)	330 (100)
Educational status				
	Non formal	74 (78.7)	110 (46.6)	184 (55.8)
	Quranic	19 (20.2)	93 (39.4)	112 (33.9)
	Primary	1 (1.1)	23 (9.7)	24 (7.3)
	Quranic and Primary	0 (00)	1 (4.0)	1 (0.3)
	Secondary	0 (00)	8 (3.4)	8 (2.4)
	NCE and above	0 (00)	1 (4.0)	1 (0.3)
Level of language understanding				
Hausa language	Speak	1 (1.1)	116 (49.2)	117 (35.5)
	Speak and Read	0 (00)	11 (4.7)	11 (3.3)
	Cannot speak	93 (98.9)	109 (46.2)	202 (61.2)
Fulfulde language	Speak	92 (97.9)	205 (86.9)	297 (90)
	Speak and Read	0 (00)	17 (7.2)	17 (5.2)
	Cannot speak	2 (2.1)	14 (5.9)	16 (4.9)
Yoruba language	Speak	93 (98.9)	147 (62.3)	240 (72.7)
	Speak and Read	0 (00)	14 (5.9)	14 (4.2)
	Cannot speak	1 (1.1)	75 (31.8)	76 (23.0)
English language	Speak	1 (1.1)	19 (8.1)	20 (6.1)
	Speak and Read	0 (00)	18 (7.6)	18 (5.4)
	Cannot speak	93 (98.9)	199 (84.3)	292 (88.5)
Membership of social organization				
Miyetti Allah	Not a member	70 (74.5)	137 (58.1)	207 (62.7)
	Ordinary member	20 (21.3)	85 (36.0)	105 (31.8)
	Executive member	4 (4.3)	14 (5.9)	18 (5.5)
Al-Haya	Not a member	85 (90.4)	222 (94.1)	307 (93.0)
	Ordinary member	2 (2.1)	4 (1.7)	6 (1.8)
	Executive member	7 (7.5)	10 (4.2)	17 (5.2)
Boroge	Not a member	85 (90.4)	220 (93.2)	305 (92.4)
	Ordinary member	4 (4.3)	4 (1.7)	8 (2.4)
	Executive member	5 (5.3)	12 (5.1)	17 (5.2)
Fulani Hausa	Not a member	83 (88.3)	215 (91.1)	298 (90.3)
	Ordinary member	6 (6.4)	9 (3.8)	15 (4.5)
	Executive member	5 (5.3)	12 (5.1)	17 (5.2)
Fulani(Kastina Kano)	Not a member	92 (97.9)	218 (92.4)	310 (93.9)
	Ordinary member	1 (1.1)	14 (5.9)	15 (4.6)
	Executive member	1 (1.1)	4 (1.7)	5 (1.5)

Table 2 Distribution of Respondents based on knowledge of HIV/AIDS prevention techniques

ITEMS	Ogun n=94	Oyo n=236	Total n=330	Mean	SD
Sharing of spouse with others.	*100.0	89.4	92.4	0.9	0.265
Pre-marital sex.	14.9	17.4	16.7	0.2	0.373
Mutual faithful monogamous sexual relationship.	83.0	57.6	64.9	0.7	0.478
Avoidance of Sexual promiscuity.	98.9	62.7	73.0	0.7	0.444
Use of condoms.	36.2	39.4	38.9	0.4	0.487
Sharing barbing materials.	92.6	64.8	72.7	0.7	0.446
Sharing syringes / needles.	97.9	94.1	95.2	0.9	0.215
Sharing tattooing instrument.	98.9	88.1	91.2	0.9	0.284
Screening blood before transfusion.	85.1	80.9	82.1	0.8	0.384
Sharing of toothbrush or chewing stick.	59.6	82.2	75.8	0.8	0.429
Traditional ceremonies and practices such as scarification or circumcision.	68.1	60.6	62.7	0.6	0.484
Traditional forms of birth deliveries and medical practices.	44.7	67.8	61.2	0.6	0.488
Pregnancy by HIV infected women.	95.7	57.6	68.5	0.7	0.465
HIV transmission through food.	2.1	14.4	10.9	0.1	0.312
HIV cannot be transmitted through drinking water.	34.0	33.5	33.6	0.3	0.473
HIV can be transmitted through air.	1.1	11.9	8.8	0.1	0.284
HIV can be prevented by avoiding things that can attract curse.	8.5	30.9	24.6	0.3	0.431
Transplanting of an organ of an infected person is evidence of love towards the AIDS patient.	00	25.0	17.9	0.2	0.384
Reuse of unsterilised ear piercing instruments is a sign of love among siblings.	1.1	33.1	23.9	0.2	0.427
HIV can be transmitted from infected woman to infant through breastfeeding.	94.7	67.8	74.5	0.8	0.431
Application of microbicides before sex can prevent sexually transmitted diseases.	77.7	36.9	48.5	0.5	0.501
HIV can be contracted through hand shake with infected person.	97.9	71.6	79.1	0.8	0.407
Insect bite and especially mosquito can transmit HIV.	97.9	65.3	74.6	0.8	0.436
HIV can be spread through contact with sweat of an infected person.	75.5	53.4	59.7	0.6	0.491
Sharing plate/food with infected person can predispose one to HIV infection.	92.6	58.9	68.5	0.7	0.465

Table 3 Distribution of respondents based on utilisation of HIV/AIDS Prevention Techniques

HIV/AIDS Prevention Techniques			Percentage	Mean
	Ogun n=94	Oyo n=236	Total n=330	
Avoid sharing of spouse with others	*96.8	44.2	71.8	0.7
Avoiding pre-marital sexes	93.6	45.2	71.8	0.7
Usage of condom during sex with multiple partners	28.7	48.3	42.7	0.4
Usage of new syringes and needles for injection.	98.9	64.4	74.2	0.7
Usage of new razor blade during barbering.	61.7	74.2	70.6	0.7
Medical check-up at hospital for HIV status	92.6	64.0	72.1	0.7
Usage of new needles for tattooing.	89.4	67.4	73.6	0.7
Screening of blood before transfusion.	89.4	74.2	78.5	0.8
Use of personal blade / razor for cutting my nails.	96.8	63.6	73.0	0.7
Avoiding the use of commercial nail cutters common tools for cutting nails.	87.2	65.3	71.5	0.7
Avoid consulting traditional medical practitioners.	80.9	51.3	59.7	0.6

*Percentage

Table 4 Chi-square analysis of respondents' personal characteristics and utilisation of HIV/AIDS prevention techniques

Variables	Df	χ^2	p value	Decision
Age	5	14.59	0.01	S
Level of education	5	30.11	0.00	S
Sex	1	1.22	0.98	NS
Marital status	1	0.56	0.45	NS
Level of understanding Hausa language	2	78.79	0.00	S
Level of understanding Fulfulde language	2	9.68	0.00	S
Level of understanding English language	2	14.20	0.00	S
Level of understanding Yoruba language	2	45.53	0.00	S

Table 5 Correlation analysis of relationship between semi-settled pastoralists' knowledge and utilisation of HIV/AIDS prevention techniques

Variables	r-value	p value	Decision
Knowledge of HIV/AIDS prevention techniques	0.263	0.000	S

Discussion

The results from the study covered the personal characteristics in Table 1, distribution of Respondents based on knowledge of HIV/AIDS prevention techniques in Table 2,, Chi-square analysis of respondents' personal characteristics and utilisation of HIV/AIDS prevention techniques in Table 3, distribution of respondents based on utilisation of HIV/AIDS Prevention Techniques in Table 5. Table 6 presents respondents' levels of utilisation of HIV/AIDS prevention techniques and correlation analysis of relationship between semi-settled pastoralists' knowledge and utilisation of HIV/AIDS prevention techniques in Table 7

Age distribution of respondents as indicated on Table 1 shows that the mean age of the respondents in Ogun State, Oyo State and across the states were 36.3, 38.7 and 38.0 respectively. Across the states, about 83.0% of the semi-settled pastoralists were below 51years of age. This implies that majority of the semi-settled pastoralists are in their active reproductive age, wherein the possibility of heterosexual activities is high. The UNAIDS (2003) sentinel survey in Nigeria reported a high record of 3.1% rate of HIV/AIDS infection among the age bracket of 15-49years.

About 6% and 9% of the respondents were single in Ogun and Oyo States respectively, however less than 10.0% of the respondents across the states were single. Ismail (2003) reported that pastoralists in general get married at around the age of 25 while Sodiya, Adedire and Lawal-Adebowale (2009) indicated that male and female pastoralists respectively are married by the age of 30. Dennis, (2007) found that those who get married at a younger

age of about 25 years have less knowledge about HIV/AIDS than unmarried women and are more likely to believe they are at low-risk of becoming infected with HIV. However, High Beam Research (2011) affirmed that a married woman among the pastoralists is expected to display appropriate modesty whenever the subject of marriage arises, for marriage confers on her a special status. Thus early marriage makes them to be less prone to HIV/AIDS infection. One hundred percent of the respondents were Muslim. This confirms the assertion of Frank (2011) that over 90% of the pastoralists were Muslims and that it is, in fact, rather difficult to discover any pastoralists who admits not being Muslim, no matter how lax their practice may be. About 1% and 13% of the respondents in Ogun and Oyo States have a least primary school education This corroborates the findings of Ashimolowo and Otufale (2010) that 82.6% of pastoralists are illiterate in Ogun state while in Oyo state Adekoya and Oladele (1998) found that 100% of the women agropastoralists in Oyo state do not have formal education. About 2.7% of the respondents across the states had at least secondary school education and above. The low educational status could be favourable to the spread of the virus HIV among pastoralists (IRIN, 2011). Oladeji and Oyesola (2000) observed that education plays an important role in communication, as it affects coding and decoding of information.

The Table further reveals that about 95%, 77% and 39% of the respondents across the states could speak Fulfulde, Yoruba and Hausa languages respectively. Fulfulde which is not one of the three major Nigerian languages (Hausa, Yoruba and Igbo)

identified by UNESCO (2003) was the most popular language among the semi-settled pastoralists. However, less than 8.0% of the respondents across the states could speak and read Fulfulde, Yoruba, Hausa or English languages. Table 1 show that Miyetti Allah was the most popular organisation to which 37.3% of the respondents across the states affirmed their membership. The level of membership in social organisation was very low among the respondents. This may be due to the fact that there is no specific form of social organisation associated with pastoralism. The pastoralists are often organised in tribes, with the household (often including the extended family) as a basic unit for organisation of labour and expenses (HighBeam Research, 2011).

In Table 2, 25 knowledge items of HIV/AIDS prevention techniques were presented. Semi-settled pastoralists had high knowledge on 15 items. These include, sharing syringes / needles ($\bar{x} = 0.9$), sharing of spouse ($\bar{x} = 0.9$), sharing tattooing instrument ($\bar{x} = 0.9$) and screening blood before transfusion ($\bar{x} = 0.8$). On the other hand, semi-settled pastoralists had low knowledge about items such as HIV can be transmitted through air ($\bar{x} = 0.1$), HIV transmission through food ($\bar{x} = 0.1$), pre-marital sex ($\bar{x} = 0.2$) and use of condoms ($\bar{x} = 0.4$) among others. The respondents in Ogun State had the knowledge score ranged between 11 and 18, and the mean score was 15.3 while in Oyo State the knowledge score ranged between 7 and 19, and the mean score was 13.5. The respondents in Ogun State (60.6%) had higher knowledge of HIV/AIDS prevention techniques than those in Oyo State (52.5%). Across the States about fifty six percent of the respondents only had high knowledge of HIV/AIDS prevention techniques while the mean score was 14.0. Salma (2010) pointed out that in Nigeria, living in the rural areas has left the rural dwellers inadequately informed about HIV/AIDS and how the virus is contracted.

Table 3 presents distribution of respondents based on utilisation of HIV/AIDS prevention techniques. From 11 techniques on utilisation of HIV/AIDS prevention technique items, semi-settled pastoralists had high utilisation in 10 HIV/AIDS prevention techniques across the states. These include, screening of blood before transfusion ($\bar{x}=0.8$); usage of new needles for tattooing ($\bar{x}=0.7$); usage of new syringes and needles for injection ($\bar{x}=0.7$) and use of personal blade / razor for cutting my nails ($\bar{x} =0.7$). This may be due to the fact that all these HIV/AIDS prevention techniques support personal hygiene which is naturally esteemed high by the semi-settled pastoralists. Meanwhile, Moussa and Konfe/Tiendrebeogo (2008) identified personal hygiene as one of the HIV/AIDS prevention techniques. However, respondents had low utilisation

of condom during sex with multiple partners ($\bar{x}=0.4$). This agrees with Adelere, Olujide and Popoola (2006) that the usage of condom as a means of preventing HIV infection is low in the rural area of southwest Nigeria. Specifically, the respondents in Ogun State had high utilisation in all the HIV/AIDS prevention techniques than those in Oyo State except for usage of new razor blade during barbering (61.7% and 74.2% in Ogun and Oyo States respectively) and age of condom during sex with multiple partners (28.7% and 48.3% in Ogun and Oyo states respectively). The table further shows that majority respondents in Ogun state (87.2%) had higher utilisation HIV/AIDS prevention techniques than those in Oyo state (41.5%). However, across the states 55.5% of the respondents had high utilisation of HIV/AIDS prevention techniques, while 44.5% of the respondents had low utilisation. The mean utilisation score was 9.2, 7.0 and 7.6 in Ogun State, Oyo state and across the states respectively. Table 4 shows that among the personal characteristics of the respondents, ages ($\chi^2=14.59$, $p< 0.05$), level of education ($\chi^2=30.11$, $p<0.05$), understanding of Hausa language ($\chi^2 =78.78$, $p<0.05$), level of understanding of Fulfulde language ($\chi^2 =9.68$, $p< 0.05$), understanding of English language ($\chi^2=14.20$, $p<0.05$) and level of understanding of Yoruba ($\chi^2=45.53$, $p<0.05$) are significantly related to utilisation of HIV/AIDS prevention techniques. This may be due to the fact that Hausa and Fulfulde languages are the most popular languages among the semi-settled pastoralists. Yoruba and English languages may be the popular languages of presenting information on HIV/AIDS prevention techniques in the study area, of which their understanding will determine the acquisition and utilisation of such knowledge. This agrees with Oladeji and Oyesola (2000), who viewed that education, plays a major role in information communication and consequently the acquisition of knowledge and utilisation of prevention techniques. Similarly, UNESCO (2003) is of the opinion that in multilingual country such as Nigeria, language issues have to be considered in any HIV/AIDS prevention programme. However, there was no significant relationship between sex ($\chi^2=1.22$, $p>0.05$) and marital status ($\chi^2=0.56$, $p>0.05$); Differences in sex and marital status may not count if knowledge is not available or acquired. The result in table 5 shows a significant relationship ($r=0.26$, $p=0.000$) between knowledge and utilisation of HIV/AIDS prevention techniques. This could be attributed to the fact that there must be awareness before adoption. This agrees with UNESCO (2003) that ignorance is a major reason why HIV infection is out of control, which

implies that if knowledge increases utilisation may do as much.

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Cultural spaces in urban identity

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Abstract: Looking at valuable tissues, it is noticed that cultural spaces have the most important position in urban identity. City identity is the resultant of all forces for changing the city to a cohesive physical-social arena and to strengthen cultural-social prestige and structural phenomenology of urban identity using the effects of these arenas. What creates the urban identity is the coordination between architectural and urban spaces with the performance and the content of physical-social phenomena in a city. Cultural performance spaces are among the most important of these spaces which have the important and valuable role in the hierarchy of urban identity. This study investigates the importance and clear position of the spaces with the cultural using for strengthening and promoting the urban identity. This research in regard to implementation process is qualitative, descriptive and then analytical. The investigation and the concepts are based on library and documentation methods. The results indicate that cultural spaces can be considered as one of physical-social phenomena of a city. Despite of different problems in the design, cultural spaces should be built in coordination with the framework determined in the principles of urban identity. Hence in creating these spaces, a suitable design of the city identity can be imaged by benefiting from past experiences and new thinking. Whatever systematic principles of urban and architectural design have more effective communication with urban identity structure, the stability of urban identity will be provided.

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Keywords: Urban Identity, cultural Spaces, Architecture, Urban spaces

1. Introduction

Urban competitiveness imposes new agendas on the cities of the future: work is now being done on how to improve the interaction between urban regeneration, economic growth and social renewal in order to achieve more comprehensive development of the city. The greatest challenge is to integrate place-identity, urban sustainability and globalization (Gospodini, 2004; Massey, Jess, 1995). Hence, the importance of mental and immaterial aspects of urban identity is based on commonalities, history, city history and people; and mental and emotional requirements for citizens.

The function of urban cultural spaces and its ability to meet citizenship cultural requirements not only is not considered by attitude on special areas of cultural activities and the type and number of them but also needs attention to the interrelationship of cultural elements and urban space in its totality. Along with changes in physical/social dimensions of urban spaces and their effective resultants, their related cultural elements are also changed. From old times, cultural spaces have been places for the communications and social/cultural interactions.

However, the importance of these spaces was different in various societies and has changed over time but the need for them has always been felt. Cultural function spaces are among public buildings that in the entire world are considered as the model of

urban area and architectural index of that period. City development is coordinated with the development of its cultural spaces. It is important that over time, the function of cultural spaces should be balanced with their own problems which are the dynamics of cultural spaces. Among the issues raised in this context, the following cases can be pointed: no capitation and specified criteria for cultural spaces, no certain criteria for locating cultural spaces and their neighborhood and lack of construction regulations for cultural spaces that all should be considered.

City identity is an inherent and internal state that affects on city body; therefore, it distinguishes the body feature of the cities dependant on a special culture and worldview from other social culture and structure. In fact, body identity is formed in a mutual context. After formation of city body, it causes continuous developments and consequently the dynamic changes in concepts and identity components of a land will become mutual in interactive context (Habib, Naderi and Forouzangohar: 2008).

Cultural spaces in contemporary urban design and construction have important role in organizing and making the urban structure qualitative. Hence, it is necessary to study the characteristics of spaces which promote the urban identity. Urban spaces can provide sustainability development in architecture and urban

construction by promoting social and cultural relations. This study seeks an answer to this question: in fact, what is the role and position of cultural spaces in urban identity structure? and how can indicate it in urban body structure?

2. Research Objectives:

- Recognition of cultural spaces positions in giving identity to the urban structure
- Investigating the effect of cultural spaces in qualitative promotion of urban spaces

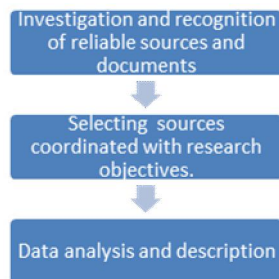
3. Research Questions:

- How can help to sustainable development of urban socio/cultural body by distinguishing the role of cultural spaces in urban identity structure?
- Is there any relationship between cultural uses exist in urban identity structure and cultural development of the city?
- Do cultural spaces play important and distinctive role in the continuity of urban spaces structure and promoting its quality level?

4. Methods

This research in regard to research performing process is qualitative and in regard to goal is descriptive and then analytical, and in regard to the results is developing. Library and digital studies have been used for gathering information from reliable sources and documents (diagram 1). The scope of this research study is investigating the cultural spaces in urban identity. In this study, urban identity is investigated as independent variable in dealing with cultural spaces and the relationship between expression and interpretation is the variables dependant to these two variables.

Diagram 1- Data collection process



5. Cultural spaces and urban identity

5.1 The relationship between the city and cultural context

There is a causal relationship of primitive culture between civic life and cultural context of the city. But

its space reflections which are cultural events center, are more emphasized. But in this area, there has not been a comprehensive and common view part to draw the relationship between cultural context and the city. In superior sectoral area, mainly it is dealt with city identity and natural- historical- cultural structure of the city. (Superior sectoral) is identifiable and forms the civic life in relationship principles between culture and the city and the ratio between both of them in this area. Amid sectoral area recognizes what flows in the city space and creates cultural-behavioral patterns; and sectoral area also points out on what occurs at the locations. There is no more dynamic than cultural spaces in the topic of civic context and civil life. Perhaps, this fact can be shown by concrete examples of streets that lost.

Obviously, the existence of cultural spaces in each city scope and area has outer effects that reflect in amid sectoral spaces, but these amid sectoral elements are only effective when have outer condition effects and the cultural spaces are considered more important because of these same condition effects.

5.2 The identity of the city

One of human social needs is sense of security and belonging. In this regard, the identity and identity elements cause calmness; create confidence and having a desire to continuous effort along with feeling of security in human life (Movasaghi and Airamlou, 2006). Identity is a part of each human personality which makes his/her individual identity and a place to recognize himself / herself. In fact, there is a deeper relationship between individual and the location than uniqueness or the experience of that location (Rezazadeh, 2001). By evoking public memories, the identity in the city creates a fixation in citizenship and leads them to urbanization which is more active than just getting settled. So although, city identity is the effect of citizenship culture but affects on the process of citizenship education and can cause criteria related to partnership and judgment of observers and residents can be codified (Nofel, Kalbadi and Pro Jaffar, 2009). Overview of the concepts related to identity indicates that regard of the identity has both immaterial and spiritual; and material and physical aspects. Different aspects of identity cannot be considered separate and independent from each other, they impact on each other, moreover, each object not only has an identity but also this identity connects to the traits result from that object action and introduces spiritual attributes which has manifested in its appearance and body (Naghizadeh, 2006). What displays in public mind is belonging or not belonging to collective and sustainable identity. In this view, a work with identity is a work in the line of collective identity such as a

historical monument in a historical tissue; and non-identity work is a work that its identity is in conflict with collective identity, like a modern building in a historical tissue. An architectural work can reveal a collective identity (religious, land, race, ...) or simply to express the characteristic and identity of its manufacturer and designer independent of collective norms (Hojjat, 2005).

Identity as an objective-subjective concept is not only a complex topic but also the most important factor to reach urban sustainability (Tavakoli and Zarabadi, 2009).

Since architecture is related to environmental characteristics of human, it has had an important role in maintaining and promoting identity and considered as a symbol of differences and local priorities from the past. Thus, one of the main axes of making local identity coherent is the regard of architectural heritage and urban design of each area; and its occurrence in the artificial environment (Mir Moghtadaie, 2004). Urban space as a physical structure is for social interactions which are accessible to urban community members. The factors for making urban identity should be identified based on constituents components of that space character, constituents components of a city character are: natural, artificial and human components (Behzadfar, 2007).

Identity means distinguishing from alien and similarity to own. The identity of a dynamic city affected by time and while maintaining itself, remains the same. The sense of identity and fixation to the city is always along with sense of unity and

awareness of the presence of plural components. So, the semantic field in urban body <similarity/differences> gives the definition of identity. Identity is an oriented and a multi-value concept. In other words, when the body of the city has valuable cultural identity, implicitly refers to the desirability of identity. The concept of identity in connection with the city and urban construction is an issue which several scholars have always offered theories in relation to it. Due to the nature of the subject, obviously those who have specially considered social areas and environmental psychology have more shares. The concept of identity in connection with city bed and urban construction is a topic which several scholars have always offered theories in relation to it. The city identity will be meaningful when has been objectively manifested in the physic of the city and in fact the outer body and physic of the city is the symbol of urban identity to the special.

Urban identity is a functional and systematic structure in the city and a discipline in architecture of a city with identity. An identity which is a growth criteria for the city, in other words, when a city or community is developed, a part of its identity traits are changed during the development; and a new organization will be obtained. Urban identity should be discussed in this structure as a criteria for development and a factor to promote environmental quality for providing participation and security fields for individual (conceptual model 1).

Conceptual model 1- Macro abstract model in regard to authentication (Komeili, 2008)

Understanding the identity process (the relationship between human and the body)	Human as identifiers	The body as a subject to identify
Focus, sense, belonging, memory	Language, race, literacy, customs, memory	Natural elements, artificial elements

5.3 Cultural spaces

The space will have identity when from one side to be considered as an independent and objective thing and on the other side as an objective thing for acting and treating in it; and finally the objectivity resulted from its conception can be adapted with our mentalities (Behzadfar, 2007). The most effective factors on sense of place are considered in two groups of meanings and activities. There are identity and beauty in meanings group and social interactions, sense of society and satisfaction in activities level.

Moreover, the quality of relationship and previous experiences are also effective in sense of place. Other factors such as selection quality, the relation with place and personal/social characteristics of users are

also the factors influencing on sense of place (Falihat, 2006, page 7).

Undoubtedly, culture and cultural spaces should be considered as the most important and richest source of identity, in this regard people achieve identity by relying on components and several cultural elements, in other words cultural background also makes differences and coherence in the space (Behzadfar, 2007). Unlike traditional look at development of cultural spaces which is mainly summarized in physical aspect of urban construction, today urban planners' view in development of cultural spaces besides attempting to necessary constructions and continuing construction of cultural collections is based on new definition. This definition emphasizes on the importance of mental and immaterial aspects

of culture element including: commonalities, background, history of the city, people of the city, emotional and mental requirements of citizenships, the role of metropolitan management in constructing culture or development of necessary facilities and preparation in developing public culture. More attention to the immaterial element of urban construction like urban aesthetic and answering to general needs of people such as calmness, sense of security and social respect and individual rights of citizens; and more specific needs like culture and art are some characteristic of this viewpoint. Material and spiritual investment for long-term cultural efficiency and more positive and deeper influence on citizens mentality for further flourishing of the potential forces and macro level of creativity in different generations of society is also a definition of development in cultural spaces. Other important part of development in cultural spaces is attention to cultural roots in all fields including in the scope of urban structures.

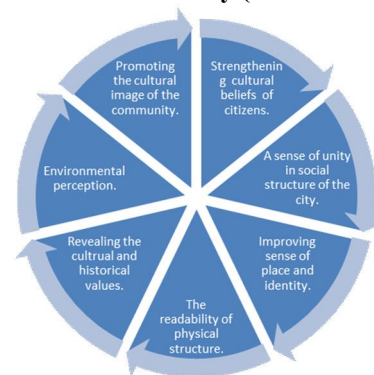
Cultural and physical identity means the descriptions and features that differentiate the body of city identity from general body and reveal this distinction with the issues related to general structure of the city (conceptual model 2).

From social standpoint, cultural spaces are suitable places for the formation of social institutions, promotion of cultural values, development and strengthening of social relations; and safeguarding of human values and national and local identities. The form of cultural spaces in Islamic cities is defined based on meaning and the body of the city gains its identity from this content which influenced by theoretical foundations of Islamic architectural art in which the ratio of format and content like the ratio of spirit and body are also detected in the foundations of worldview. In social standpoint, cultural spaces in the cities are suitable places for the formation of social institutions, promotion of cultural values, development and strengthening of social relations; and safeguarding of human values and national and local identities.

Cultural function of urban space and the ability to respond to cultural needs of citizens cannot be studied just with attitude on special spaces of cultural activities and their type and numbers but requires attention to the interactions of cultural elements and urban spaces in its generality. The related cultural elements are changed along with transformation in social and physical dimensions of urban space and its effective vectors (Rahnamaie and Abbaszadeh, 2011). Cultural spaces can be called as signs which identify different parts of the city that observer cannot find his/her way into it (Rapoport, 1990).

Urban spaces are not only the arena of expression and occurring community culture but also provide the beds for production, cultural consumption and cultural signs exchange; and are also the performer of cultural functions besides economic exchanges. In aesthetic, social, economic and symbolic aspects, cultural functions have an important and lasting impact on the form and function of the cities (Evans, 2001).

Conceptual model 2: Effective dimensions on cultural spaces in urban identity (source: authors)



5.4 Factors for giving urban identity:

The identity of the city should be recognized on the basis of constituents components of that space character; among the components forming the character of a city are: natural, artificial and human components which each of them has its special characters and variables.

Among the variables of these components, the following cases can be pointed:

- Natural components: mountain, river, hill, plain .
- Artificial components: single buildings, road, neighbourhood, square, urban blocks.
- Human components: culture, language, religion, custom, literacy (Behzadfar, 2007).

5.5 Physical-space identity

Physical tissue and place- space structure of the cities form one of the most important dimension of identity in the cities, because the formation of urban physical tissue affected by ideas, beliefs, activities and cultural level of the society. Thus, the recognition of this part of the cities can result in more recognition of other social, economic and cultural dimensions. Actually, physical tissue provides visual recognition of urban identity so has more importance among other urban dimensions.

The most important dimensions are considered in physical identity, briefly are: formation of the city (residential history and the emergence of the city and evolution process over time), physical features and

structure of the city (organization system map, size, density and spatial distribution of urban phenomena), archeological and old places (tombs, fire-temples, the shrines, schools, bridges, cemeteries, buildings, monuments and etc.), access traits (urban and suburban communication network), performance characteristics of the elements and constituent component of physical tissue of the city (recognition of old neighborhoods, tourism axes, open and public areas of the city), demonstration of city architecture and construction (urban facades, construction methods, architectural style, scale and ...), mobility characteristics of the city (the effect of time factor in visual aspects of the city, sound and smell) (Nofel, Kalbadi and Pro Jaffar, 2009).

5.6 The relationship between identity and environment

Environment consists of a set of behavior setting which placed inside each other and have common interfaces. The main elements of these behavioral settings are behavior index pattern and physical environment. After referring to "quality without a name" that cause buildings and cities to be survived, Alexander said that for defining this quality in buildings and cities, the work should be started with understanding these subjects that identity of each space results from continuous frequency of special patterns of the events in that place (Alexander, 2006). Rapoport considers the environment as the result of meaningful communication. In his view the environment can be seen as a series of communication between objects and objects, objects and people, and people and people. They have pattern and structure (Rapoport, 2005).

What blazons a work in public view with or without identity is belonging or not belonging of work to collective and sustainable identity. In this viewpoint, with identity work is a work which its identity is in the line of collective identity, like a historical monument in a historical tissue; and without identity work is a work which its identity is in conflict with collective identity like a modern monument in a historical tissue. An architectural work can be the result of a collective identity (religious, land, racial) or only independent from collective norms expresses character and identity of its own planner and manufacturer (Hojjat, 2005).

Since traditional architecture is the manifestation of sustainability principles which architects and so architecture are formed through it, is known with identity. The principles such as unity, wisdom, honesty, contentment, architecture for dynamic and transient identities come and go in other arts and literature; and leave some works. But mixing identities and in other words without identity is only

considered in architecture due to naming of the work and get together buildings (Hojjat, 2005).

6. Results

Each city in its components and organizational form including social body and behaviors and cultural activities, has some characteristics which determine its identity. So, identity promotion with cultural areas is in fact a type of valuation or quality determination which establishes a full connection between space and person's mental reserves from direct experiences to culture and tradition. In recognition of city identity, architecture of cultural spaces has often similar characteristics, so, in designing the cities it is necessary to organize their spaces through appropriate and coordinate way. Cultural spaces in the cities are the places for holding face to face meetings, political protests or even public celebration, so, include the concepts like citizen participation and civil society.

Civil life or civilization is not also apart from people, their participation and human social relationships but its constructive symbolism is the cultural spaces existed in the cities. The recognition of the quality of impact of the spaces with cultural function in urban identity requires understanding the processes of evolution in the structure of urban space. With designing urban cultural spaces such that environments with identity are made, personal identity of citizenship can be promoted and also the attendance rate of citizenship and their interactions increased.

7. Conclusion

It can be said that architecture and urban construction has a mission to preserve ancient cultural values in its nature and therefore is considered as an element to give identity to cultural structure, as an obligation standardization is seen in the culture and architecture of the world. Human activities in social, cultural and political arenas guarantee the survival of collective life and sense of citizenship which is manifested and developed in the city through cultural spaces. Therefore, it can be stepped in strengthening the cultural spaces to promote urban identity by applying the following cases:

- 1- Maintaining and orienting the cultural spaces in urban structure.
- 2- Strengthening the development in cultural areas of the city through existing cultural spaces.
- 3- Maintaining cultural components and preservation of physical-social security.
- 4- The role of cultural spaces in providing continuity of social physical structure.

- 5- The impact of cultural spaces as the elements for giving identity in urban body.
- 6- Identity construction particularly for new and ancient areas, cities and metropolitans.
- 7- Determining the rights of citizenship to discuss city pattern and cultural structural identity.
- 8- Clear defining of cultural spaces at different scales in various structures.
- 9- Defining of cultural identity in physical context.

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The Anti-angiogenesis Properties of Two Tumstatin Synthetic Peptides in Infant Hemangioma

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Abstract: The aim of this paper was to describe the anti-angiogenesis properties of the two tumstatin synthetic peptides, T3 and T7, which corresponded to 69-88, 74-98 respectively of amino acid sequence of tumstatin, on infantile hemangioma endothelial cells in vitro. The MTT assay results demonstrated that the tumstatin peptides, T3 and T7, could inhibit the proliferation of hemECs in the culture media with 0.025 volume fraction of FBS in a dose dependent manner. When the volume fraction of FBS in the culture media rose, it was deduced that more growth factors exerted their effect promoting proliferation to the extent that the difference between different dose groups were covered up. Additionally, it was observed in the tumstatin peptides groups that the cell morphology had changed, the cells became contracted and sparse compared with the control group. Further, the cell cycle assay demonstrated that the two tumstatin peptides could arrest the cell cycle at the G0/G1 phase in the hemECs. This results were consistent with the prior MTT assay results, and showed the reasonable cause why the two peptides could inhibit the hemECs proliferation. Moreover, it was demonstrated that the two tumstatin peptides could inhibit the migration of hemECs by the in vitro wound healing assay.

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Keywords: tumstatin; anti-angiogenesis; infant hemangioma; endothelial cells

1. Introduction

Infantile hemangioma (IH), a benign vascular tumor, is the most common tumor of infancy, with an incidence of 5%~10% at the end of the first year. There is increased risk in premature neonates under the weight of 1500 g. The abnormal growth of blood vessels, was considered to be the main pathological process of infantile hemangioma. Thus, it should be reasonable that the disease--infantile hemangioma could be treated by the same therapeutic strategy used to treat tumor by anti-angiogenesis theory.

Vascular basement membrane (VBM) is an important constituent of blood vessels providing structural support. VBM was also speculated to modulate capillary endothelial cell behavior especially during sprouting of new capillaries. During matrix re-organization, several short protein fragments are generated from VBM by proteases. Some of these fragments were identified as inhibitors of angiogenesis. At present there are about 25 endogenous angioinhibitors in clinical trials and many more in preclinical studies for the treatment of cancer. These angioinhibitors fall into two general categories: (a) antibodies or small molecules that target pro-angiogenic factors of tumor cells such as VEGF, bFGF or PDGF, and (b) endogenous

angioinhibitors such as thrombospondin-1, angiostatin, interferons, endostatin and some of the non collagenous (NC1) domains of Type IV collagen that target vascular endothelial cells. Tumstatin (the NC1 domain of $\alpha 3$ chain of type IV collagen) and its deletion mutant tum-5 possess anti-angiogenic activity. It was demonstrated that the anti-angiogenic activity of tumstatin and tum-5 is independent of disulfide bond requirement. This property of tum-5 allowed researchers to use overlapping synthetic peptide strategy to identify peptide sequence(s) which possess anti-angiogenic activity. Among these peptides, only the T3 peptide (69–88 amino acids) and T7 peptide (74–98 amino acids) inhibited proliferation and induced apoptosis specifically in endothelial cells.

In this work, we tried to identify the properties of T3 and T7 peptide on the cultured infant hemangioma endothelial cells. It was observed that the changes of the cultured infant hemangioma endothelial cells on its proliferation and apoptosis on the condition that the synthetic tumstatin peptide T3 and T7 was applied. It was desired that this work should shed light on the prevention and control of the infantile hemangioma by providing the experimental base for the new therapeutic strategy.

2. Materials and methods

2.1 Synthetic peptides

T3 peptides covering 69–88 amino acids of tumstatin, LQTFTTMPFLFCNVNDVCNF, T7 peptides covering 74–98 amino acids of tumstatin, TMPFLFCNVNDVCNFASRNDYSYWL, and the corresponding scrambled peptide, SRNLSFYASCYPEWNNRSRSCNLNYV were purchased from ChinaPeptides Co.Ltd. (Shanghai, China).

2.2 HE staining

The hemangioma tissues derived from surgical resection specimen of Chinese infant cavernous hemangioma patients was resected, fixed in 10% neutral formaldehyde for 12 hours, followed by decalcification, dehydration, rendering transparency, paraffin embedding, slicing, spreading, drying. It was then stained by hematoxylin solution for 5 min, differentiated in 0.5% acid alcohol for 5 s, rinsed with diluted ammonia for 30 s, counterstained with 0.5% aqueous eosin for 2 min, cleared and mounted in neutral resin.

2.3 Isolation of endothelial cells and cell culture

Primary cultures of hemangioma endothelial cells (hemEC) were established from Chinese infant hemangioma patients. These hemEC were selected for the studies because they are derived from typical proliferating hemangioma, exhibit clonality and cryopreserved cells at low population doublings are available. All properties we have examined have remained constant over several generations in culture. Briefly, ECs were isolated from hemangiomas by the method described previously by Eileen Boye, et al^[1]. Tissue samples of infant hemangioma were digested with trypsin, the cells were resuspended in EBM-A (EBM131 (Clonetics, USA), 20% heat-inactivated FBS (MinhaiBio, China), 2 mM glutamine, 100U/ml penicillin, 100 mg/ml streptomycin, 0.5 mM N-6,2'-O-dibutyryl adenosine 3':5'-cyclic monophosphate, 1.0 mg/ml hydrocortisone (Sigma,USA) and grown to confluence. The ECs were purified from such primary cultures using Ulex europaeus I lectin-coated magnetic beads (Vector Laboratories Inc., USA), then, were grown in EGM-2 (Clonetics) on AF-coated dishes (Cascade Biologics), with 10% heat-inactivated FBS, in 5% CO₂ at 37 °C. Prior to specific experiments, cells were cultured in the absence of serum and supplemental growth factors for 12–24 hours. Collection and handling of all human material was according to guidelines of Ethics Committee of the First Affiliated Hospital of Chengdu Medical College on Human Studies and Clinical Investigation for protection of research

subjects, and informed consent was obtained from all subjects.

2.4 MTT assay

Cells were trypsinized, seeded at 1×10^3 cells/well in 96-well plates, and treated with T3, T7 peptide at various concentrations (0, 15, 30, 45, and 60 µg/mL) in the culture media with various volume fraction of FBS (0, 0.025, 0.05, 0.10). Twenty-four hours later, the effects on cell growth were examined by MTT assay: 20 µL of MTT (Sigma,USA) solution (5 mg/L in PBS) was added to each well, and the cells were incubated for 4 h at 37 °C. The adherent cells were subsequently solubilized with 150 µL dimethyl sulfoxide (DMSO). The absorbance (OD) at 490 nm was recorded using an ELISA reader (BioTec,USA).

2.5 Cell cycle assay

Cells were treated with T3, T7 and the corresponding scrambled peptide (34 µg/mL). After 24 h of incubation, the cells were washed in PBS and fixed in 70% ethanol overnight at 4 °C. Propidium iodine (10 g/mL) supplemented with RNaseA (200 g/mL) was added to the cells for 30 min (at 37 °C) prior to FACS analysis.

2.6 *In vitro* wound healing assay

Subconfluent cells were detached and 5×10^5 cells were seeded in six-well tissue culture plates. After 24 h, the cells, which grown to confluence to form a monolayer, were cultured in serum-free medium for 24 h. Scratch wounds were created by scraping confluent cell monolayers with a steril pipette tip to make an approximately 0.8mm gap. The cells scraped down were washed by serum-free medium, and the cells were then treated with T3, T7 and the control peptide (34 µg/mL in each group) or with out peptide in the medium with 10% FBS. After 48 h, migration was quantified by counting cell number that had advanced into the cell-free space from 10 randomly chosen segments (0.8mm/segment) along with the initial wound border.

2.7 Statistical analysis

SPSS11.0 for Windows (SPSS Inc) was used to analyze the data. Pearson's chi square test and t-test were used to compare the statistical significance of the differences in data. A level of $P < 0.05$ was considered statistically significant.

3 Results

3.1 Histologic appraisal of hemangioma

The histologic appraisal of infant cavernous hemangioma tissues includes the following characters: grossly large dilated blood vessels and large vascular channels, less well circumscribed, with a single layer of endothelium. These thinly walled

vessels resemble sinusoidal cavities filled with blood cells such as figure 1.

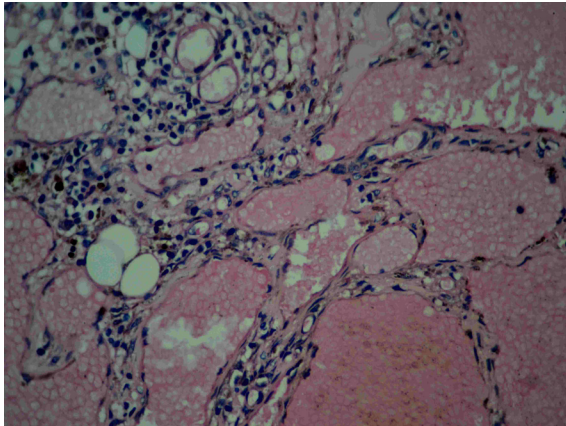


Figure 1. The histologic appraisal of infant cavernous hemangioma tissues. The hemangioma characterized by grossly large dilated blood vessels and large vascular channels, less well circumscribed, with a single layer of endothelium filled with blood cells.

3.2 Effects of tumstatin peptides on proliferation of hemECs

The MTT assay was used to measure the viabilities of hemECs after a 24-h treatment of tumstatin peptide (T3, T7), and the corresponding scrambled peptide (control peptide). The results show that peptide T3, T7 significantly inhibited the proliferation of hemECs in the condition that the hemECs were cultured in culture media with 0.025 volume fraction of FBS, compared with the control peptide group ($P < 0.05$), in a dose dependent manner. While in the culture media with 0, 0.05, 0.10 volume fraction of FBS, there were no significant difference among the different dose groups (Figure 2).

3.3 Effects of tumstatin peptides on cell cycle of hemECs

To study the effect of tumstatin peptide treatment on proliferation at different phases of the cell cycle, we treated exponentially growing cells with tumstatin peptides T3, T7 and control peptide for 24 h. Conventional DNA FCM showed that 43.6% of the hemECs treated with control peptides were found in G0/G1 phase, 26.3% in S phase, and the remaining cells in G2/M phase. However, treatment with T3, T7 peptide resulted in an accumulation of cells in the G0/G1 phase. After treatment with T3, T7 peptide, the fraction of G0/G1 DNA content increased to 60.7%, 57.7% respectively compared with the control peptide group and the control group ($P < 0.05$), indicating that tumstatin peptides could arrest the cell cycle at the G0/G1 phase in the hemECs (Table 1).

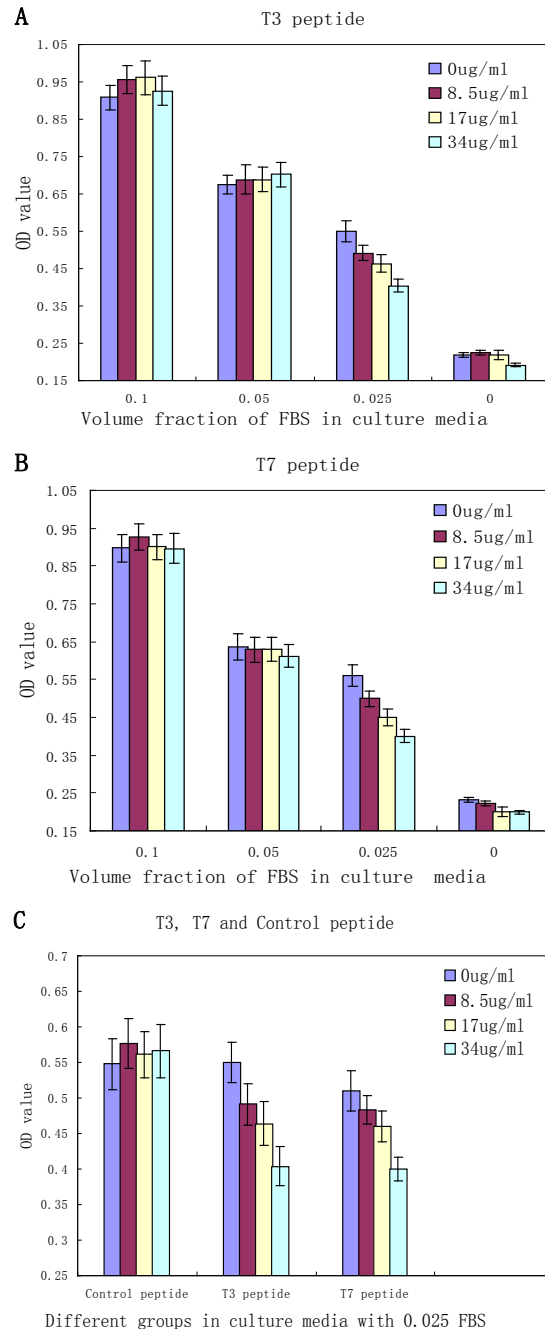


Figure 2. Effects of tumstatin peptides on proliferation of hemECs. Peptide T3, T7 significantly inhibited the proliferation of hemECs in the condition that the hemECs were cultured in the culture media with 0.025 volume fraction of FBS, compared with the control group ($P < 0.05$). While in the culture media with 0, 0.05, 0.10 volume fraction of FBS, there were no significant differences among those peptides.

Table 1. Effects of tumstatin peptides on the hemECs cycle distribution of by flow cytometry assay.

Groups	G0/G1(%)	S(%)	G2/M(%)
T3 peptide	60.4±2.1 [†]	17.4±2.3	21.6±3.4
T7 peptide	57.7±1.8 [†]	20.9±1.9	21.5±3.0
Control peptide	43.6±3.1	26.3±2.7	30.4±2.9
Control	40.5±2.5	29.4±3.2	30.3±4.5

* $P < 0.05$ vs Control peptide, [†] $P < 0.05$ vs Control

3.4 Effects of tumstatin peptides on migration of hemECs

Peptide T3, T7 could significantly inhibited the migration of hemECs compared with the control group and control peptide group ($P < 0.05$) at a dose of 34 $\mu\text{g/mL}$ added into the medium with 10% FBS in the corresponding group for 48 h, while there were no significant differences between the T3 peptide group and T7 peptide group, the control peptide group and control group (Figure 3). This results indicated that the tumstatin peptides—T3 and T7, have the potential capability to inhibit angiogenesis of infantile hemangioma through inhibiting the migration of hemECs. Additionally, it was observed in the tumstatin peptides groups that the cell morphology had changed—the cells became contracted and sparse compared with control group, which is according with the results of the MTT assay.

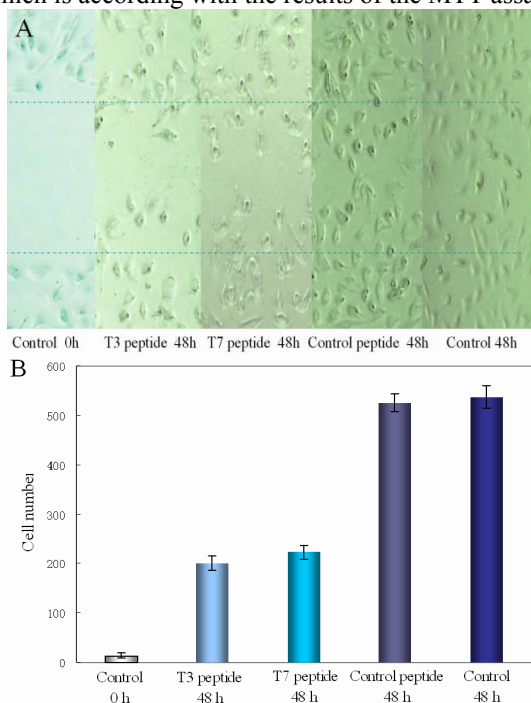


Figure 3. Effects of tumstatin peptides on migration of hemECs. Peptide T3, T7 significantly inhibited the migration of hemECs compared with the control group and control peptide group ($P < 0.05$) after added into the medium with 10% FBS at a dose of 34 $\mu\text{g/mL}$ in the corresponding group, while there were

no significant differences between the T3 peptide group and T7 peptide group, the control peptide group and control group.

4 Discussion

Angiogenesis is involved in various pathological disorders including infantile hemangioma as well as other tumor. To inhibit angiogenesis, a number of inhibitors have been identified, and certain factors such as angiostatin [2], endostatin [3], canstatin [4], arresten [5], and tumstatin [6] are tumor-associated angiogenesis inhibitors which are potentially generated in vivo. Tumstatin and its deletion mutant tum-5 possess powerful anti-angiogenic activity. As one of the endogenous angiogenesis inhibitors (EAI), tumstatin's roles in tumor are remain to be fully elaborated. It was demonstrated that EAIs are part of a balance mechanism regulating tumor angiogenesis, serving as intrinsic microenvironmental barriers to tumorigenesis [7]. T3 and T7 peptide are synthetic peptides according to the different segment of tum-5 peptide sequence, and both been reported that could inhibited proliferation specifically in endothelial cells [8]. However, the role of tumstatin on the infantile hemangioma have not been demonstrated to date. And understanding the mechanisms in cellular fate of the hemangioma will help to establish more effective eradicating therapies. As the most common tumor of infancy, there still exists many obstacles in the treatment process of hemangioma. At present, many infant and young children suffered from this disease still could not been rescued because of the limited effect of the treatment methods of infantile hemangioma including surgical operation and pharmacotherapy such as steroidal hormone, etc [9,10]. The abnormal growth of blood vessels, was considered to be the main pathological process of infantile hemangioma. Thus, it should be reasonable that the disease—infantile hemangioma could be treated by the same therapeutic strategy used to treat tumor by anti-angiogenesis theory. As were reported, tumstatin could inhibit the proliferation of endothelial cells, specially on the dividing cells. Due to the superiority of specificity and targeting effects compared with traditional therapy, tumstatin have the potential applying value to become a novel drug in the treatment of infantile hemangioma.

In the present study, we demonstrate the anti-angiogenesis property of two tumstatin synthetic peptides, T3 and T7, which corresponds to 69–88, 74–98 respectively of amino acid sequence of tumstatin, on infantile hemangioma endothelial cells in vitro. The MTT assay results demonstrated that tumstatin peptide (T3, T7) could inhibit the proliferation of hemECs in the culture media with

0.025 volume fraction of FBS in a dose dependent manner. When the volume fraction of FBS in the culture media rose, it was deduced that more growth factors exerted their effect promoting proliferation to the extent that the difference between different dose groups were covered up. Additionally, it was observed in the tumstatin peptides groups that the cell morphology had changed, the cells became contracted and sparse compared with the control group. Further, the cell cycle assay demonstrated that the two tumstatin peptides could arrest the cell cycle at the G0/G1 phase in the hemECs. This results were consistent with the prior MTT assay results, and showed the reasonable cause why the two peptides could inhibit the hemECs proliferation. Moreover, it was demonstrated that the two tumstatin peptides could inhibit the migration of hemECs by the *In vitro* wound healing assay.

It has been reported that the T3 peptide and T7 peptide could induced apoptosis specifically in endothelial cells. We also tried to identified the property of those peptides on the hemECs apoptosis. But there was no difference being found between those peptides and control groups in the apoptosis detection assay by a annexin-v-fluores staining kit (Roche). So, there is much more work to be done to explain the results. Interestingly, it has been reported that a synthetic peptide fragments of tumstatin, peptide 21 (MPFLFCNVNDVCFASRN DYS), couldn't demonstrated its effect on apoptosis of HUVEC-12 cells in the TUNEL assay^[11].

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Subacute Ruminal Acidosis and Some Nutritional Considerations Influencing Ruminal Ph

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Abstract: The nutrition program affects rumen health, which influences hoof health. Ration formulation involves a balance between acid and buffer production. The risk of SARA can be minimized by considering the feed ingredients used to formulate the ration, along with the environment and management specific to that dairy. The formulation balance should be shifted toward additional peNDF and less or slower fermenting NSC sources when the cow's environment (heat stress abatement, stall comfort, degree of over-crowding, etc.) or management (DM and ration accuracy, feed availability, etc.) is not as comfortable or reliable as desired. Farm management should strive to ensure that the consumed ration is extremely similar to the formulated ration.

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Key words: ruminal fermentation, subacute rumen acidosis, laminitis, physically effective fiber.

1. Ration Preparation

Forages in general, and haylages in particular, have a large potential for variation. The degree of variation at a given dairy depends largely on the management of cropping and harvesting systems. One advantage that bunker silos have over upright silos and bags is that ensiled feed from a given load or field is spread over a larger area of the silo. Thus, changes in forage DM or chemical measurements occur more gradually than in other storage systems. However, variation can still occur across the height of a silo. To estimate this potential variation, 11 corn silage and 9 haylage bunker silos from 9 dairies located in central New York were evaluated. Samples were collected on 6 dairies with a backhoe, on 2 dairies with a loader bucket, and on one dairy with a face shaver. Sample collection was designed to reflect the feed that would be obtained if a feeder obtained a loader bucket of feed from a region (upper, middle, or lower) of the silo as compared with a bucket obtained from the entire height of the silo face. Silos above ($n = 15$) approximately 4 m in height were split into thirds for sampling, while those less ($n = 4$) than approximately 4 m were split into halves. The vertical trench was dug to a depth of about 0.2 to 0.3 m. Experimental feed within each section was thoroughly mixed with a silage fork and then subsampled to obtain a sample approximately 5 to 10% the size of the removed silage pile. This sample was then again thoroughly mixed with the silage fork and finally sampled for analysis of DM, ADF, NDF, CP, lactate, and VFA with wet chemical procedures (Dairy One, Ithaca, NY). The entire approximately 3-L sample was ground for analytical procedures. Sorting of the ration by the cow can result in the consumption of a very inconsistent ration. Typically, long particles are

selected against, resulting in some meals having a much greater grain content than intended (Martin, 2000; Leonardi et al., 2001; Leonardi and Armentano, 2003). It seems likely that sorting could result in SARA. Cows with experimentally induced SARA preferentially consumed alfalfa hay over alfalfa pellets or the TMR, apparently in an attempt to modify SARA (Keunen et al., 2002). In a related experiment, consumption of free choice sodium bicarbonate did not differ between SARA and control time periods (Keunen et al., 2003). It seems unlikely that cows would preferentially sort long particles from the TMR to ameliorate SARA, since SARA has been routinely documented in herds via rumenocentesis (Oetzel et al., 1999), and sorting is a common occurrence in dairy herds. Free choice hay may be beneficial to cows with SARA, but cows have exhibited varying preferences when offered different forages (Coppock et al., 1974). Thus, the ad libitum availability of TMR and hay could be deleterious to production in high-producing cows. Sorting can be minimized by avoiding excessive amounts of long material in the TMR. Added hay or straw should not be longer than 2.5 to 5 cm (Hall, 2002; Shaver, 2002). Wetter rations help the various feeds to stick together, thus making it more difficult to sort. Water, or wet feeds such as wet brewers grain, can be added to reduce ration DM to less than \square 50%, or to a level that acts to reduce the sorting problem (Shaver, 2002). Palatable feeds are less likely to be sorted than unpalatable feeds (Leonardi and Armentano, 2003). Feed should be available ad libitum to encourage maximum DMI. The amount of refusals is an economic concern, potentially increasing feed costs by 10% if one were to offer 110% of the normally consumed ration and then discard the orts. Orts should not be fed to young

heifers since they may be contaminated with manure and spread Johne's disease as well as other pathogens. Orts have been successfully fed to far-off dry cows when their approximate analysis is known and they are fed as a ration ingredient at a set amount per dry-far cow (W. C. Stone, unpublished observations). Another approach would be to limit Orts to 1 to 3% in an attempt to minimize feed costs and to ensure that, even if diets are being sorted, the prepared ration and essentially all long feed particles are consumed. A potential problem with this approach, however, is that animals would consume all available feed, and then exhibit slug-feeding when fed again. Slug-feeding can result in acidosis. In fact, it has been used as an experimental protocol to induce acidosis (Owens et al., 1998). An alternative approach would be to feed for a high refusal rate, but then refeed the Orts. In this system, cows are fed at approximately 106 to 108% of actual intake. A refusal of this level, along with steps taken to minimize sorting, ensures that the Orts are very similar to the original ration. It also allows cows to be fed on a consistent schedule without the concern of wasting leftover feed. Refusals are then incorporated into the lactating cow TMR as an ingredient and refeed to the lactating cows. Refusals from pens are then thrown away or fed to dry-far cows on a rotating basis by pen such that feed is never more than 3 d old in any pen. Mixing of Orts and new TMR will not be successful if forages or any concentrates are prone to heating, as in the summer months. Refusals should not be refeed to lactating cows if the feed has heated or the quality is noticeably different than the original TMR. The use of TM preservatives (e.g., propionic acid) and *Lactobacillus buchneri* inoculation of forages at ensiling may also make this program more successful by improving aerobic stability of the TMR (Kung et al., 2003). Feed should be pushed up frequently, usually 8 to 10 times per day, to encourage intake and minimize sorting. Feed should be pushed up more frequently throughout the day the first several hours following feeding, when the majority of feed is generally consumed by cows (Robinson, 1989).

2. Ruminant contractions

Grant and Colenbrander (1990) fed lactating cows alfalfa hay that was chopped fine, coarse, or medium (a mix of fine and coarse), and measured production, chewing, and ruminal parameters. Milk fat content, rumination, and ruminal pH all increased with increasing forage length. Salivary flow rates (Cassida and Stokes, 1986) were multiplied by the time spent eating, ruminating, and resting for each forage type. The salivary bicarbonate equivalent concentration (Erdman, 1988) was multiplied by the

total salivary flow, yielding the additional bicarbonate available to animals fed the medium (161 g of bicarbonate) and coarse (182 g of bicarbonate) rations. Bicarbonate is typically supplemented at 0.8 to 1% of ration DMI (Erdman, 1988), which would amount to approximately 180 g of bicarbonate, essentially the same additional amount as produced by the coarse ration. Milk fat increased from 3.2 to 3.8, and rumen pH increased from 5.4 to 6.25 when cows were fed the coarse as compared with the fine hay. One would not expect this degree of response in milk fat and rumen pH when feeding supplemental bicarbonate at this level, particularly with alfalfa-based rations (Erdman, 1988). Nørgaard (1989) investigated the effect of physical form of the diet on rumen motility and chewing activity. A diet consisting of 80% concentrate and 20% forage was fed to 3 lactating cows in a 3 × 3 Latin square design. The forage was all barley straw, but the physical form was varied across treatments as follows: 4% long straw (LS), 16% pelleted straw (PS); 10% LS, 10% PS; and 20% LS, 0% PS. Increasing the LS from 4 to 20% of the diet resulted in linear increases in the time spent eating, ruminating, total chewing time, and the number and length of rumination periods. The frequency of primary contraction cycles of the reticulorumen at rest and during eating also increased linearly as the percentage of LS in the diet was increased from 4 to 20%. There was a significant, positive linear correlation between the time spent ruminating and the frequency of primary contraction cycles at rest (Nørgaard, 1989). Volatile fatty acids are eliminated from the rumen primarily by absorption, while only a small quantity flow into the omasum (Bergman, 1990). Reticulorumen contractions mix the ruminal contents, enhancing the absorption of VFA by the ruminal epithelium, increasing the flow rate of digesta to the omasum, and dispersing saliva throughout the rumen (Hungate, 1966). Increasing the frequency of reticulorumen contractions should increase the rates of VFA absorption and passage, and ruminal saliva dispersment. Each of these processes should result in an increase in ruminal pH, either through a reduction in ruminal VFA concentrations, or the buffering of acid. The change in reticulorumen contractions caused by the increased amount of long fiber in the Nørgaard study (1989) may be the reason that the increased amount of coarse fiber used by Grant and Colbrander (1990) resulted in an unexpectedly large increase in ruminal pH. It should be noted, however, that the significant differences in ruminal contraction cycles observed by Nørgaard (1989) were between a ration mostly void of physically effective fiber (4% long straw) and one containing 20% long straw. Smaller differences in

reticulorumen contraction cycles would be expected to occur if additional long fiber was added to a ration already containing an adequate or nearly adequate amount of fiber. Nonetheless, increased reticulo-ruminal contractions may be an additional benefit of long fiber that is not normally considered in ration formulation.

3. Chewing and NDF

The amount of rumination per unit of NDF for specific forage is often the same at different feeding rates (Woodford et al., 1986; Beauchemin and Buchanan-Smith, 1989). For example, Woodford et al. (1986) increased the amount of alfalfa hay fed to cows so that rations contained 28, 36, 45, or 53% hay; rumination was essentially the same at 63.2, 60.6, 60.7, and 59 min/kg of NDF. However, total chewing (ruminating and eating) per unit of NDF across forages is not constant (Mertens, 1997). Mertens (1997) indicated that total chewing within and across forage types varied, with straw providing the greatest amount of total chewing per unit of NDF. A small amount (0.25 to 0.45 kg/d) of straw added to the TMR may be particularly useful when one wants to increase total chewing without displacing much of the other ration ingredients.

4. Number of ration ingredients.

The composition of feed ingredients is inherently variable. Feedstuff variability in DM or carbohydrate composition increases the risk of SARA as animals consume an inconsistent diet. St-Pierre (2001) indicated that the portion of the total variance of the TMR in a nutritional component (e.g., NDF) contributed by a given feedstuff increases by the square of the amount of the feedstuff. Thus, a diet formulated to contain multiple ingredients will likely be much more consistent than one designed around only a few ingredients. The variance can be further reduced by formulating with accurate ingredient analyses, and by selecting feedstuffs that are relatively consistent.

5. Dietary buffers

Sodium bicarbonate should be supplemented to corn silage-based diets at the rate of approximately 0.8 to 1% of ration DMI. It is less likely to be beneficial in alfalfa-based rations (Erdman, 1988). Added buffer may be more likely to be beneficial in scenarios similar to those in the "increased risk of SARA" column.

6. Management-Related Problems

Management-related problems, such as free stall overcrowding, inadequately bedded or otherwise uncomfortable stalls, and excessive parlor holding

times may also alter feed intake patterns and animal behavior. Batchelder (2000) noted that cows kept in a pen with 30% more cows than free stalls ruminated less throughout a 24-h period than cows kept in a pen with one stall per cow. Of course, an attempt should be made to alleviate the environmental or management-related condition that is altering normal bovine behavior. If the problem is not corrected, dietary alterations can be made to increase ruminal pH. The degree of dietary adjustment depends on the severity of the environmental insult. An example of these changes would be to increase NDF and reduce NSC by approximately 2 to 3 percentage points, and to increase forage NDF and herds with management-related cow behavior problems.

Substituting some fibrous by-product feeds for higher starch containing feeds would reduce the risk of an increase in ruminal lactic acid levels. Rumen VFA production could be further reduced by replacing a portion of carbohydrate with added fat.

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Nutrition and feeding: the type of nutrients required by Markhoz (Iranian Angora) goat

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Abstract: Goats are known to be both more able and more willing than some species to select and consume a wider variety of material and to select those plants or plant parts having higher nutritive value. The type of nutrients required by all animals is essentially the same and these are energy (carbohydrates, fat), protein, minerals, vitamins and water. Although fat is shown here as an energy source there does appear to be a limited requirement for fat itself, but this is not considered to represent a problem. These nutrients provide the raw materials or resources for body maintenance, muscular activity, growth (meat production), reproduction as well as milk and fiber production. Nutrients interact to serve different functions which will be reviewed briefly. Energy is obtained from dietary carbohydrates (sugars, starch and fiber) and fats. Protein is the nutrient which might be considered the second most limiting for both fiber and milk production in the Angora goat. Vitamins are a group of compounds which are required in minor amounts. Generally these are grouped as the fat soluble vitamins (A, D, E and K) or the water soluble vitamins (C and the B complex group).

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Keywords: Nutrition; Feeding; Markhoz goat

1. Introduction

Both magic and mystery are sometimes attributed to the goat in respect to nutrition or feeding habits. Actually the animal is merely a small ruminant, and except for size, it functions much as any other ruminant Devendra, (1978). The same basic principles of nutrition apply to the goat as other ruminant species, and these principles will be reviewed only briefly in this discussion. However, the goat in general, and especially the Angora, does have some unique aspects which warrant mention. Many perceive the goat to be a scavenging or "tin can" eating animal which can survive on almost anything. By contrast research has shown the Angora to have a high nutritive requirement relative to other domestic ruminants. At the same time it has been reported that the goat has a superior ability to digest poor quality forages. Likewise different breeds of goats have been reported to have a low or a high requirement for protein. Clearly some of these contradictions need to be resolved before a logical treatment of the subject on the nutrition of the goat can proceed. The apparent controversy relating to the digestive ability of the goat appears to be explainable. The ability of a ruminant species to digest forages is greatly influenced by the time these materials remain in the digestive tract. In animals with a large rumen capacity, such as a beef cow, the feedstuffs remains in the tract for a longer period of time than some other animals such as a deer and certain types of goats which have a low volume of the digestive system. The latter apparently make up for this by being more selective grazers thus consuming a higher

quality diet and in some cases passing ingested material through the digestive system at a more rapid rate. Thus they often consume a larger amount of material relative to body weight (Huston, 1978). This can have the effect of showing the animal to have a reduced ability to digest structural carbohydrates, but to work to the animal's overall advantage.

Goats are known to be both more able and more willing than some species to select and consume a wider variety of material and to select those plants or plant parts having higher nutritive value.

Problems tend to be encountered when the ability of the goat to be selective is restricted such as a monoculture or a restricted variety of plant species which does not meet their nutrient requirement. The apparent inconsistency relating to protein requirements appears to be explained in that at maintenance or subsistence levels goats appear to be able to maximize the recycling of nitrogen (urea or ammonia) and thus to survive on a low level of protein. However, the protein requirements for production of meat, milk or fiber does not appear to be less for the goat than for other species and may actually be higher. This is almost certainly true of the Angora. The apparent ability of the goat to recycle nitrogen (Bryant et al., 1979) suggests that this animal may have a superior ability to utilize nonprotein nitrogen. Some studies suggest that this is the case, but this is not currently being exploited by the industry. Other unique aspects of the Angora have to do with the demands associated with fiber production. The Angora goat is an animal breeding success story in that they produce a high level of

fiber relative to body size and feed consumed. Selection for high fiber production has certainly elevated their requirements for protein, energy, and possibly other nutrients. On a world basis, large differences exist within the Angora in inherent levels of mohair production. Thus, one would expect differences in nutrient requirements related to different levels of fiber production. Observations strongly suggest that the goats found in some areas such as Turkey and Lesotho normally receive a lower quality of ration, but at the same time have a lower genetic potential. Apparently the Angora found in the U.S. has the highest genetic potential for fiber production and the problems rising from this. Most of the discussion to follow will be based on data and experience obtained under Texas conditions. Although the Angora goats in Texas may well have unusually high nutritive requirements, they are often run on rations which after long use by goats do not have the quality or nutrient content to meet their requirements. The result is a goat which is almost perennially undernourished unless they are appropriately supplemented. It has been estimated that the normal weight for mature Angora does is on the order of 85 pounds, whereas, many does found in market channels tend to weigh on the order of 65 pounds. It may be argued that these are culled animals, and that herd does are larger, but it is obvious that only a small percentage of the does ever reach optimum size. The first result of underdevelopment is reduced reproductive performance. In addition death losses among these underdeveloped does may increase due to nutritional, parasitic or climatic stress. Although reduced by poor nutrition, fiber production will continue until the animal dies of starvation and the quality, or more properly fineness, of the fiber will improve under conditions of poor nutrition. However, this statement applies to diameter only as length and weight will be reduced and the fleece will often be matted and difficult to shear or process.

2.Required Nutrients

The type of nutrients required by all animals is essentially the same and these are energy (carbohydrates, fat), protein, minerals, vitamins and water. Although fat is shown here as an energy source there does appear to be a limited requirement for fat itself, but this is not considered to represent a problem. These nutrients provide the raw materials or resources for body maintenance, muscular activity, growth (meat production), reproduction as well as milk and fiber production. Nutrients interact to serve different functions which will be reviewed briefly.

3.Energy

Energy is obtained from dietary carbohydrates (sugars, starch and fiber) and fats. The Angora goat is a ruminant with a large microbial population in the rumen. The microbial population requires carbohydrates for growth. They ferment both fibrous and grain based diets into compounds called volatile fatty acids (acetate, propionate and butyrate) that are readily absorbed through the rumen wall to be utilized by the host animal for energy. Grain based diets are more readily fermented in the rumen than fibrous based diets and thus tend to produce more energy. The fiber in immature plants is more readily fermented than mature plants. Thus, most grazing animals go through an annual cycle of weight loss and weight gain associated with season-based changes in maturity and availability of forages. They exhibit a cycle of depositing excess energy in the form of body fat during the spring season and gradually mobilize their stored fat during the fall and winter when feed supplies are scarce. Unfortunately, Angora goats store relatively little body fat, and for this reason the Angora is more susceptible to nutritional stress at the time of unfavorable feed conditions. This does not mean that Angoras will not fatten, but that due to their high nutrient requirements a higher quality diet is required to permit fat deposition. Fats are a concentrated form of energy ($2\frac{1}{4}$ times energy of carbohydrates) and therefore, adding fats to the ration is a very efficient way of increasing caloric density of the diet; however, there are some adverse affects of fat addition. Polyunsaturated fatty acids are apparently inhibitory to microbial growth, resulting in reduced fermentation of fiber in the rumen. Not more than 3 to 5% unprotected dietary fat appears to be well tolerated by ruminal micro-organisms. Whole cottonseed (20% fat) has been used successfully as an energy supplement for Angora goats, but high levels may cause a reduction in fiber digestibility. It is recommended that whole cottonseed be limited to no more than $\frac{1}{4}$ the total diet.

4.Protein

Protein is the nutrient which might be considered the second most limiting for both fiber and milk production in the Angora goat. Proteins are made up of amino acids. The animal's tissue level requirement is for individual amino acids. The two main sources of amino acid supplies to the animal are; microbial protein synthesized in the rumen and dietary proteins and amino acids which escape ruminal degradation. If energy is not limiting, rumen micro-organisms appear to provide sufficient protein for maintenance, slow growth, and early pregnancy. Animal fibers (wool, mohair, etc.) are pure protein.

Thus, a high-producing Angora goat has a high protein requirement, compared to other ruminant species, and will respond to increased dietary protein with increasing fiber production up to 20% of the ration Sahlu and Fernandez (1992). However, it may not always be desirable to feed for maximum fiber production. Thus, the choice of level of protein in the ration or in the supplement is an economic as well as nutritional consideration. Complete rations are seldom formulated to contain more than 16% protein, but in commercial practice goats are seldom fed complete rations. Most feeding is in the form of energy or protein fed as a supplement to range forage, and under these conditions, protein concentrates of 20 to 40% are generally used. The kind or quality of protein consumed by ruminants, including the Angora, is not considered to be particularly important. This is a general statement to which there are some exceptions. The very young kid may function as a pre-ruminant and thus respond to good quality protein. Animal fibers such as mohair contain a higher percent of the sulfur containing amino acids (methionine and cystine) than other body tissues, and the availability of these amino acids at the tissue level frequently limit fiber production. Unfortunately, if these are fed in the ration they are normally broken down in the rumen and do not reach the tissue level where they might be directly used as building blocks for fiber synthesis Malechek et al., (1972). Mohair production appears to be dependent on and limited by the rate of synthesis of these sulfur containing amino acids. It is important that goat rations contain an adequate level of available sulfur. The term available is important. In most cases browse makes up an important part of the diet of the goat. Many of these plants contain tannic acid, or other compounds such as lignin, which tie up much of the protein, rendering it somewhat indigestible. The result may be not only a protein insufficiency, but a deficiency of sulfur as well if the sulfur is unavailable. If goats are fed nonprotein nitrogen (such as urea) then the need for sulfur for protein or fiber synthesis is obviously important. The recommended level of sulfur is usually expressed as a ratio of nitrogen to sulfur. This is normally stated as something on the order of 15:1, but there is reason to believe this should be no higher than 12:1 for fiber producing animals. In the case of goat feeds it should be this high or above. Qi, *et al.* (1992), estimated that the total ration should contain .23-.29% sulfur. The preferred source of sulfur would likely be in the form of s-containing amino acids, elemental sulfur or in the sulfate form such as ammonium, potassium, calcium or sodium sulfate. In the normal scheme, amino acids presented at the tissue level for meat, milk and fiber production are derived mainly from

microbial protein synthesized in the rumen and dietary protein that has escaped degradation in the rumen. Production efficiency would potentially be improved if a significant proportion of these feed proteins could get through the rumen without being degraded. This would be especially true with respect to mohair production if the protein feeds used were made up of high quality protein, rich in limiting amino acids such as methionine. It is more important that these sulfur containing amino acids are fed in a form which prevents rumen degradation. It has been shown that fiber production (wool or mohair) can be increased by as much as 20% through the use of rumen by-pass proteins (see Figure 5-1). At present there are methods of coating amino acids or protecting proteins to increase the amount which escape ruminal degradation. Although this can be done on a laboratory scale, it has not yet been used extensively in practice. Some proteins found in nature tend to be slowly digestible, and a portion of these tend to get through the rumen intact. This is true of some of the browse (tannic acid containing forages) species utilized by goats with the result that the browsing goat may produce more mohair than a non-browser. Unfortunately many of these proteins are poorly digested and thus may not become available even past the rumen. The end result is that some browse species or protein supplements may stimulate fiber production, without beneficially affecting other body functions. Thus it may not be desirable to attempt to stimulate additional fiber production by this route unless overall nutrition is satisfactory. Some protein concentrates (blood meal, fish meal, meat meal or feather meal) are poorly or slowly digestible and thus have some rumen escape properties. Fish meal not only has escape value, but is also high in the sulfur containing amino acids and has been shown to be useful to increase fiber production. Since a small amount of readily soluble protein is necessary for microbial digestion of fibrous materials in the rumen it may often be desirable to provide at least a low level of readily available protein to stimulate ruminal action even when protein is available from other sources such as browse. Another option to increase fiber production can apparently result from a high level of protein feeding. This would not only supply any protein or amino acid needs, but may result in some spill over from the rumen thus providing a form of ruminal by-pass. Although a response from feeding a high level of protein or a high level of bypass protein can be expected it may not always be economic. In general it is more financially remunerative to use the most economical source of natural protein. Where protein supplements are comparable in price a mixed protein supplement might be preferable. There appears to be

an opportunity to make greater use of non-protein nitrogen (NPN) with goats than is being done at the present time. This statement is based on economic consideration and it is not meant to imply that the animals will actually do better on NPN sources.

5. Vitamins

Vitamins are a group of compounds which are required in minor amounts. Generally these are grouped as the fat soluble vitamins (A, D, E and K) or the water soluble vitamins (C and the B complex group). Ruminants are thought to be able to synthesize all except the fat soluble vitamins. Vitamin D is produced by the action of the sunlight on plant or animal tissues. A and E are widely present in plant or forage materials. Thus, vitamin deficiencies are unlikely with goats under normal grazing conditions. Vitamin A is the one most likely to prove limiting, but this will occur only under extreme conditions such as in young animals which have not experienced a growing season when green forage was available. Because of the remote possibility of a deficiency it is probably advisable to include Vitamin A in feed supplements for goats at the rate of 5000 I.U. or more per pound of ration. The cost is normally negligible. Where producers have knowledge of, or suspect that, a Vitamin A deficiency exists or where past history has shown a response to this nutrient, injections of Vitamin A would provide a quick response. A limited number of tests under Texas range conditions have not shown a response to injections of Vitamin A.

6. Minerals

Minerals are required by all animal species, and certainly the Angora goat is no exception. A number of mineral elements are required in relatively small amounts and deficiencies of almost any mineral can be serious. It is a mistake in management to allow mineral deficiencies to limit production since these can usually be provided at low cost. Very little research has been conducted on the mineral requirements of Angora goats, and even if this was not the case, results would tend to be area specific. The minerals which are considered essential for animals fall into two categories known as "macrominerals" (calcium, phosphorus, potassium, etc.) or those required in relatively large amounts and "microminerals" which are required in small amounts. There are a large number in the latter class which are considered essential. These are often required in such small amounts that they are difficult to study. Micromineral requirements are too complex to attempt to discuss at this point. Generally producers should be concerned about the minor elements only if they live in an area which is known

to be low in specific elements such as iodine, selenium, etc. On the other hand many producers will choose to use a broad spectrum trace mineral mixture as a form of insurance. A large amount of research or experience might be required to conclusively confirm or deny that a response to some mineral elements might be obtained. When goats are managed on range or pasture the only major (macromineral) element with much likelihood of being deficient is phosphorus, but goats, like sheep, appear to have the ability to conserve phosphorus. A limited amount of research indicates that they are less likely to respond to supplemental phosphorus than are cattle. However, most dry range forages, especially grasses, are at least borderline in their phosphorus content for goats. When this is compounded with soil or moisture conditions which contribute to low phosphorus content, a deficiency of phosphorus for Angora is a real possibility or even probability. Thus provision of supplemental phosphorus could be recommended under many conditions. Many browse plants are high in mineral content and this, compounded by a habit of highly selective grazing, provides goats with some protection against mineral deficiencies. Fortunately most protein supplements contain a significant level of phosphorus or if this is not the case phosphorus should be added in the formulation of supplements. Still the provision of additional phosphorus during the non-growing season (for forage) should be considered good insurance. Two common sources of phosphorus are bonemeal and di- or monocalcium phosphate. The other mineral that might deserve special mention in connection with Angora goat nutrition is that of sulfur. This was discussed earlier in connection with protein. However, it is probably desirable that any mineral fed to goats should contain sulfur. Although information on the mineral requirements of the Angora goat is sketchy there is little evidence that mineral deficiency is a major problem or explains poor performance with this animal. In fact, it would be good news if we could identify a mineral element which when offered to the goat would markedly improve performance.

7. Water

Water is also a critical nutrient which should not be ignored. Goats can live with low intakes of water, especially when consuming green forage. However, they perform better when given access to clean and safe water. Still it may occasionally be possible or desirable to run goats in areas where water supply is restricted. This can be more easily done with goats than with other species such as cattle. It may be possible to run non-lactating goats on green forage without water, and even for lactating goats hauling water may not be a major chore. Goats

are often less willing to drink from foul or contaminated water sources such as earthen tanks. When Angora goats are forced to drink from earthen tanks they should be observed carefully for bogging. They are more likely to become trapped than other species especially when they have a full clip of mohair which may become weighted with mud or water.

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Estimated income elasticity and price elasticity of olive in Iran

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Abstract: The objective of this study is to consider the income elasticity and price elasticity of olive products on consumption in Iran using Autoregressive distributed lag (ARDL) approach in order to estimate the relationship between variables. The required data are in the Agri-jahad website, statistical state of Food and Agriculture Organization (FAO) and also in different publishes of central bank for 1991-2007. The result of this study shows that both income and price variables whether in short time or long time have important effects on consume of this production and also compare the effects of this variables in short and long time and shows that use of olive in short time is sensible and meaningful.

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Key words: ARDL method, Olive, FARS province, Income elasticity, Price elasticity.

JEL classification: E64, C4, C22,

Introduction:

Olive tree is one of the ever green trees which grows well around the Mediterranean Sea and shows a good adaptation in area which has suitable climate. The olive economical products obtain in tropical and semitropical area where doesn't have serious winter freezing risk. (Meschi et al. 2002).

Olive plant is resistant against drought and eight gram salt in per liter of water in irrigation and also it can tolerate about ten gram salt in soil extract and two gram salt in per kilogram soil. Olive can grow well in moderate and humid climate. It can tolerate -7-10 c temperate and it would frostbite or loss below -10 c (Izret 1, 1998). The annual precipitation rate should also be 400 to 500 mm and its desirability rate should be between 700 to 1200 mm, (Lajvardi, 1980).

Olive is one of the major manufactured and exported products of agriculture department of Iran, so a significant proportion of production, crop lands and a part of export are pertain exclusively to this production (olive) in Iran.

Agriculture is one of the most important segment of economy which provides basic needs of society, thus, it has a particular limitation and preference at economical development in Iran after the Islamic revolution (Amin fard, 2001). In terms of having considerable development potentials, such as millions acters of superficial and for cultivation, possibility of using billions cube meters of superficial and underground sources, enabling to increasing agricultural and horticultural products and in addition to consider the role of this department in strategic purpose, like providing food safty, employment, and export development of non petrolic products, agriculture is the

most important segment of government. (Mehrabi Basher Abadi and Taghavi, 2011).

The price of agricultural products was always a determiner factor in agricultural items market. Torkamani and Tarazkar investigate effects of currency rate changes on exported price of pistachio by ARDL method and their major purpose of the study was examine currency rate effects on pistachios export price in Iran. The results shows that changes of currency rate in short and long time is the most important factor which affects on exports price of this product (Torkamani and Trazkar, 2005).

Other researchers, who use ARDL approach in their studies, are Amir Teimoori and Khalilyan. These two scholars research as “ profiting and growth of total factors of production in Iran's agricultural department and its overview at forth developmental programs” by using ARDL method and analysis and calculating profiting production factors indices to investigate application efficiency rate of different economical parts. By considering to the assessments, despite of alters in agriculture they deduced that this department had optimum profit and proper implication to use production sources (Amir Tiemoori and Khalilyan, 2008).

Many researchers use ARDL method in their studies such as: War and Wollmer (1996), Cheung and et al (1997), Rahimi(2001) and etc.

At present study we investigate olive consumption in respect to fields and gardens conditions, climate situation and also by considering consumers income and olive price. The study hypothesis is that rate of income and products price have positive effects on consumption.

Data and Methodology:

In this study we used ARDL method in order to estimate income elasticity and price elasticity of olive on consumption scale. First it is necessary to estimate demand function of olive's consumers in whole given society, then we analysis this subject by considering the results and investigating.

The specify model for demand function follows:

$$\ln Q_0 = a \ln P_0 + \ln R_0$$

Where:

Q_0 is olive consumption;

P_0 is olive real price;

R_0 is income scale of consumers.

Related to the olive demand function structure, we can say that most researchers, who study about olive price variables, intend the income and price of substitute products as major variables in order to investigate price and income elasticity and crossing and non economical variables like numbers of consumers and climate indices. And some other researchers refuse to mention substitute variables for olive because of its properties (such as medicinal properties).

It shows that olive consumption is a function consumer income and olive price. In order to investigate short time and longtime relationship between dependant variables and other explanatory patterns variables, we can use collective method such as Engle Grenger and error correction method (ECM).

However because of limits of using Engle Grenger¹ method and ECM² model and also to refusing faults of these models, such as existence of biases in small samples or unable to test statically hypothesis, they suggest more proper methods to analysis short time relationship between variables. So in this case we can indicate to ARDL solution (H.M.Pesaran & B.Pesaran 1997). By using of this solution, it is not necessary for gathering degree of variables- which is essential in Engel Grenger method- to be equal (Yousefi, 1997). In addition, this method estimates are useful for refusing some problems like its correlation and inborn, so for this reason we use ARDL method in this study.

The total form of generated ARDL model can be show as:

$$\alpha(l, p)y_t = \alpha_0 + \sum_{i=1}^k \beta_i(l, q_i)x_{it} + ut, \quad i = 1, 2, \dots, k$$

Where α_0 is width of origin, y_t is dependent variable and L is late factor which are define as:

$$L^i y_t = y_{t-i}$$

So:

$$\alpha(l, p) = 1 - \alpha_1 L^1 - \dots - \alpha_p L^p$$

$$\beta_i(l, q_i) = \beta_{i0} + \beta_{i1}L + \beta_{i2}L^2 + \dots + (\beta_{iq_i}L^{q_i})$$

For estimating longtime relationships can use two steps method as follow:

In first step the long term relationship should be test. For this, if evaluated coefficient sum to dependent variables lag was smaller than one, dynamic pattern would move toward longtime balance. So it is necessary to test this hypothesis by convergence test (Noferești, 2008) like below:

$$H_0 : \sum_{i=1}^m \beta_i - 1 < 0$$

$$H_1 : \sum_{i=1}^m \beta_i - 1 \geq 0$$

Statistical quantity t which is necessary for this test can be compute like this:

$$t = \frac{\sum_{i=1}^m \beta_i - 1}{\sum_{i=1}^m s\beta_i}$$

By statistical comparing calculative t and critical quantity which offer from Benerji and Dolador Master at given confidence level, we can find existence or unexistence of equilibrium longtime erlations between our patterns variables. If this stable longtime relationship between variables proved, in second step we would analysis and estimate the value of coefficients in longtime. In longtime these equations will be confirmed for present variables in this model:

¹ - Engle Grenger

² - Error Correction Model

$$E_t = E_{t-1} = \dots = E_t$$

$$X_t = X_{t-1} = \dots = X_{t-k}$$

$$= \dots = EP_{t-m}, \quad Ep_t = EP_{t-1}$$

$$PR_t = PR_{t-1} = \dots = PR_{t-f}$$

The interconnection between a set of economical variables, can provide a range of errors correction/ reform models use. The number of optimum lags intervals for each variable can be determine by Akaik, Hanan queen, Schearts- Beizian criterions (standards).

To consider this model in this study, we use two effective lags at 5% significant level. Data and information which are needed to do this study, are extracted from agricultural Jahad website, statistical

state of food and agriculture organization (FAO) and also from different publications of central bank in 1370-1386 period, and also we use software packages like Microfit 4.1 and excel to estimate and compute results. Next section shows the olive demand function and its analysis.

Description:

Results of dynamic model (ARDL)

Variable name		coefficient		Standard error
C	Width of origin	B ₀	-5.5627	2.5942
LpR(-1)	Olive use logarithm with 1 delay	B ₁	-0.25796	0.24085
LpD	Olive price logarithm	B ₂	0.57387	0.27958
LR	Income logarithm	B ₃	6.3574	2.5055
LR(-1)	Income logarithm with 1 delay	B ₄	-5.7906	2.4916
DW=2.02		F=14.2871(.000)		R ² =0.85108

Source: results of this study

The determinate coefficient of regression is 0.85 which estimate by (ARDL) model with lag in each variable. The declaratory variable of the model can show regression change with 85% in average. The error mean of dependant variable is 10.06 and cubes sum of disorganization statement is 0.8 that lag on proper confidence level at this estimating. Results of model correlation show that this regression with 2.02 coefficient consider are placed in high boundary has

negative correlation. Thus we can remove this inter-correlation by giving 2 effective lateness to LM test. Fisher statistical test also show that above regression has a very high significance level. The evidence of his claim is statistical value (14.28) with significant level 1 percent.

Results of the long time analysis ARDL model

Variable names		coefficient		Standard error
C	Width of origin	-5.5627	B ₀	2.5942
LP _D	Olive price logarithm	0.31591	B ₁	-0.32644
LR	Income logarithm	0.56673	B ₂	0.26534

Source: result of this study

According to results of this table income variables of olive which has direct effect on consumption. This effectiveness from statistical point of view is not significance, so by applying 1 lag; it will reach to 5% significance level. Because of this you can see effectiveness of this variable at longtime model, according to results of the statistical test investigated computing t and critical quantity which are offer from Benerji and Dolador Master at given confidence level. The results of longtime indicate that income variable with 0.56 coefficient has the most important effects on

olive consumption that corrects at 5% significant level. Therefore you can be optimistic about applying increasing income policy to Regulate Olive consumption. Next variable which investigate is olive price. Results of estimating ARDL model illustrates that this variable has not significant effects on olive consumption rate in our country. The proof of this claim was having no significance of this variable with 0.31 values (from statistical point of view).

Results of error correction estimating

Variable name		coefficient	Standard error
Dc	First degree differences of width of origin	-5.5627	2.5942
Dx ₂	First degree differences of olive price logarithm	-0.25796	-0.24085
Dx ₃	First degree differences of income logarithm	6.3574	2.5055
Ecm(-1)	Error correction component	-1.000	None
Dw = 2.0214		F = 5.5552(.014)	R ² = 0.62498

Source: result of this study

After being sure about effects of parameters of long time olive consumption function and in order to be assure about probable changes (variations) of variables in short time, we use error correction model as a pattern. To reach this purpose, the different between income and price variables should be considered. Results indicate (That), as income variable has a positive effect on consumption at long time, it also shows positive effect in short time. Then at short time obtains 6.35 which show variables capable in consumption variations declaratory at short time at significance level 5% now we can be optimistic about temporary and short time policy respect to income variations. About price variable also shows that despite of positive effects of price variable in longtime is (0.25), for short time model this value is negative from which statistical point of view, it is not significance and its effect is not increase the olive production. In short time model estimating, the criteria which determine validity rate to reach initial balances, is ECM coefficient or error correction model. According to results of above table, the determinate coefficient at short time regression is 0.62 which shows

declaratory variables cannot explain variations in olive consumption absolutely. The Fisher test results also show that short time model is defining at 5.55 and significance level 5 percent.

Conclusions:

All we can say that the results show that the income variable has a greater impact on the consumption of olive oil and what is meaningful in the long term and short term. But in the case of variable price must be said that the opposite is true. If the government adopted a policy that will allocate a subsidy to consumers Raise income and consumption can be increased olives. As well as policy advocacy and training classes can produce better management and improved quality of production and increase supply and other non-economic variables, marketing and advertising agents can also help to increase the consumption of olive oil.

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Inter and intra professional collaboration in the implementation of Problem-Based Learning in nursing education: lesson for South Africa

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Abstract: Purpose: This review examines various examples of collaboration in PBL implementation, particularly between academic and practice entities. **Methods:** The updated integrative review (IR) approach according to Whitmore and Knalf (2005) was utilized to guide this search and understand the extent to which PBL is collaboratively implemented in nursing education for pre-registration programme. **Findings:** Collaboration emerged as a consistent theme – whether between academics and practitioners in the supervision and guidance of nursing students, between faculty members and real patients in facilitating PBL group tutorial sessions, between inter-professional students in PBL learning, or between nurses of different specialties in developing PBL scenarios. [Rakhudu M A; Amaize A; Useh U; & M Maselesele. **Inter and intra professional collaboration in the implementation of Problem-Based Learning in nursing education: lesson for South Africa.** *Life Sci J* 2012;9(4):344-353] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 53

Key concepts: Collaboration, implementation and problem based learning, inter-professional, intra-professional

1.Introduction

Nursing educators worldwide are charged with the task of preparing a nurse workforce that is responsive to dynamic population changes that are increasing in complexity. Problem-based learning (PBL) as a pedagogical approach that has been proposed as a solution to address the challenge of producing nurses that are critical thinkers, life-long learners, and more equipped to handle the challenges of their ailing communities (Rideout, 1994). The approach arose from critiques of predominantly lecture-based courses taught in medical schools in the 1950s and 1960s. It was argued that such methods of teaching lacked relevance to future physician practice in that it did not encourage teamwork, inquiry skills, problem-solving and critical thinking skills, nor was it effective in linking theory of practice (Tavakol & Reicherter, 2003). The World Health Organization echoed such concerns, especially from the standpoint of rapid technologic and information growth: “The explosion of scientific information makes traditional curricula increasingly irrelevant, because they are based on what is known today, to the exclusion of how to learn what will be known tomorrow” (Kantrowitz, et al., 1987; WHO, 1993 in Tavakol & Reicherter, 2003). The development of PBL began at medical schools at Case Western University in the United States in the 1950s and at McMaster University in Canada in 1965 (Tavakol & Reicherter, 2003).

While there are many variations to PBL implementation, there are shared elements and core components that work together to foster integration of knowledge from a variety of disciplines. Students are given a carefully crafted, ill-defined problem scenario (much like the type that would be encountered in the practice setting), and engage in an analytic process of

progressive inquiry by initiating and developing appropriate hypotheses (Biley & Smith, 1998). The teacher’s role shifts from that of a content expert to that of a facilitator of group learning process and provider of guidance in eliciting critical learning objectives. Working in groups, students integrate their previous knowledge and then explore the various aspects of the problem scenario using formal and informal resources (Biley & Smith, 1998). They subsequently bring their findings back to the larger group, which solidifies and stimulates further learning. As students become life-long learners, the process strengthens important skills such as: critical thinking, teamwork, self-direction, communication, and problem solving (Biley & Smith, 1998).

Nursing education literature is rich with case studies and evaluations of PBL implementation experiences, suggesting that this student-centered approach has increasingly established a strong place in nursing. The effective implementation of PBL is crucial to ensuring the successful integration of theory and practice for students. This depends on well-crafted problem scenarios, trained facilitators, supportive guidance, translation of classroom learning into the practice setting, and available resources (human, fiscal, informational, and infrastructural) to support all of these endeavors. When compared with traditional lecture-based approaches, PBL has been seen as a resource-intensive endeavor because it requires: a much lower teacher-to-student ratio, a strong capacity in crafting problem scenarios, adept facilitation skills, adequate infrastructural support for students’ self-directed learning process (including library resources, internet connectivity, and in some cases even simulation / skills labs or standardized patients), and appropriate student assessment methods.

At North West University's Mafikeng Campus (NWU-MC) in South Africa (a historically disadvantaged university), nurse educators have implemented PBL for third- and fourth-year nursing students since 2002. In a qualitative study conducted in 2008 exploring the experiences of nursing students regarding PBL (Rakhudu 2008) and Internal and External programme evaluation of PBL in 2008 (NWU 2008), NWU-MC students voiced their desire to have improved integration of PBL insights in the clinical practice setting. This has prompted an examination of the nursing education PBL literature around the topics of collaboration and better integration of theory and practice.

This literature review examines various examples of collaboration in PBL implementation, particularly between academic and practice entities.

Framework.

The updated integrative review (IR) approach according to Whitemore and Knalf (2005) was utilized to guide this search. Integrated review is described as a specific type of literature review that summarizes past theoretical and empirical literature to provide a more comprehensive understanding of a phenomenon (Whitemore and Knalf (2005). The overall goals of IR framework include defining of concepts, reviewing of theories, reviewing of evidence, and analyzing methodological issues. For this publication, the aim was to search for evidence for best practice in collaboration in implementing problem based learning in nursing education.

1. Method.

This review focused broadly on exemplars of collaboration in PBL implementation in nursing. Articles included in the review adhered to the following inclusion criteria:

- 1) Problem-based learning (PBL) as a teaching method or central focus
- 2) The study demonstrated some level of collaboration between distinct entities
- 3) Participants were students, clinicians, and/or educators – all nursing-related
- 4) The study was published in the last 12 years (since 1999)
- 5) The study was available in English

Initially, a broad search of published studies was conducted using PUBMED, CINAHL, and MEDLINE. The following search words “problem-based learning”, “collaboration”, “nursing education” and related terms were used in this search. The searches identified 114 citations. Other papers were located from the reference sections of these articles and by searching recent electronic or paper. These results were then scanned to eliminate articles that only described isolated PBL implementation experiences or that offered commentary or critique on

methodology and research related to PBL. While initially the focus of the search was on the education of nursing students, it was decided that including other entities of collaboration might provide more insight on the topic. This process yielded a total of 19 articles spanning 1999 to 2010. These included 1 systematic review of PBL utilization in clinical teaching and 18 other articles describing collaborations of varying configurations and aims.

3. Results and Discussion

1. PBL in the clinical setting.

The only systematic review found in this search (Williams & Beatti, 2008) investigated the use of PBL by clinicians as a method of clinical teaching in undergraduate health professional programs. Authors sought to answer the following questions: 1) What is the clinician's understanding of the term PBL?; 2) Is PBL utilized or applied as a strategy for teaching in the clinical setting?; and 3) What facilitates or impedes the implementation of PBL in the clinical setting? (Williams & Beatti, 2008). Five qualitative studies spanning 7 years (1998-2005) were found to meet inclusion criteria, though only one of these studies focused exclusively on nursing education. This systematic review confirmed that PBL is indeed used as a teaching strategy in the clinical setting. Although the studies were heterogeneous in nature, a common theme was that application of PBL in the clinical setting was heavily influenced by clinician perceptions of PBL in relation to knowledge, preparation, and understanding of the teaching approach. Specifically, a lack of understanding of the basic PBL principles interfered with the teaching process, which led clinicians to revert to more traditional teacher-centered methods, thus undermining the more student-centered facilitation of critical thinking (Williams & Beatti, 2008). A number of barriers to PBL implementation in the clinical setting were noted, namely: poor understanding of PBL on the part of clinicians, irregular communication between clinicians and lecturers, unclear role perception, high staff turnover, lack of coordination between clinical experiences and PBL content, lack of PBL training/preparation for clinical teachers, lack of support of students in the clinical setting, time management, and competing demands of patient and clinical environment (Williams & Beatti, 2008). Authors also noted a number of proposed solutions to address some of these barriers, including: regular and focused communication between the lecturer and clinician; appointment of a clinical teaching associate to create a student/faculty/expert nurse triad in the clinical setting; matching clinical experiences and PBL tutorials; providing PBL training to all teachers and clinicians; and gravitating toward a process of “supported participation” rather than self-directed learning in the

clinical setting to facilitate PBL (Williams & Beatti, 2008). They further concluded that more research is needed to identify best practices in PBL implementation in the clinical setting. O'Neill, Willis, and Jones (2002) investigated the student experience in linking PBL and clinical experiences at the University of Manchester in the United Kingdom. At this particular university, a PBL approach was introduced in 1994 through an integrated course throughout students' clinical clerkships. Third- and fourth-year students were asked to respond to an open-ended question on the end-of-module course evaluation. Data from these questionnaires and from six focus groups were analyzed by theme. Authors found that students used a process of elaboration to link their learning from PBL into the clinical setting. This was accomplished through two main ways: encountering an appropriate patient (outside the PBL group), bringing their experiences back to the PBL group for discussion (inside the PBL group). The process was facilitated by the following factors: proper match between the clinical clerkship and the PBL case content, the role of the tutor in the facilitation process, and the self-directed initiatives of the student.

2. PBL collaboration for the clinical education of nursing students.

Seven of the 19 articles in this review described exemplars of PBL collaboration with the aim of clinical education of pre-registration nursing students. Examples involved nursing institutions and health service organizations in Europe (Finland, Brussels, Sweden), Australia (New South Wales), the United States (Washington DC), and Canada (Ontario). Nursing students were at the center of all of these exemplars, and two articles described inter-professional collaborative learning with other health professions students (physiotherapy, medical and nursing students in Goelen et al., 2006; medicine, occupational therapy, physical therapy, social work, and nursing students in Solomon et al., 2003).

Ääri et al. (2008) describe a collaborative partnership between Turku University of Applied Sciences and Turku Health Care Department in Finland. At this institution, PBL had been implemented in nursing education since 2004, and it was necessary to enhance the students' clinical learning. Authors decided to pilot an initiative where tutorial PBL small group sessions would be carried out in the long-term care practice portion of the curriculum (this was the students' first clinical experience). Clinical mentors of the nursing students were initially given a 20-hr mentor's training which covered the basics of PBL and evidence-based nursing. One PBL cycle consisting of two 2-hr tutorial sessions (each group consisting of 8-9 students) was carried out during the four-week clinical practice and held near

the practice wards.

During these sessions, clinical mentors (registered nurses) and university faculty worked together as tutors to promote student learning. A self-reported pre- and post-test questionnaire was administered to the students before and after the clinical practice experience. Results of the questionnaire showed that there were significant differences in PBL learning skills as well as in interactions with old patients before and after the intervention. Other notable results were a high level of student satisfaction and increases in both "own attitude towards long-term care" and "interest in work in long-term care." Authors concluded that this intervention was a positive one for all parties involved and pointed to collaboration between teacher and clinical mentor as an important factor in creating the best possible clinical practice learning environment for nursing students. They also suggested a number of practical considerations for other seeking to implement PBL tutorials in clinical, namely that: 1) the scenario must be fruitful and current for both students' learning goals and for clinical practice; 2) there must be adequate space for small group work and information-seeking activities (e.g. internet) near the ward; 3) the teacher must arrange the tutorial group work schedule in collaboration with the mentors; 4) the nurse administration of clinical practice must be involved and must see it as professional development for clinical nurses as well; 5) teacher and mentors of clinical practice must be capable of collaboration; and finally 6) the journal / notes of the tutorials that indicate the process and outcome of the small group work can be very informative to other nursing staff of the ward (Ääri et al., 2008).

Another collaborative teaching effort, described in Curtis (2007), took place in Australia and focused on mental health nursing. Mental health professionals in New South Wales, Australia were concerned that they were having difficulty recruiting newly-graduated nurses to their specialized area of nursing, citing the perceived lack of preparation by the tertiary sector, students' prejudices and anxieties about mental illness, perceived lack of support during clinical placement, and the quality of the clinical placement itself. The need to address these issues brought about collaboration between academics at the University of Wollongong (UOW) and clinicians in the local Area Health Service. Collaborators decided to focus their efforts on the intensive clinical workshops designed to prepare 2nd- and 3rd-year bachelor of nursing students for entry into their 4-wk mental health clinical placements. Consultation with clinicians about student competency during mental health clinical placements revealed that students not only took too much time to adjust to the mental health clinical

environment, but also that they needed more skill development prior to clinical placement. It was decided to adopt a combination PBL / role-play approach to these pre-clinical workshops, organized across a 2-wk period.

The 2-day workshops were co-facilitated by a mental health clinical nurse consultant working in an emergency department and an academic with a background in mental health, alcohol, and other drug nursing; both were experienced facilitators. In consultation with other mental health clinicians, the facilitators developed the problem scenarios and compiled supporting documentation that addressed a variety of mental health conditions as well as practice issues that come into play in the mental health setting (legal issues, ethical issues, dual diagnoses, etc.). The “consumers/clients/patients” in the role-plays were played by experienced clinicians and caregivers who were coached and debriefed by the facilitators. Students working in small groups were able to practice their interview skills in the first phase of the PBL process and were given feedback. In addition, they were given an introduction to their clinical placement sites and were able to ask any questions they had. When the clinicians left, the students were assigned to formulate and write up a mental status assessment based on the information obtained during the scenario.

They were also asked to identify gaps in their knowledge and learning objectives and then seek information overnight in order to formulate a nursing care plan for the next day. They were then asked to write an initial nursing report and present their consumer/client/patient to another group of students during a mock staff shift handover. Evaluations were collected from students at three time points: immediately after the workshop, after their mental health clinical placements, and for a selected number of students who were known to have chosen a career in mental health nursing upon graduation. The workshops were consistently rated highly, and were said to be very useful in increasing student confidence and knowledge preparation prior to the clinical placement. Responses after the clinical placements confirmed the usefulness of the workshop in preparing students for “what to expect.” Clinicians who were surveyed found the workshop experience to be valuable because they allowed them to contribute to the students’ learning and showcase the mental health nursing field. The recent graduates who chose mental health nursing also corroborated the usefulness of the workshops in inspiring them to pursue mental health. The author concluded that this collaborative teaching approach was a successful intervention in bridging the gaps between institutes of learning and of professional practice, and pointed out that there was a 5-fold increase in new graduates choosing to begin their

career in mental health in the two years since introducing the workshops.

Three other studies (Holaday & Buckley, 2008; Ehrenberg & Häggblom, 2007; Staun et al., 2009) described strategies that made use of PBL principles in the clinical learning environment as a way to bridge theoretical knowledge to the practice setting. All involved collaborations between academics and clinical nurse preceptors / supervisors in order to support student learning in accordance with the PBL principles of self-directed learning, reflection, and critical thinking.

In Holaday and Buckley (2008), nurse faculty at Trinity University in Washington DC, the Catholic University of America in Washington DC, and George Mason University in Fairfax, VA decided to work together to come up with an educational strategy that effectively addressed their challenges of faculty shortages, larger class sizes, competition for clinical sites, and limited educational resources. The model they developed has the following tenets: 1) students construct their own learning objectives for their clinical experiences based on individual learning needs and guidance from course objectives while clinical faculty help monitor their knowledge gained and modify the objectives as needed (through an ongoing clinical log); 2) the learning experience is completely embedded in the clinical setting where actual patient case situations encountered by students are used; and 3) guided by clinical preceptors, students choose an actual patient case encountered during their clinical experience, follow categorical guidelines, and develop written case situations that are then used for PBL tutorials. Clinical experience and tutorials occur concurrently, and students are assessed on their participation and progress in both domains. Although outcome data of this model is still forthcoming, authors note that it has been a rewarding and ongoing collaboration of nurse educators committed to teaching excellence.

Two examples from Sweden (Ehrenberg & Häggblom, 2007; Staun et al., 2009) highlight similar collaborative strategies in linking PBL with clinical education. In Staun et al. (2009), educators and clinicians employ the use of “patient-centered training in student-dedicated treatment rooms,” where the nursing student (alone or in pairs) take responsibility for patients placed in a student-dedicated room, performing all nursing care with the guidance and support of supervising clinical staff. The students followed the same patients for several days (rather than on their supervisors), and a logbook was kept to guide communication, assessment, and joint reflection between student, clinical supervisor, and lecturer. This approach was found to be highly satisfactory by most participants – both for staff and for students, with

students feeling that their time in clinical education had been used efficiently. The process of supported student reflection was cited as an important strategy to bridge the theory-practice gap (Staun et al., 2009). Ehrenberg and Häggblom (2007) described a similar guided reflection strategy to enhance clinical education. This intervention had the objective of improving nursing students' integrated learning during clinical education, ability to actively search for knowledge, reflect critically, and improve the clinical learning environment. Central tenants in this intervention were: 1) PBL as an educational method; 2) guided reflection; and 3) a supervision model supporting nurse preceptors. Nurse preceptors were supported by training in PBL, reflection, and techniques for literature search in nursing research. Each student was assigned to a nurse who was his/her personal preceptor during the whole 11-week clinical placement. This nurse preceptor supervised the student in the clinical environment and supported his/her self-directed learning. An additional part of this intervention involved a head nurse preceptor who was responsible for a small group of students from different clinical units. In collaboration with the clinical lecturer, this head preceptor arranged weekly meetings with the group of students to discuss problems and issues from the clinical field. Every other week, students were to bring patient scenarios from their units, which formed the basis for integration of theoretical and practice knowledge. The clinical lecturer held a joint appointment at the university and at the hospital, supported the head preceptor, the personal preceptors, as well as the students through the entire process and oversaw assessment processes. Students and staff perceived the utilization of PBL principles in this supervisory model to be positive overall. Authors emphasized the need for strong collaboration between health care clinics and the university as well as adequate training and support of all parties involved, especially in the central tenants of PBL. They concluded that when integrated into the clinical setting, PBL can engage students in authentic situations and prepare them for their professional careers by training them to be life-long learners.

The two remaining articles that describe exemplars of PBL collaboration with the aim of clinical education of pre-registration nursing students focus on inter-professional collaborative learning with other health professions students. Goelen et al. (2006) described inter-professional learning with undergraduate physiotherapy (3rd year), medical (2nd year), and nursing students (3rd year) in Brussels, Belgium, while Solomon et al. (2003) described inter-professional learning with undergraduate medicine, occupational therapy, physical therapy, social work, and nursing students in Ontario, Canada. Both used

real patients to enhance the PBL process.

In Goelen et al. (2006), the educational module consisted of 5 2-hr seminars given at 2-wk intervals during 10 consecutive weeks, with a total of 177 students divided into control groups of 8 single-profession students and intervention groups of 8 students evenly distributed from 3 professions – nursing, medical and physiotherapy. The triggers for PBL were a stable Parkinson's patient interviewed by the students in the 2nd seminar, and a recent stroke patient interviewed in the 4th seminar. In the first seminar, was an introductory orientation seminar where students familiarized themselves with each other and prepared for the patient interview process in the next seminar. The 3rd and 5th seminars were dedicated to student presentations of their work on the educational goals derived from seminars 2 and 4. Pre- and post-module evaluations were conducted using the Luecht et al. (1990) Interdisciplinary Education Perception Scale (IEPS) to assess student attitudes toward inter-professional cooperation in relation to this particular intervention (Goelen et al., 2006). In the intervention groups, authors found a significant improvement in overall attitudes of male students, as well as in attitudes pertaining to competency and autonomy of individuals in one's own profession. No significant improvements were found in the control groups, and authors found no adverse effects of the use of real patients in the educational module – in fact the patients valued the opportunity to contribute to teaching and brought more complexity, empathy, and humanity to the educational experience for students. Authors concluded that the inter-professional PBL module using real patients had the potential to improve attitudes pertaining to inter-professional collaboration and could have important implications in their ultimate future practice in health care.

Solomon et al. (2003) describes a similar incorporation of real patients in inter-professional PBL education. In this initiative, 10 senior-level students representing 5 professions (medicine, occupational therapy, physical therapy, nursing, and social work) were recruited to participate in an 8-week course on rehabilitation issues in HIV at McMaster University. Two tutorial groups of 5 each met weekly for 2 hours per session. Two experienced tutors interested in HIV (one a physician and the other an occupational therapist) from the Faculty of Health Sciences at McMaster University were recruited to participate as facilitators. In addition, two persons with HIV-AIDS (PHAs) who were experienced educators were asked to participate as resource tutors and were given training in PBL and basic facilitation skills. Their role was to provide insight from the perspectives of a PHA and prompt students to consider various aspects of the problem. Students were required to keep a weekly

journal and participated in semi-structured qualitative interviews within two weeks of the conclusion of the course. A broad theme that emerged from both the journals and the interviews was that students saw many benefits of the involvement of PHAs in the tutorial process – they provided a perspective on the lived experience and a context for learning, challenged assumptions and values, and acted as knowledge resources to guide students in their self-directed learning. Some students worried about offending the PHA tutors, but were able to work through these anxieties as the course progressed. Authors concluded that the involvement of PHAs in small-group PBL settings was perceived positively by students and created a more relevant learning text while addressing some of the issues of stigma in health professional students.

3. PBL collaboration for the training and professional development of clinical nurses. Another seven of the 19 articles in this review described exemplars of PBL collaboration with the aim of strengthening the capacity of clinical nurses. Price & Price (2002) uses examples from midwifery and gives an informative review of helpful frameworks that can be used in maximizing the clinical practice environment as a learning opportunity for students and clinical nursing staff alike. Celia & Gordon (2001) describe a PBL effort at a hospital in Philadelphia, USA used to train novice nurses as they enter the acute healthcare setting. Five other studies (Badeau 2010, Blackford & Street, 1999; Kim et al., 2007; Matthews-Smith et al., 2001; and Williams et al., 2002) describe examples of PBL being used for the training and professional development of clinical nurses in various settings around different topics (cardio-pulmonary, ethical decision-making, communication and cultural diversity, and geriatrics). All of these articles illustrate fruitful collaboration between academic institutions and practice institutions to further professional development of nurses.

Price & Price (2002) point out that PBL is traditionally implemented in the classroom setting, where issues of patient safety and competing demands on time are not a primary concern. The previous section of this review examined a number of examples where these issues were circumvented through strong collaboration between academics and clinicians committed to enhancing nursing student learning.

They argued that in order for PBL to be implemented effectively in the clinical environment, the approach must be adapted to bridge the learning differences between the two contexts. For example, the clinical supervisor takes on a modified facilitator role and must be mindful of problems and learning issues that are thematic and apply to more than one client so that short patient stays does not disrupt learning.

Authors emphasize the difference between the clinical supervisor role and that of the classroom PBL facilitator. Because of the demands of the practice environment, the clinical supervisor cannot afford to adopt an entirely nondirective role. S/he must continually assess the practitioner / learner's comfort level and competence in the practice environment. When using patients as foci of learning, inquiries must be handled discretely so that patients do not perceive that the student learner is unprofessional or incompetent. As an example, casting the parent as an expert to his/her child's disease process is much more helpful than asking naïve questions about what the parent might assume the student nurse should already know about the child's care. Echoing other studies, Price & Price agree that the process of reflection (on the part of both the supervisor and the learner) is an invaluable tool in promoting learning in the clinical setting. They further conclude that having a structured experience, framework-guided training, an appropriately tailored clinical supervisor role, and consistent monitoring and evaluation of group process are keys to successful adaptation of PBL in the professional development of staff and student learners alike (Price & Price, 2002).

Celia & Gordon (2001) was the only study in this review that described a PBL experienced used to train and orient novice nurses to the acute setting. This initiative, which took place at the Hahneman University Hospital in Philadelphia, USA (an acute tertiary-care teaching facility), represented a collaboration between the hospital's Staff Education and Training Department, the Staff Development Instructor, and Director of Nurse Recruitment and Retention, as well as the Medical College of Pennsylvania / Hahnemann University School of Nursing (which offered the program for graduate credit) (Celia & Gordon, 2001). Funding for the program was provided in the form of salaries for the new nurses as well as a flat rate of pay to cover training and participation for the nurses serving as trainers. The curriculum was designed to give novice nurses a comprehensive overview of acute and chronic health problems and patient management issues, while developing expertise in resources-seeking, clinical reasoning, self-directed learning skills. Thirteen PBL cases were developed, and novice nurse groups (14 in the first class and 12 in the second class divided into 2 groups) met on 2 non-consecutive days over a 6-wk period. Instructors and clinical nurse specialists reviewed the PBL cases for accuracy, realism, and clinical relevance, and a PBL consultant helped with the actual construction of the cases. Each PBL case was completed over an 8hr period with a 3-4hr sessions devoted to researching learning issues. A summative assessment was used in which learners

were given a similar PBL scenario to complete in a week's time, and evaluated orally in a 45-minute session on his/her ability to think critically. Orientation to the clinical unit, supervised clinical practice, as well as skills labs were incorporated as other aspects of this comprehensive orientation program. Post-course surveys showed that participants strongly agreed that the PBL format was useful as a learning tool for novice nurses transitioning into acute care. Novice nurses expressed the desire to have PBL as a regular part of their clinical education and would have preferred to have PBL in their undergraduate curricula. Nurses also noted that they could relate the PBL cases to patients they were seeing in the clinical units. Authors concluded that this PBL-based orientation program aimed at preparing novice nurses for tertiary care successfully supported novice nurses through the transition into acute care delivery. Preceptors and supervisors noted improved self-direction and critical thinking skills of program graduates (Celia & Gordon, 2001).

A number of other articles described PBL as a useful tool in nursing staff professional development. In Kim et al., (2007), a collaborative effort between nursing faculties in a university and clinical nursing leaders in an affiliated hospital in Seoul, Korea resulted in a pilot PBL program for continuing education of nurses. Two PBL packages in cardio-pulmonary nursing were developed and piloted in collaboration with nurse faculty after the need for PBL education was identified at a workshop involving the two stakeholders. The scenario development team consisted of 4 head nurses and 3 nurse faculty members who were experts in cardio-pulmonary nursing. The implementation consisted of 6 weekly 3-hr sessions with 45 nurses not previously exposed to PBL, divided into 5 groups according to their clinical backgrounds. Upon evaluation, participants noted a number of perceived advantages of PBL, including: self-motivation, active attitude, enhanced self-confidence and presentation skills, comprehensive approach, use of evidence-based practice, cooperative learning, and self-reflection. They also noted the following disadvantages: time-consuming, lack of direction, different learning outputs depending on abilities of group members. Based on these findings, the authors concluded that PBL is strongly recommended as a continuing education approach if tailored to the learning needs of clinical nurses. Additionally, the collaborative development of the program with school researchers and hospital nurses was seen as a positive educational strategy for evidence-based research and practice (Kim et al., 2007).

Two other articles (Williams et al, 2002 and Badeau 2010) described similarly successful outcomes

from using PBL as a strategy for professional development of nursing staff. Williams et al. (2002) described PBL at the New Mexico Veterans Administration (VA) Health Care System as a strategy to enhance the ethical decision-making of nursing staff. Eighteen primary care nursing staff (10 registered nurses, 5 licensed practical nurses, 1 nursing assistant and 2 health technicians) volunteered to participate in this pilot study, facilitated by a nurse manager. The PBL case used was adapted with permission from a case used in one of the nursing courses at the University of Phoenix. The pre- and post- test evaluations found that participants shared knowledge and demonstrated improved scores in decision-making and critical thinking skills. The authors further concluded that PBL is an appropriate learning and teaching strategy for ambulatory care nurses, and noted an increased awareness of ethical issues in the clinical environment (Williams, et al., 2002). In Badeau (2010), an initiative headed by the vice president of nursing and the director of innovation and knowledge at Joseph Brant Memorial Hospital (a Southern Ontario community hospital in Canada) and funded by the Nursing Secretariat (through the Ministry of Health and Long Term Care in Ontario) gave rise to a PBL professional development program for nurses. The program provided nurses the opportunity to spend time away from their regular responsibilities and further their education. The PBL program took place on site and occurred once every week during a regularly scheduled 11.25-hr day shift for a 6-wk period, with groups of no more than 8 participants. McMaster University School of Nursing was also requested to assist in the planning and development of the PBL opportunity for nurses and to serve as PBL group facilitators. The program planning committee consisted of a clinicians and educators who assessed organizational learning needs, identified desired outcomes, developed program objectives, developed participation criteria, selected program participants, assigned PBL groups, assigned facilitators, selected program topics, and developed problem scenarios, learning packages, and evaluation forms. Anecdotal evidence suggests positive outcomes related to the professional development of nurses, including: self-reported improvement in communication, conflict-management, research, and critical thinking skills. Authors further conclude that evidence-based nursing can be operationalized through PBL approaches to professional development of nursing practice (Badeau, 2010).

Two additional articles that used PBL in the professional development of nurses were guided by the assessment of specific nursing educational needs. In the case of Blackford & Street (1999), the PBL initiative arose out of an assessment of nursing issues

in caring for children and families of non-English speaking background (NESB). The issues of communication and cultural differences were increasingly impacting nursing care at the Royal Children's Hospital in Melbourne, Australia. Twenty-six nurses from clinical areas with high NESB client intake participated in the initial research into nursing educational needs. Six of these nurses (2 clinical educators, 1 unit manager, and 3 experienced nurses, all from different units) the participated in the follow-up collaborative effort to develop clinical-derived PBL packages that were subsequently piloted and incorporated into graduate nursing curricula, and into day-long / 2 half-day in-service education workshops in clinical areas. The nurses involved in this effort expressed enthusiasm of the PBL approach in the hospital setting in promoting learned across clinical areas, and their collaboration set the stage for further education on nursing units (Blackford & Street, 1999). In Matthews-Smith et al., (2001), collaboration between the Scotland National Board of Nursing, Midwifery, and Health Visiting and the University of Glasgow gave rise to a training and educational needs assessment around geriatric issues. Focus groups and individual interviews with nurses caring for older adults (22 hospital nurses, 15 nursing home nurses, 14 home care nurses), and group discussions with older adults formed the basis for the needs assessment. The assessment yielded rich information that formed the basis of a 9-scenario PBL module around various content, skills, and process areas deemed to enhance geriatric nursing care. The final educational module was embedded in the research findings from the needs analysis and consultation with the clinical areas. The authors offer this framework as an exemplary approach to: being attentive to diverse needs of nurse adult learners, promoting deeper approaches to learning, and enhancing critical thinking skills (Matthews-Smith et al., 2001).

4. Collaboration to enhance the PBL process.

The final three articles in this review focus on studies that highlight examples of collaboration to enhance the PBL process itself. Niemer et al. (2010) outlines a collaborative process for PBL scenario, while Carrega & Byrne (2010) describes the use of PBL to teach clinical education skills, and Conway et al. (2002) highlights challenges of PBL implementation across nursing cultures.

It is often acknowledged that a fruitful PBL learning experience is highly dependent on the quality of the PBL scenario itself (Roberts & Ousey, 2004; Duch, n.d.; White, 2005). The effective PBL scenario must first engage students' interest, motivate further self-directed learning, and relate to the real world (Duch n.d. in Niemer et al., 2010). It must require students to make decisions or judgments based on

facts, information, logic, or rationalization; further, it must be open-ended (not limited to one correct answer), connected to previously-learned knowledge, and embody controversial issues that will elicit diverse opinions (Duch n.d. in Niemer et al., 2010). Based on these principles, Niemer and colleagues put together a 10-member PBL scenario development team consisting of 2 pediatric, 2 obstetrics / newborn, 3 medical-surgical, 2 psychiatric, and 1 skills / simulation nurse faculty at Northern Kentucky University in Kentucky, USA. Through a series of 3 6-hour workshops, participants worked together to develop a set of PBL scenarios that were clinically relevant, amenable to theoretical analysis and problem-solving by nursing students. The first workshop focused on orienting participants to PBL and solicitation of appropriate actual patient care experiences. The second workshop took these patient care experiences to a theoretical level appropriate for students. The third and final workshop focused on peer review and finalization of the PBL scenarios. At the end of this time-consuming, yet creative process, 10 PBL scenarios and templates for implementation were developed. Authors noted positive evaluation from students in the eventual course that used these PBL scenarios.

Carrega & Byrne (2010) provide an example of PBL as a teaching strategy to enhance the skills of experienced nurses in a nursing education Master's program. At a Southeastern University in Georgia, USA, a PBL assignment was used to better prepare future nurse educators / clinical faculty. Masters level students were in the 2nd of a 4-semester program and were given an assignment involving PBL scenarios that described clinical learning situations of pre-registration nursing students. By having the graduate students create a teaching plan for each PBL scenario, the assignment provided a way to assess their creativity and problem-solving abilities in helping facilitate the learning of a hypothetical future student. Despite the need for further research into the effectiveness and long-term knowledge acquisition, the authors concluded that PBL can be used as a strategy to better prepare future nurse educators for clinical teaching, and perhaps in their guidance of students' self-directed learning and critical thinking skills in the clinical environment (Carrega & Byrne, 2010).

The final article in this literature review focuses on broader issues of cross-cultural implementation of PBL (Conway et al., 2002). This article explains a collaborative effort between the University of New South Wales, nursing faculty at the University of Newcastle, and the Australian Federal Government (AusAID) to help enhance nursing education in the Maldives at the Maldivian Institute of Health Sciences. The Australian PBL curriculum was

delivered offshore with University of Newcastle faculty of nursing staff visiting the Maldives for 1- to 6-wk teaching visits. Through the PBL implementation process, it was very apparent that there were significant differences between the Australian and Maldivian understandings and practices in nursing. In addition, there were remarkable differences between beliefs and attitudes about illness and health care practices in the capital (Male) and in the smaller islands of the Maldives. There were religious, political, language, and cultural concerns that impacted on the PBL content. Authors cited that the implementation success was only possible because of close collaboration with the community of health-care providers in the Maldives, continuous communication, mutual understanding, sharing information reciprocally, and being creative, innovative, and flexible. Authors concluded that PBL has the potential to be a powerful tool for changing cultures and caution nurse educators to ensure that such program delivery is culturally relevant rather than conflicting with the cultural values and realities of nursing practice in the host culture. Programs must be designed in alignment with cultural and contextual circumstances so that learner capacity may be strengthened effectively (Conway et al., 2002).

Collaboration as a common theme and lessons

The present review has summarized 19 peer-reviewed articles that examine the uses of PBL as an approach to further nursing education. Collaboration emerged as a consistent theme – whether between academics and practitioners in the supervision and guidance of nursing students, between faculty members and real patients in facilitating PBL group tutorial sessions, between inter-professional students in PBL learning, or between nurses of different specialties in developing PBL scenarios. In many of the studies, PBL was cited as an effective approach to bridging the gap between theory, practice, and research and enhancing important skills necessary for nurses to take better care of their patients – students were able to better integrate their classroom learning in the clinical setting through reflection, experienced nurses were able to enhance their practice through professional development opportunities, and PBL modules were seen as a way to respond to research-derived learning needs of professional nurses. Conway et al. (2002) emphasized a final lesson of being mindful of cultural and contextual relevance when implementing PBL.

4. Conclusion, recommendations and Implications for the South African context

These articles shed light on a number of implications for the resource-limited South African context (particularly at NWU-MC). It is clear from the literature that collaboration can take many forms, but a central aim unites all of efforts. The central aim or

motivation for collaboration can range anywhere from the need to develop effective PBL scenarios (as in Niemer et al., 2010), to the need to transition novice nurses into practice in a tertiary care setting (as in Celia & Gordon, 2001), to the need to better prepare students for the mental health nursing clinical placement (as in Curtis, 2007), to the need to address learning needs of nurses caring for geriatric patients (Matthews-Smith et al., 2001), to the need to better integrate classroom learning and clinical learning for nursing students (as in Ääri et al., 2008; Holaday & Buckley, 2008; Ehrenberg & Häggblom, 2007; and Staun et al., 2009), to the need to enhance inter-professional attitudes (as in Goelen et al., 2006). In order for NWU-MC to develop an effective model for collaboration centered on PBL, it must decide on its central collaborative aim. This will drive whether or not NWU-MC decides to focus its efforts on nursing students, practicing clinical nurses, or on enhancing existing PBL processes. This central aim will depend on available financial and infrastructural resources, institutional priorities and mandates, availability and willingness of prospective stakeholders, and current human resource capacity.

As NWU-MC moves toward collaboration in PBL, it may be helpful to develop research efforts to identify important PBL stakeholders (especially those at the managerial level) as well as priority educational needs facing the nursing profession as a whole (similar to those undertaken in Matthews-Smith, 2001 and in Blackford & Street, 1999). As NWU-MC moves forward in collaboration, it must keep in mind the cross-cultural lessons from Conway et al. (2002) especially since the PBL approach is a new system of teaching and learning for this rural context. Furthermore, NWU-MC must keep in mind the differences between classroom learning and clinical learning (as outlined in Price & Price, 2002). Ultimately, to ensure success, special attention must be paid to the training of all collaborating parties in PBL, piloting new interventions before scale-up, and careful evaluation of interventions.

The nursing education literature is rich with numerous examples of PBL implementation. The use of this pedagogical strategy in the clinical setting among collaborative partners is still relatively new because of inherent challenges of bridging the theory-practice-research gap and the demands that the clinical setting poses. This examination of the literature has provided a number of tangible exemplars for collaborative implementation of PBL involving nursing students, nursing educators, nurse managers, clinicians, and researchers. As NWU-MC in South Africa gravitates toward a more collaborative approach to the implementation of PBL, lessons learned from

these exemplars can provide much guidance and insight.

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The effect of betamethasone on fetal movement, biophysical profile and fetal circulation in preterm fetusesSoghra kazardoost¹, Parichehr pooransari^{*2}, Masoome mirzamoradoi^{MD3}, Hashemi Mohammad Abad Nazir⁴.

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Abstract: Objective: Evaluating the effect of antenatal betamethasone on the biophysical profile and Doppler indices of umbilical and middle cerebral arteries. Materials and Methods: Twenty-five preterm labor singleton pregnancies (gestational age, 26-34 weeks) were studied prospectively. These patients received two consecutive doses of betamethasone 24 hours apart to accelerate pulmonary maturation. Fetal biophysical profile (BPP) and Doppler assessment were performed twice, on admission and 48 hours after administration of the first dose. The mother recorded fetal movement before, during and after the study periods. Comparison was made between biophysical profile score, fetal movement and Doppler indices of the umbilical and middle cerebral artery before and after betamethasone administration. Continuous data were compared by paired t test and dichotomous data were compared by McNemar test between pre and post treatment evaluations. The statistical significance was set at 0.05 levels. Results: Twenty-five women—median age, 26 (19-42) years; median of gestational age, 32 (26-34) weeks—which were referred to Imam Sajjad hospital, Yasuj from August 2010 to December 2011 were enrolled into the study. There was significant difference in fetal movement before and after betamethasone administration ($p=0.004$). The frequency of BPP scores ≤ 8 increased from 13 to 21 subjects ($p=0.039$) at post treatment evaluation which was significant statistically. There was statistically significant difference in the reduction of umbilical artery PI (0.10) (95%CI: 0.01-0.19) and RI (0.07) (95%CI: 0.08-0.06), but these changes were not important clinically. The mean changes of MCA PI and RI were 0.01 (95% CI:-0.16-0.19) and -0.01 (95% CI:-0.08-0.06), respectively. Conclusion: After betamethasone administration, fetal movement, BPP scores and umbilical artery indices were decreased, while MCA Doppler indices were not affected.

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Keywords: Betamethasone, Biophysical profile, Doppler indices, fetal movement

Introduction

Preterm birth is associated with significant prenatal morbidity and mortality rates. The overall preterm delivery (PTD) rate is 8.1% (1). The use of prophylactic maternal corticosteroids to enhance fetal lung maturity in women at risk of PTD has currently been carried out (2). Biophysical assay is a useful tool for the assessment of the fetal well being. Previous studies have shown that antenatal steroid administration may suppress fetal activity and change the biophysical score (3). Sometimes this transient changes may result to an unwanted iatrogenic delivery. Doppler velocimetry of the brain circulation and umbilical for evaluation of the well being of the fetus in the uterus has been used (4, 5). We have also been want that used this technique in healthy preterm fetus, because that can differentiate between fetal distress and suppression of biophysical profile due to steroid effect. Therefore we studied onset and duration of betamethasone administration on biophysical profile and Doppler indices of healthy fetus. These

information can decrease management errors due to misinterpretations of biophysical profile data.

Materials and Methods

Thirty one single fetus pregnancies at high risk for preterm delivery who were admitted to the obstetrics unit of Imam Sajjad hospital, Yasuj from August 2010 to December 2011 with 26-34 weeks gestation were enrolled into the study. Six of these patients were excluded from the analysis due to spontaneous delivery prior to completion of all the examinations or incomplete data. The median age was 19-42 years. The main indication for hospital admission and steroid use was third trimester vaginal bleeding, previous preterm delivery, uterine anomaly and false labor due to urinary infection. Usually, any patient who was admitted to the hospital with a gestational age of less than 34 weeks received steroids. Informed written consent was obtained from all patients. Before baseline examination, an ultrasonography examination was performed for the

biometry and estimated fetal weight. All of the examinations were done after breakfast at 8-12 midday to control the fetal circadian rhythm. The gestational age was calculated based on the last menstrual period (LMP) which agreed with the second trimester ultrasonography examination.

Karyotypic suspicion of medication of magnesium sulfate and narcotic analgesics that might interfere with the biophysical profile and Doppler studies were excluded from the study. All of the examination was carried out by one person. Both arteries were sampled at the lowest feasible incident angle.

After completion of the base line examination (0) the patients who were eligible for the study received two doses of 12 mg betamethasone, 24 hours apart. BPP scores and Doppler flow velocimetry wave forma of umbilical and middle cerebral artery were performed at 0 and 48 hours after the first dose of betamethasone administration. Fetuses were included if their initial biophysical profile scores were equal to or higher than 8.

0 or 2 points were assigned for each component of the biophysical profile, the non stress test, fetal movement, fetal tone, breathing movements and amniotic fluid volume. Fetal heart rate tracing was recorded daily for 30 min before the biophysical profile was obtained and evaluated and interpreted as reassuring or non-reassuring as proposed by ACOG.

Doppler studies were performed immediately after the biophysical profile scores. Peak systolic velocity, pulsatility index (PI), resistance index (RI), S/D ratios of both the middle cerebral and umbilical arteries were obtained.

MCA: Median Cerebral Artery; UA: Umbilical Artery; PI: Pulsatility Index; RI: Resistance Index

Discussion

In this study, it was observed that administrating betamethasone for the mother may lead to a significant but temporary decrease of biophysical profile scores in healthy preterm fetuses. In a study performed by Rotmensch et al., a profound suppression was observed on the biophysical profile scores at 48 hr of steroid use (5) which was consistent with our findings. The mechanism causing the suppression of biophysical activities by steroids are not clear. The ability of synthetic glucocorticosteroids in suppressing neural activity has been documented (6); furthermore, glucocorticoid receptors are widely expressed in cerebral cortical tissues, mid brain and subcortical nuclei which may partly explain the suppression. Jackson et al. also obtained the same results. They showed that the administration of betamethasone decreases fetal movement and

The data were analyzed using SPSS version 11.5, continuous data were compared by paired t test and dichotomous data were compared by MCNemar test between pre and post treatment evaluation. The statistical significance was set at 0.05 level.

Results

Twenty five women with the median (range) age of 26 (19-42) years were enrolled into the study. The median (range) of gestational weeks at delivery was 32 (26-34) weeks.

The mean reduction of umbilical artery PI was 0.10 (95% CI: 0.01-0.19) and of the umbilical artery RI was 0.07 (95% CI: 0.01-0.12). The mean changes of MCA PI and RI were 0.01 (95% CI: -0.16-0.19) and 0.01 (95% CI: -0.08-0.06), respectively (Table 1).

In nine (36%) subjects, fetal movement decreased 48 hours after steroid treatment ($P = 0.004$).

The frequency of a higher or equal to 6 BPP score increased from 2 to 3 subjects ($P=1.0$) and the frequency of a higher or equal to 8 BPP score increased from 13 to 21 subjects ($P = 0.039$) at post treatment evaluation.

	Pre treatment	Post treatment	PV*
	N = 25		
UA PI	1.09 (\pm 0.32)	0.99 (\pm 0.34)	0.025
UA RI	0.62 (\pm 0.11)	0.55 (\pm 0.16)	0.019
MCA PI	1.99 (\pm 0.61)	1.98 (\pm 0.72)	0.875
MCA RI	0.84 (\pm 0.13)	0.85 (\pm 0.19)	0.823

* paired t test

breathing and as a result the biophysical profile scores may be decreased. In their study, amniotic fluid was also decreased, but this result was not obtained in our study (7).

Biophysical monitoring using the biophysical profile scores has been shown to decrease both mortality and morbidity in the at risk fetus. This is the most commonly used tool in at risk fetuses and also in the high-risk pregnancy monitoring (8). By suppression of the multiple fetal biophysical parameters, antenatal steroids may result in a significant clinical confusion (9).

Another modality for evaluation of the fetal status is Doppler velocimetry of the umbilical and fetal cerebral circulation (10). In a previous study carried out by Cohlen et al., corticosteroids had no effect on Doppler indices obtained from fetal, placental or uterine arteries (11). This finding has been subsequently confirmed by others (12, 13). In our study, the middle cerebral and the umbilical artery Doppler indices decreased, although not clinically

significant. These findings suggest the reliability of this modality for the assessment of fetuses previously exposed to antenatal steroids. Doppler studies have the potential to differentiate the steroid-induced changes in the fetal biophysical profile from those due to fetal compromise (14). The fact that antenatal steroid usage is rising, subsequently leading to an increase in the rate of abnormal biophysical profile highlights this matter as a notable clinical consideration (15). Until new monitoring tools or algorithms are added, the decision regarding the delivery of preterm fetuses exposed to antenatal steroids should be cautiously made.

Conclusion

We demonstrated that betamethasone administration can cause a remarkable, but impermanent reduction in fetal body movement. This result is particularly outstanding for the biophysical profile score obtained after 72 hr of steroid administration. Misinterpretation of the post steroid biophysical depression as an evidence of fetal compromise could lead to the unwarranted delivery of a preterm fetus but MCA and umbilical artery Doppler indices can detect the difference between the two compromised and non compromised fetus groups.

Acknowledgement

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Conflict of Interest

None declared.

Running Title: Betamethasone and Biophysical Profile in Preterm Fetuses

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A new review on Cooperative diversity in wireless networks

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Abstract: Today, wireless communication systems will be built for cooperation rather than for more coexistence. Cooperative communication is a hot topic of current research and many researchers believe it to be the next big step after multiple-input multiple output systems. The important idea is that multiple nodes cooperate in order to increase the link quality, reliability and data rate of the system. In the future, the density of active nodes competing for a common wireless channel in cellular as well as access or ad hoc networks will increase significantly. Therefore, node cooperation is an efficient means of achieving these gains.

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Keywords: cooperative diversity techniques, Virtual MIMO, fading channels, Rayleigh fading

1. Introduction

Cooperative diversity is a wireless transmission technique so as to overcome fading. It is a diversity technique which is obtained using signal relaying nodes. The relay nodes transmit its received signal from the source node to the destination node, which receives two non independent signals from the relay and the source node. Cooperative diversity is a virtual multiple antenna technique which exploits multiple antenna signal processing. It has recently been proposed as a promising technology to achieve spatial diversity in wireless networks. Single antenna nodes in wireless networks share their antennas and transmit cooperatively as virtual MIMO systems. Thus spatial diversity can be achieved and multipath fading can be effectively mitigated.

Cooperative diversity networks technology is a promising solution for the high data rate coverage required in future cellular and ad-hoc wireless communication systems. There are two main advantages of this relaying technology. The low transmit power requirements and the spatial diversity that can mitigate fading. Cooperative diversity networks combine the usual power saving with the spatial diversity provided by the antennas of separate nodes. The basic idea is that between the transmitter and receiver nodes, there can be another node, which can be used to provide diversity by forming a virtual multi antenna system. In regular cooperative-diversity networks, in addition to the direct link all relays participate in sending the source signal to the destination.

By enhancing diversity, cooperation in wireless networks allows increasing the transmission reliability and extending the radio coverage without the need of implementing multiple antennas at the terminals. In wireless networks, antenna diversity

technique has been commonly used to combat the deleterious effect of the fading. These techniques require the terminals to be of reasonable size so as to support multiple antennas, a requirement that proves to be unfeasible for future wireless terminals which are expected to be small and light. Recently cooperative diversity in wireless networks have gained much interest in the wireless research community due to its ability to mitigate fading through achieving spatial diversity, while resolving the difficulties of installing multiple antennas on small communication terminals. Basic idea is in addition to the direct signal from source to the destination, multiple cooperative nodes (relays) collaborate together to relay the signal from the source node to the destination node. As a result the destination can receive multiple independent copies of the same signal and can achieve diversity through the establishment of a virtual antenna array. Other benefits are expansion of the radio coverage without using high power levels at the source, increase of connectivity and higher capacity.

2. Important issues in the area

- 2.1 System modeling taking interference into consideration: In network scenario, cooperative relay system can suffer from co channel and adjacent channel interference. Hence, the effect of this interference needs to be addressed.
- 2.2 Power optimization based on link condition: Wireless nodes generally have limited battery power. If relay based systems have some feedback mechanism, then power can be allocated based on link condition. Such dynamic allocation of power may save battery power or boost the data transfer rate and hence an important area to be investigated.

- 2.3 Full duplex operation of relays: Relay operation in half-duplex mode creates system bandwidth expansion. Full-duplex relay operating in single frequency can solve this problem. Hence, further investigation is necessary for full duplex relay operation.
- 2.4 Spectral efficiencies: Orthogonal transmission from relays to receiver in different time slots effect the spectrum efficiency. Relays can interact with the receiver using orthogonal codes to avoid bandwidth expansion. Therefore, issues of orthogonal code design for distributed relay nodes may be addressed in future.
- 2.5 Complexity performance trade off: Relays can process the signal in non-regenerative (Amplify and forward-AF) or regenerative mode (Decode and forward-DF) depending on their functionality. Non-regenerative mode of operation puts less processing burden as compared to regenerative mode; hence often preferred when complexity and latency are important issues. Scope exists in future for non-regenerative mode of relay operation. Noise amplification is a major issue in non regenerative mode of operation.
- 2.6 Multi-hop communication: The research community has increased its attention towards wireless multi-hop communication due to its envisioned application of Ad-Hoc networks, sensor network, and range extension of cellular networks.
- 2.7 Modeling of relay links in various environments: Radio propagation suffers with path loss, shadowing and multi-path fading which depends on regional geography. Statistical behaviors' of various propagation environments are available in literatures. Relay links can be modeled in such propagation environment.
- 2.8 Diversity combining techniques for relay systems: Most of the system models were considered selection combining and maximum ratio combining at the receiver. In future, other type of diversity combining techniques such as equal gain combining, switch combining etc, can be incorporated in relay based system.
- 2.9 Node cooperation with cross-layer design: Node cooperation is a powerful technique to improve the performance of wireless sensor network. Sensor nodes are powered by small battery that may not be recharged easily. So reducing energy consumption is an important issue for such type of network. Protocol layering in network design provides modularity for network protocols that facilitates standardization and implementation. Investigation of cross-layer optimization is another issue.
- 2.10 Bidirectional user cooperation: In user cooperation, users terminal not only have to transmit its own data, but also other users data by sharing some of the resources. Extension of work for bidirectional user cooperation may be addressed.
- 2.11 Base station cooperation: in traditional cellular system, user terminals communicate with a parent base station. User near the outskirts of cell can see other neighboring base stations and become an active source for generating interfering signals. To overcome this problem, neighboring base stations can also cooperate with parent base station and form joint decoding of received signals. Relay cooperation can be extended for base station cooperation.

3. Focus of research

Cooperative diversity combining techniques, fading channel modeling, performance of amplify and forward protocol, performance analysis of MRC and generalized selection combining techniques with an input threshold.

4. Research for selection of research issue

The next generation wireless systems are supposed to handle high data rate as well as large coverage area. It should consume less power and utilize bandwidth efficiently. At the same time, the mobile terminals must be simple, cheap and smaller in size. In wireless environment, the quality of received signal level degraded due to path loss and shadowing from various obstacles in propagation path. In addition to this, signal quality suffers from fading due to constructive and destructive interference of multipath components which makes it difficult for the receiver to extract the message correctly. Effect of fading can be suppressed by diversity technique in which replicas of signal is provided to the receiver. Receiver can make a decision on behalf of these replicas; hence, reliability of reception can be improved. Diversity can be achieved with the help of multi-antenna systems where multiple antennas are installed at transmitter/receiver. However, implementing multiple antennas at wireless terminal is not practical due to size; cost and weight constraints. Cooperation among nodes creates spatial diversity in wireless network, even if individual nodes do not use antenna arrays for transmission and reception. Here, diversity gain can be translated into robustness against fading for same transmit power or substantially reduced transmitted power for same level of performance.

5. Literature review

Cooperative diversity networks technology is a promising solution for high data rate coverage required in future wireless communication systems. There are two main advantages of this technology; the low transmit RF power requirements, and the spatial diversity gain [1]. In this paper, comprehensive analyses of the incremental-best relay cooperative diversity, in which limited feedback from the destination terminal, e.g., a single bit indicating the success or failure of the direct transmission. If the destination provides a negative acknowledgment via feedback; in this case only, the best relay among available relays retransmits the source signal in an attempt to exploit spatial diversity by combining the signals received at the destination from the source and the best relay. The best relay is selected as the relay node that can achieve the highest signal to noise ratio at the destination node. Here the receiver has to wait for the retransmission of signals from the best relay. It will take additional time. So for delay sensitive applications, this would not be a good solution. While the relay is responding for the signal from the receiver, it can't respond for any signals coming from some other nodes. In this paper, the channel is Rayleigh faded and combining scheme used was MRC. So the receiver should add up all branches coherently. It consumes lot of power because each branch requires sufficient power for processing the signal passing through it. Moreover for no coherent modulation schemes, it won't give better performance. End to end performance of two-hop transmission systems with relays over Rayleigh fading channel is mentioned in [2]. Here only one relay is considered. If the relay misbehaves, performance of the system becomes very poor. Authors won't mention about the combining techniques. Modulation scheme used is BDPSK. It is possible to use MRC in this system for better performance. In [3], low complexity cooperative diversity protocols that combat fading induced by multipath propagation in wireless networks are mentioned. This paper deals with single relay system and combining technique used at the receiver end is not given. It is possible to use MRC in this for better performance. In [4], selection combining in cooperative relaying networks over

Rayleigh fading channel is given. This combining technique is useful when the transmitter uses no coherent modulation schemes. For coherent modulation schemes it won't give better performance. Because co phasing is not done in selection combining scheme, so any phase variations occurred during channel transmission are not cancelled at the receiver end and it may lead to degradation in the performance. Also selection combining scheme considers only one

branch signal for processing. In [5], generalized selection combining for amplifies and forward cooperative diversity networks are given. Here the performance of the combiner under Rayleigh fading channel with amplifies and forward protocol using BPSK modulation scheme is mentioned. This system is applicable for no coherent communication systems only. It is possible to use MRC in this system for better performance.

In [6], comparison of diversity combining techniques for Rayleigh fading channels is mentioned. Here basic combining techniques like Selection combining (SC), equal gain combining (EGC) and maximum ratio combining techniques (MRC) are given. Each has its own advantages and disadvantages. For no coherent communication systems SC is preferred where as for coherent modulation schemes, MRC is used. Moreover MRC requires channel state information such as channel attenuation and phase variations. Both EGC and MRC require co phasing, but performance of EGC is poor compared to MRC. In [7], analysis of generalized selection diversity systems in wireless channels under rician fading channels is given. It is applicable only for microcellular and picocellular environments. In [8], performance analysis of linear diversity combining schemes on Rayleigh fading channels with binary signalling and gaussian weighting errors are given. Here the error probability performance of MRC, EGC, SC and GSC diversity schemes for i.i.d Rayleigh fading channels with gaussian channel estimation errors are explained. In this case the power consumption at the receiver side will be more. In [9], Sensitivity to timing errors in EGC and MRC techniques over Rayleigh and Nakagami-m fading channels are given. Here the use of these two techniques causes high power consumption at the receiver end. In [10], MRC and GSC diversity combining with an output threshold is mentioned. This system checks the combined output SNR and if it is less than a predetermined threshold, it tries to increase the SNR by combining branch signals. This system has a limitation that each time after processing all branch signals, combiner should verify the output SNR.

In [11], performance analysis of adaptive decodes and forward cooperative diversity networks with best relay selection are given. Here, from the receiver end, a feedback signal is given to the relay side, if the information has not been properly received. The relay which has highest SNR will retransmit the information to the receiver. Since this system uses decode and forward (DF) technique, it consumes time for decoding the signal received from the source. So for delay sensitive applications this system will not give better performance. The authors

in [12]-[18], authors mentioned the performance of cooperative diversity with amplify forward and decode and forward protocols in Rayleigh and Nakagami fading channels using various combining schemes. In [19], [20] performance of decode and forward and hybrid decode amplify and forward protocols are given.

In [21], [22] the performance of generalized selection combining (GSC) scheme with input threshold have been mentioned. Here the receiver tries to use acceptable diversity paths by comparing the SNR of each path against a certain threshold. In my work a new method is suggested at the receiver end. Signals from various relays, which are above certain threshold SNR are combined using MRC technique. Performance the analysis of input thresholded MRC (IT MRC) under Rayleigh fading channel in cooperative communication networks. That is the relay signals greater than the threshold are combined effectively using MRC with an input threshold, So that the power at the receiver side may be saved effectively.

6. Conclusion

Need for high performance wireless communication systems are one of major goals of today's research. MIMO techniques are a solution for high performance. From the implementation point of view, there are still difficulties in accommodating multiple antennas in many types of wireless terminals and therefore the benefits promised by MIMO are yet to be fully exploited.

Cost of antennas and complexity makes MIMO difficult to get accepted. Instead of using separate antennas we can use nodes in the network as antennas which in turn use the cooperation of sender and nodes to avail multi antenna structure and so is known as cooperative communication.

We can achieve same performance output from optimized cooperative schemes as that of MIMO systems. Hardware complexity and cost are less in cooperative communication. This concept has applications in various wireless standards.

6.1. Need for high performance wireless communication systems with fewer electronics and lower power consumption.

6.2. Disadvantages of common MIMO systems and achieve the same performance output from optimized cooperative schemes.

6.3. Applicability to various wireless standards.

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9/6/2012

BUILDING ORIENTATION AND ITS EFFECT ON HOUSE PLAN CONFIGURATION FOR THE CLIMATE OF LAHORE

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Abstract: This study on Passive design considerations for the solar orientation focuses residential buildings for its application in retrofitting the developments is proposed for energy conservation by the government and private sectors. This study integrates the experimental findings on test rooms at main orientations as a PhD dissertation for implementation in the residential sector in addition to many other identified features. Different practical environmental data is calculated for climatic consideration in architectural and urban design. The standard house planning and its configuration is presented in relation to orientation for the thermal control. The results of experimental study and simulations showed the SW an optimum orientation for heating and cooling requirements. [Sabahat Arif ,Arif Khan and Khalid Alamgir. **BUILDING ORIENTATION AND ITS EFFECT ON HOUSE PLAN CONFIGURATION FOR THE CLIMATE OF LAHORE.** *Life Sci J* 2012;9(4):362-368] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 56

Keywords: Orientation, plan configuration, climate, altitude, temperatures.

1. Introduction

Solar access is the key factor affecting any building and it varies seasonally at a given geographical location hence there is a need to heat or cool the building within the available variations of sun at different orientations (Brophy et al., 2000). Thermal comfort, solar exposure and daylight in any built locality is affected by the buildings' orientation, form with the glazing ratio of each facade, adjacent topography and surrounding structures. It has been concluded in the literature review that, N-S orientations were performing better than the E-W. The planning of access roads on a site influences solar access considerably because it controls the plot orientation.

For urban design of housing, it is justified to divide innumerate climates into a limited number of zones , though it is difficult to classify (Sodha et al., 1986). Temperature is an important aspect of climate and has been used to grade climatic zones in the world on a scale of climatic archetypes as given in the following Table1.

Table 1 Climates are characterized by the temperatures.

Climate type	Temperature range
Hot	over 30 ° C
Tropical	with averages above 20° C
Subtropical	4 to 11 months above 20° C
Temperate	4 to 12 months at 10° to 20° C
Cold	1 to 4 months at 10° to 20° C
Polar	12 months below 10° C

Source: www.maps.of.world.com, accessed on 1st November, 2009.

The rate of heating and cooling of the surface of earth is the main factor determining the temperature of the air above it and the solar radiations have an indirect effect on the air temperature (Das, 2006), (Tzonis et al., 2001). Temperature difference on the earth's surface causes significant variations locally. Climatic conditions get changed by the variation of temperatures of land and sea on earth's surface. The diurnal and seasonal temperature variations are affected by the sky conditions (Olgay, 1963). The building envelope gets hotter when they are exposed to solar radiations, and the temperature inside the buildings vary than the outside air temperature due to the thermal properties of the envelope materials (Fry and Drew, 1964). Temperature is also affected by the altitude and orientation of a location. Pakistan has a variety of climates and climatic zones like very cold, humid, arid range in addition to hot and very hot. The southern parts of the country receive heavy rains. The northern part is outside the monsoon belt. The extreme northern areas are dry and experience very cold winters with heavy snow fall but mild summers. However, July and August 2010 showed a significant climate change in the northern and western parts of the country. The city of Lahore has the changing seasons which set a difficult task for the building designers.

For a building designer and architect, all the parameters of weather are important including wind speed and its direction, sunshine hours, solar radiations and the relative humidity of the air in order to apply thermal considerations. Therefore, for

thermal comfort estimation of cooling or heating loads in buildings are important.

Pakistan has a wide diversity of habitat due to the large variation in climate and landform. The climates vary from hot, dry desert, temperate in northwest, and arctic in the north (Figure 1). Pakistan has the cold mountainous area, the high desert of Baluchistan and the hot desert of the Indus and the warm humid breezes of the coastal areas. Five different climatic regions have been recognized in Pakistan due to diverse climatic conditions and through the seasonal extremes of the climate, as shown in Figure 3.4b, classified by ENERCON, (1990).

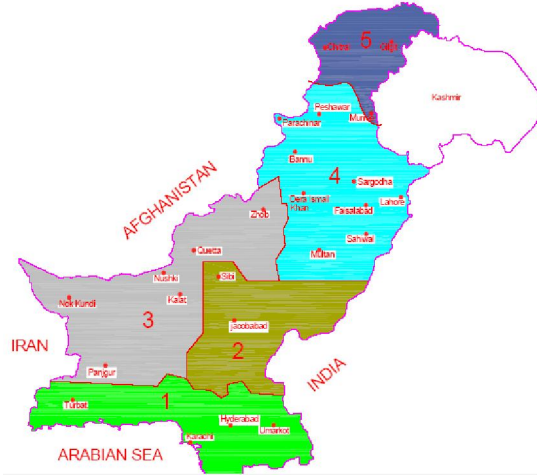


Figure 1 Climatic zones of Pakistan.

Source: ENERCON, Manual (1992), Islamabad.

Each zone also has its own architectural and cultural variations. Lahore is located in the Zone 4, which is characterized by the high summer of May and June when midday temperatures rise well past the forties. During the cold weather of December and January, the night time temperatures fall close to freezing.

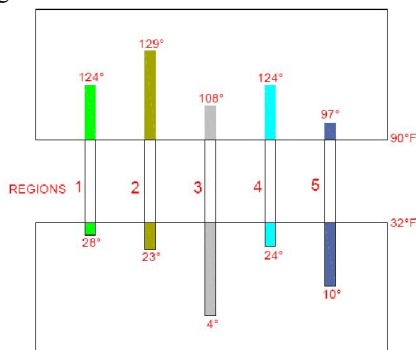


Figure 2 Maximum and minimum temperatures recorded in Lahore.

Source: Enercon, Building Energy Codes for Pakistan.

The Earth's orientation affects the amount of solar radiation received at different latitudes on earth. Figure 3.2 demonstrates the positions of the Earth in its orbit and it varies from declination angle of +23.5o on 22nd June (summer solstice position) to -23.5 o on 22nd December (winter solstice). The zero declination angle on both, 21 March and September 22 (Equinox positions), is important to understand the building design problems.

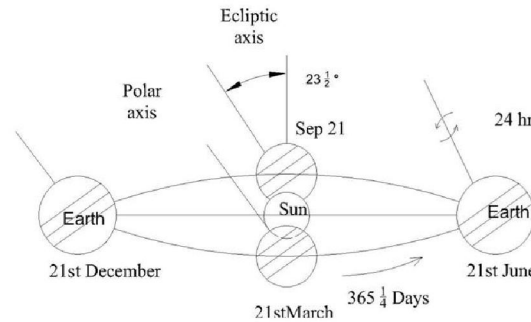


Figure 3 Relative positions of the Earth and Sun throughout the year.

Source: Solar Passive Building, book published in Oxford Pragamon Press, 1986.

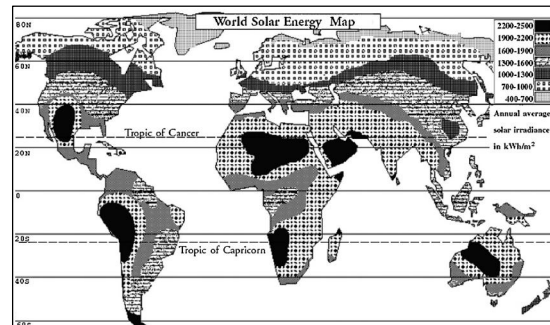


Figure 4. Global solar radiation Map of the World. Source of images: Gordon Weyn and Energy Sector

Assessment for USAID/Pakistan June, 2007 and Jan Kreider, Advanced Solar Design, College of Engineering and Applied Science, Department of Civil, Environmental and Architectural Engineering, University of Colorado at Boulder, USA.

The climate of earth is determined by the energy input from the sun. The solar geometry and the energy flows from the sun are important at a location on earth with regard to passive design technique.

It may be depicted from this map (red spot) that the annual average solar irradiance of about 1900 to 2200 kWh/m², is falling on the latitude of Lahore as shown in Figure 4.

The latitude of Lahore varies from 31° 15' to 31° 45' and Longitude from 74° 01' to 74° 39'. Lahore is situated at an elevation of 213 meters (712 feet) above the mean sea level.

Though the principal climatic elements of any location are solar radiation, temperature, humidity, wind, precipitation and special characteristics such as lightning, earthquakes, dust storm and so on when human comfort and building design are considered (Konya, 1980) but it may also

be stated that the rate of recurrence of certain amount of climatic data for example monthly mean minimum and maximum temperatures, their diurnal range, monthly mean, maximum & minimum relative humidity and wind direction and velocity for any location must also be collected and analyzed. The average minimum and maximum temperatures in different months of the year in Lahore are shown in the Table 2.

Table 2 Average Minimum and Maximum temperatures in different months of the year in Lahore.

Months	Average Temp.	max.	Average Temp.	min.	Months	Average Temp.	max.	Average Temp.	min.
January	19.8oC		5.9oC		July	36.1oC		26.9oC	
February	22.0oC		8.9 oC		August	35.0 oC		26.4oC	
March	27.1oC		14 oC		September	35.0 oC		24.4oC	
April	33.9oC		19.6oC		October	32.9 oC		18.2oC	
May	38.0 oC		23oC		November	27.4 oC		11.6oC	
June	40.4 oC		27.4 oC		December	21.6 oC		6.8oC	

2. SUNSHINE HOURS IN LAHORE

It is an established fact that the duration of daylight varies over different Latitudes and various seasons on earth. The sunshine hour is the time between sunrise and sunset at any latitude on any day. Sunshine hours recorded for the year January 2008 to August 2009 by the Meteorological Department, Lahore are shown in the Table 3.0 The total sunshine hours in 2008 were 2720.80, indicating the comparative severity of

the sun shine in the different months of a year in Lahore. The greater hours of sunshine in 2009 in summer season indicate that a higher cooling load requirement in the buildings as compared to heating requirements in the winter season in Lahore. The greater number of sunshine hours can be related to the low cloud cover in the respective months and availability of less cloudy hours which is associated with low humidity in the air.

Table 3.0 Total sunshine hours in the year 2008 and 2007 (metreological department)

Date	Jan.	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
2008	199.9	204.3	264.2	261.9	269.9	204.5	202.5	211.3	255.6	248.9	221.4	176.4
2009	185.2	220.3	238.5	276.2	310.5	308.7	252.9	228	-	-	-	-

Source: Meteorological Department, Lahore.

It is clear from the above table 3 that the sunshine hours are the maximum in the month of May. The buildings can be oriented according to the sun path sun in the respective month for the desired amount of sunshine.

3. IDENTIFIED FEATURES OF HOUSE PLAN CONFIGURATION

For the sustainability, the form of residential plans in Lahore are studied, the essential elements of planning are identified after wide survey of the new and older developments in and around Lahore. The houses are found whether at large or small scale, contain essentially some architectural spaces to be designed or planned in different configuration. They are listed in the following Table 4.

Table 4 Essential architectural design components of a house.

Essential Features/zones	Optional features/components
Car –Porch	Terrace
T.V Lounge/Living-room	Verandah/s
Drawing- room	Powder- room
Dining- room	Study- room
Bed- room/s	Store- room
Bath room (attached)	Dressing- room
Kitchen, (dry and wet)	Pantry
Stair- case	Laundry
Servant- quarter	Guest- bed

Unlike other buildings, the residential buildings are occupied in one way or the other for whole of the 24 hours and therefore they must be considered for thermal comfort for the whole day and night. There can be a number of orientations in any locality and the components/zones in a house can face any orientation. Windows being the main recipient of solar load are more important in orientation. In general practice, windows are provided for the view and aesthetic consideration of the facades by the professionals and the users. Day lighting, ventilation and solar loads are not given priority in design.

The orientation can be related to the sustained house plan configuration in Lahore, as follows:

1- Almost all the residences are comprised of a number of zones and each zone in a house planning can have different temperature profile due to different exposure to sun resulting in a different heating or cooling load and therefore each zone can have an independent heating and cooling system.

2- The different temperature profiles result in different solar-loading conditions imposed by outside environmental conditions through the building envelope. The loads are mainly due to the sun and its orientation facing each zone. Other loads are internal loads from the artificial lighting, occupants, air leakage and ventilation. All these loads are lower in comparison to the other building types.

3- Residential buildings usually are of smaller size single or double story houses in practice in Lahore. Multi-family houses are similar to the single-family detached house which has exposed walls in all the four directions. In some cases various zones in a house plan may have certain exposure to the sun which might not be the desired orientation. As the Architectural Design is dictated by aesthetical consideration which may impede the integration of passive features when they are without quantification. It is essential that each zone in a plan configuration should have proper load calculation (ASHRAE 2002).

4- The flow diagram including essential and optional features of a typical house form are shown in Figure 5. The main entrance to the house is essentially attached with the car porch. The drawing room and the guest rooms are approached either through a lobby or passage directly linked with the TV lounge/ living room. The living room and the dining room are connected with the kitchen so that guests from the drawing room can reach the dining room with maintaining the house privacy requirements. The bed rooms including master and the children bed are designed together and have a direct social link with each other.

5- The plan configuration contains the architectural spaces exposing to different orientations. Despite the guidelines for the energy efficient house design, each zone in a house plan configuration does not seem to have the desired orientation because of the typical house form and space organization. Therefore, a quantitative knowledge regarding the positioning and laying the living spaces in a house plan can be given priority with relative effect to the solar exposure.

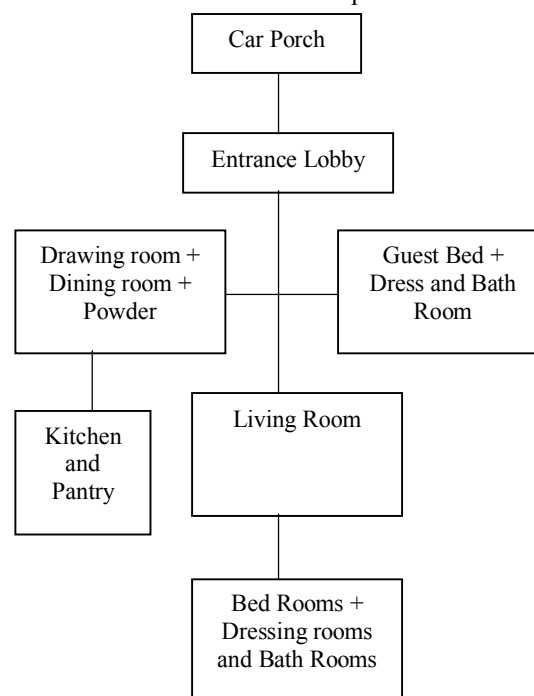


Figure5: Identified essential features of a typical house plan configuration

The flow chart of activity is shown in the above figure which attained its form due to the social, cultural and functional needs of the society. The guest room essentially has to be placed near the entrance lobby. The living room has acquired a central location as it is assumed to be the center of activities in a residence. The bath rooms are attached to the bed rooms mostly through a dressing room. Thus each component or zone in the plan configuration has a special character attached with its space and function and need a special solar exposure for the indoor thermal comfort.

3.1 SUN PATH CHART FOR LAHORE AND PLAN CONFIGURATION

The Sun Path Diagram (SPD) is the graphical projection of the arc of sun through the sky on to a horizontal plane. The horizon is represented by the outer most circle and the observation point in the center (Figure 6). The solar radiations greatly vary with the weather, latitudes and altitude. Pakistan

is located between the 25o N and 35o N latitudes where the percentage of the direct solar radiations are very high (ENERCON, 1992). The direct radiations affect the buildings greatly by entering through the windows. The SPD can be used for any latitude to determine the position of sun in terms of angles of altitude and azimuth angle at any hour of the 21 day of each month. SPD for Lahore, Pakistan is shown in the Figure 3.7a.

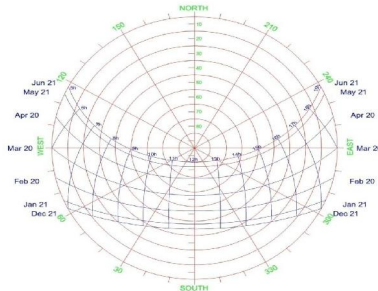


Figure6: SPD for Lahore, Pakistan.
Source: ENERCON Design Manual, 1982.

The altitude angles are represented by concentric circle spaced at 10 degrees interval. Zero degree represents the outer circle and 90 degrees is the center point. The radial lines represent the azimuth angles. Twenty first day of each month is denoted by the elliptical curved lines superimposed on the concentric circles. Each sun path line is marked with twice path of two months as it is composed of two halves. Cross lines at right angles to the circles show hours of the day listed at the upper most line of sun paths.

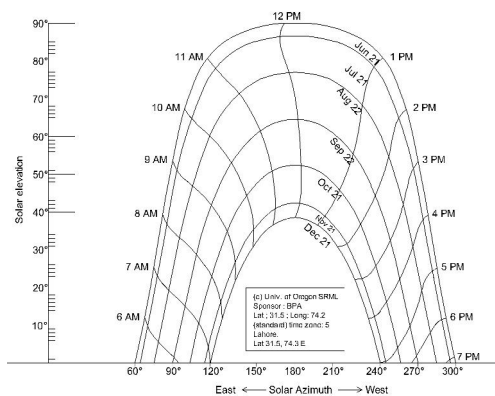


Figure 7: Sun altitude against the Azimuth Angles for 32o N, Lahore.
Source: University of Oregon, Solar Radiation Monitoring Laboratory (2008).

For finding the position of sun in Lahore, 32o N latitude, mark the sun path line of month and locate the time line perpendicular to it. On the crossing of these lines, the altitude angle can be read on the concentric circles. Following this point towards the radial lines, reading on the outermost circle gives the azimuth angle as described above for the summer and winter solstice dates. The minimum and maximum altitudes attained by the sun paths on 32o N latitude are 34.5o and 81.5o.

The sun's rays have an altitude of 0° at 5:00 a.m., on 21st June as shown in the SPD for the latitude of Lahore. The sun's azimuth angle at 6.00 am is 62o E/W and 118o E/W on 21st June and 21 December respectively. It has an altitude of 12o according to SPD at 6.00 a.m, in Figure 3.7b on the summer solstice day; whereas, the altitude angle reaches 81.5 at 12 noon on the same day. The Altitude angles for summer and winter solstice positions in Lahore are shown in Figure 3.6. The azimuth angles for the summer and winter solstice positions are S62o E/W and S118o E/W. The azimuth angles east ward in the morning and westward in the afternoon. The SPD is the appropriate way for determining the position of sun at any hour or any day of the year. The SPD is composed of two paths of summer and winter solstice positions of sun. Therefore, each line of sun path is marked with two Roman numbers on the SPD.

As the city of Lahore lies in the northern hemisphere, theoretically, the solar radiations on south facades receive three times more radiations in winter months than other orientations of facades. Whereas, in summer period, the south facades receive the lesser amount of radiations than eastern or western facades except north facing façade of a building as the sun never goes to the north orientation (SPD, Figure 3.7a). Amount of sunlight is greater in summer due to longer sunshine hours than in winter therefore sunlight is distributed towards east, west and south orientations of a building. The impact of solar radiations on four cardinal directions and the horizontal surface of a building are shown in the Table 5.

Table 5 Impact (BTU/ sq.ft/day Radiations on different orientations of a building at 32o N Latitude

Season	East	West	North	South	Roof
Summer	1207	1207	452	563	2596
Winter	620	620	140	1606	954

Source: Crowley and Zimmerman, 1984.

It is evident from the above table that the solar radiations are greater in winter on south orientation and lesser on east and west orientation

whereas in summer, the impact is reverse. Similarly, in winter season the impact of solar radiations increases from 8.00 am to the maximum at 12 noon and then decreases at 4.00. p.m. However, the west exposure is more troublesome for buildings in summer due to higher afternoon temperatures combined with the effect of radiations.

4.IDENTIFIED SOLAR ALTITUDE ANGLES FOR LAHORE

The Solar Altitude Angles for 32oN latitude calculated by the author for the location of Lahore and the value for important dates are reproduced in Table 6.

Table 6 Solar Altitude Angles at noon for the solstice and equinox positions at 32o N, Lahore.

Month and Date	Ka (solar altitude coefficient) (Butler 2002)	Altitude of Sun at noon due south in degrees
21st January	69.5	37.5
21st March and 21st September	90.0	58
21st April	101.5	69.5
21st June	113.5	81.5
21st September	90.0	58
21st October	78.5	46.5
21st December	66.5	34.5

As a rule of thumb, the sun’s altitude on equinox at noon (21 March and 21 September), is 90 minus the latitude of the given site. This information of altitude angle on the site can be helpful in designing shading device with south orientation on these dates. The altitude of sun is the smallest on 21 December and the earth’s axis is tilted away from the sun for northern hemisphere (Figure 8).

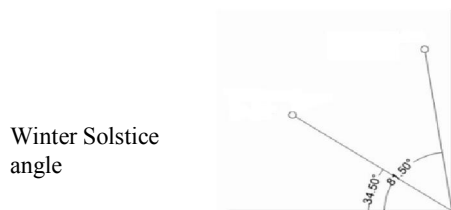


Figure 8 Calculated altitude angles for solstice positions of sun in Lahore.

5. ANALYSIS THROUGH SIMULATION

While incorporating the sun path chart and the weather data for Lahore, simulations were also conducted to verify the experimental data and results. The house plan configuration simulated was as shown in Figure 9.

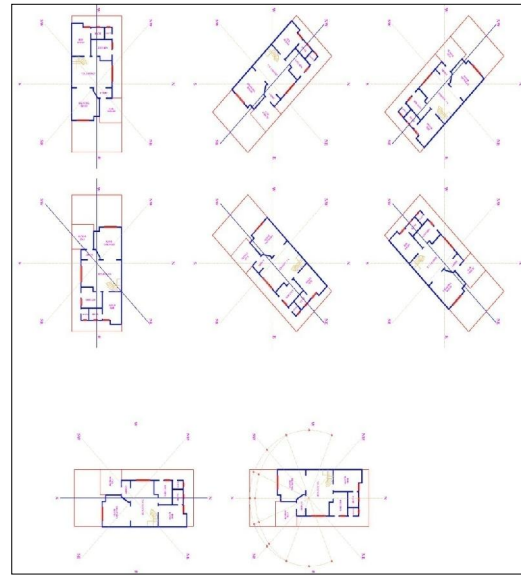


Figure 9: Simulated house plan configuration

The results of the study showed that significant part of energy can be conserved by appropriate control of heating and/or air conditioning. The results of experimental study and simulations showed the SW an optimum orientation for heating and cooling requirements.

CONCLUSIONS

As evident from the above theoretical considerations for a passively designed energy efficient house design in Pakistan, it is very important for the building design professionals and researchers to incorporate the solar data provided in this study for the buildings sustainability.

Although the passive design guidelines are available for different climatic zones in the world but the key information for controlling the sun in either summer conditions or for winter seasons are not available in the country particularly for the fast growing cities. Many studies in the literature review have demonstrated that the sun affects the temperatures inside the buildings depending upon the orientations. Thereby, these orientations affect the heating and cooling of those spaces for thermal comfort inside. Local climatic conditions are required to be known especially the ambient temperature behavior which affects the indoor temperature

profiles in various zones of a house configuration. In which windows, their respective sizes, site conditions and material of building envelop with respect to sun orientation are very important.

This study on Passive design strategy for the solar orientation focuses new or old buildings for its practical application in retrofitting the existing residences and development of new urban settlements by government and private sectors. The study for orientation in occupied houses has the limitations due to the lack of control of various environmental factors by the occupants. Therefore a complete passive design solution regarding solar data is suggested for the architects or building professionals for the adaptation of orientation in house plan configuration.

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Role of Professional and Technical Training in Human Development

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Abstract: Human development is the latest approach in developmental concept. Its objective is to "increase human choices" with the intention to improve living quality. This approach focuses on human and uses education as its main tool for human development. The idea is that a training individual acquires abilities and competences that turn that individual into an asset to be utilized for achievement of defined objectives.

What is important in training programs is to indentifying specific qualities that may introduce individual and social changes to bring about improved quality of life. This article searches for training concepts that may promote educational, economic, social, and cultural equality.

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Key words: Development, Human Development, Human Development Approaches, and Competences.

Introduction

Human development is a more advanced form of development concept if we look at it as social-economic point of view or as a social-economic improvement program. Human development adds humanistic dimension to the original development concept. Development concept was initially directed toward increased production. Yet today, it is directed toward improvement of human life (Nazari, 2006).

Development specialists and professional societies have proposed various approaches for providing better living conditions as a part of the national development programs. Education is the most important element of the human development program that is able to provide changes in human prospect and behavior. Education is used to increase economic growth, improve living quality, provide knowledge, train skills, create jobs, and increase national production. That is why education has achieved its special standing in current societies.

The role of education as a basic human right and value in personal development is now publically accepted. Education is likened to the heart of society. Social pleasure and renewal depend on education (UNESCO, 1998).

In the first UN report on development program published in 1990, human development was proposed as "the process of increasing human choices." This definition was changed in 1997 report to: "human development is a process to expend life improvement by providing better choices" (Mashayekh, 2006). The important point in this definition is the increased human choices based on individual's needs as the focal point of development process (Poorfar & Ahmadi, 2008).

Table (1): Development Classification (Khalili Tirtashi, 2001)

Economic Development	Economic Growth: National Growth Product Growth
Human Resource Development	Human as operant in production process; human as a means
Welfare Oriented Approach	Human as the beneficiary of development process and not as the operant
Basic Needs Approach	Provide the required goods and services for deprived
Human Development	Extended production and distribution of product and services plus applications of human empowerment; human as the target

Human development has four basic components:

- 1) **Productivity:** Productivity improvement in human development means creating an environment where individuals are able to utilize their abilities in the best possible way. The focus is on the quality of development in line with quantitative growth.
- 2) **Equity:** Equity is equal access to opportunities. It means that people should be able to share opportunities and equally benefit from them.
- 3) **Sustainability:** The availability of choices and benefit from opportunities should be guaranteed to the future generations.
- 4) **Empowerment:** Empowerment represents a social environment that people can share to obtain better living conditions (UNDP, 1995).

Human Development and Human Asset

Assets can be divided into three general categories:

- 1) **Natural assets:** including natural resources, plants and animals, soil and mineral reserves, fresh water resources, and the like;
- 2) **Material assets:** including production equipment, machineries, facilities, bridges, railroads, and the like; and
- 3) **Human assets:** including knowledge, skills, experiences, vigor, innovation, and the like.

Human development emphasizes on the human assets and this represents a fundamental change in social priorities. There are two justifications for this change of priority:

- 1) The return on investment in human assets is at least equal to the return on other investments.
- 2) Investment in human assets may produce savings in material asset and natural resource utilization in certain cases (Griffin and McKinley, 1996).

Investment in education produces direct benefit at individual and social levels. Direct benefits of education at individual level show up in form of additional salaries and wages. Indirect benefits of education are represented as reduced crime, increased hygiene, better child rearing, and proper family

management. Direct social benefits of investment in education can be observed as increased productivity and higher level of national wealth resulting from the transfer of knowledge and skills within educational system. Indirect social benefits of investment in education may include reduced health costs, lower crime rate, and increased benefits from population control (Mohsenpour, 2006).

A trained individual has higher social and scientific skills, accountability, cultural awareness, and the like. Such a person may turn into a development agent. Human development creates a bidirectional relation between its two elements, i.e. development for human and human for development. At one end, development produces additional benefits to humans and more humans benefit from it. And at the other end, development is the result of human thoughts and actions. The relationship between human development and education is that the advancement of human thoughts and actions is the outcome of education. And, education has been the only past and present means for human to institute development. This relation can be illustrated as follows (Nazari, 2006):



Human asset is the manifestation of individuals who:

- 1) has deep and sufficient knowledge about a given specialty;
- 2) is innovative and creative with the ability to apply the learnt skills to a given specialty in an entrepreneurial way;
- 3) observes professional responsibility and has desirable work discipline;
- 4) has a sense of cooperation and practice patience with others; and
- 5) believes in natural resources as "a means to understand how a society values its surrounding environment" (Ta'iee, 1997).
- 6)

Human Development and Education

Jaques Delour, Director of UNESCO Educational Commission, stated four education principles for achievement of human development in 21st century (UNESCO, 1998):

- ✓ Learning to know; i.e. learning, advancement, reasoning, retention, and other human abilities.
- ✓ Learning to do; learning to acquire certain skills and competences to apply to various situations.
- ✓ Learning to live together or with others: learning how to participate in group projects, how to deal with crisis, how to respect group values, how to reach mutual understanding, and how to maintain peace.
- ✓ Learning to be: learning how to benefit from opportunities created by education.

The main role of education in human development is to generate opportunities for advancement of these four competences that are also known as: 1) individual competence, 2) cognitive competence, 3) communication competence, and 4) productivity competence (Ayrton Senna Institute ,2005).

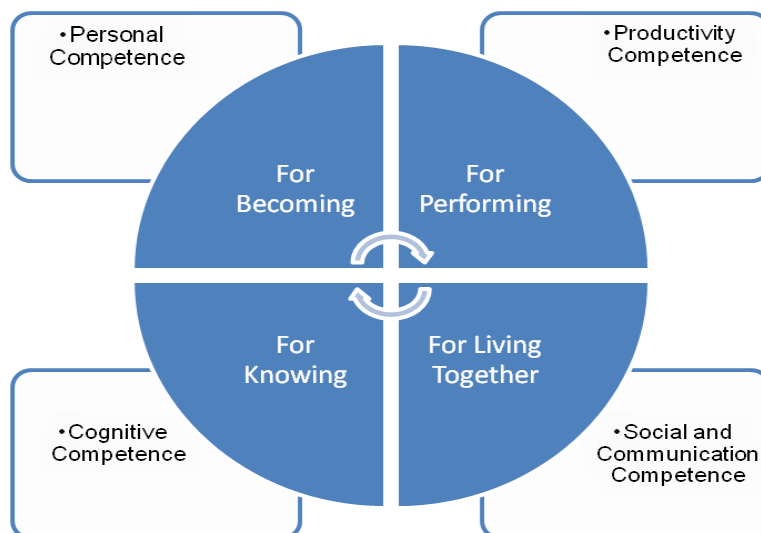


Figure 1- The Four Competences of Human Development
Source: Ayrton Senna Institute ,2005

Philosophy of Education

Based on the Four Components of Human Development

1) *Liberating School of Education*

Education is liberating, idealistic, and optimistic about human perfection and tries to provide human serendipity. According to Paulo Freire, founder of liberating school of education, human being lives in a "becoming" state and this is what differentiates human from animals. Human being accepts his imperfection and, therefore, relies on education as a tool for achieving perfection. Freire believed that education governs the human revitalization process and helps him to change from "being" state to "becoming" state. Consequently, a dialogue oriented education provides a base for liberation. Dialogue in Freire's line of thinking has two dimensions, namely, thinking and action. He believes that living a human life means understanding the world and taking actions to change it (Sha'bani Varaki, 2004).

2) *Critical Rationalism School of Education*

Carl Popper is the founder of critical rationalism school of education. This school was developed during several decades of 20th century. Critical rationalism school of education attempts to train responsible citizens as its objective. It tries to internalize cognitive and moral ideals in individuals' mind and conscience. Democracy, in this approach, is the best model for social management. This approach emphasizes on staying away from filling students mind by resorting to memorization of classroom materials within the educational curriculum. This approach, instead, encourages learning through judicious criticism. It develops a problem seeking eye and a creative mind to search for proper solutions to

theoretical and practical problems intended to internalize cognitive and moral ideals in the students (Paya, 2007).

3) *Humanistic School of Education*

In this approach, human being is not an object to be made. It is, rather, a unique being in the process of becoming and reaching out to higher positions. In this approach, individuals are responsible for learning and discovering meanings and concepts (Mahdian, 2006). Personal development and creating positive individual characteristics are more important in humanistic school than transferring raw educational materials to the students. The focus of this school is mostly on education with two parts: (a) transfer of basic training materials such as mathematics, physics, literature, and the like, and (b): teaching intellectual frameworks, i.e. how a person should think about issues and how he should evaluate them (Mahdian, 2006).

4) *Self-Belief and Assertiveness School of Education*

Salter (1949) and Wolpe (1958) were two researchers who concentrated on assertiveness and its training. Assertiveness has been the focus of attention during past two decades which shows the importance of this aspect of social interaction. Educational systems later applied this concept to its programming. There are several definitions for assertiveness skills. Lange and Jakuboski (1976) defined this skill as: "assertiveness includes asking for own rights and expression of own thoughts, feelings, and beliefs in a proper, direct, and honest way so that the rights of others are respected" (Hargie, et. al, 2005).

5) *Cooperative School of Education*

Society needs citizens with certain characteristics in order to promote cooperation in different social

subjects. People need to acquire certain skills, attitudes, and knowledge in order to learn how to cooperate with each other. Cooperation is possible with the required awareness, effective skills, and constructive attitudes.

A training program of cooperation should include subjects such as: a) how to define a problem; b) how to analyze a problem; c) how to identify objectives; d) how to have effective interpersonal relationships; e) how to make group decisions; f) how to live together; and g) how to live up to group spirit (Sarkar Arani, 2000).

6) *Quality School of Education*

"Education for all" World Declaration of 1990 pointed out that the poor quality of education needed improvement and recommended that education not only should be available to all but also should be made more suitable. This declaration makes quality of education a prerequisite for achieving equality. Of course, quality alone is not sufficient but it should be considered as the heart of education. A complete definition of quality in education was gradually proposed by considering special characteristics of students (e.g. health and motivation), processes (i.e. teachers), content (i.e. curriculum), and systems (i.e. a set of proper resources).

This concept was further developed by UNESCO. One of the first manifests issued by UNESCO to support quality education in "learning for doing" was published with the title "World of Education for Today and Tomorrow: A Report from International Commission on Education Development by Edgar Faure". This report made a statement that: "The objective and content of education should be constructive and innovative in order to provide for manifestation of new social and democratic qualifications" (EFA report, 2005).

7) *Competency School of Education*

International organizations have accepted and emphasized competency based education fundamental for sustainable development. UNESCO considers vocational training as an important element of a sustainable development. About 80 percent of jobs in the world require certain levels of technical and professional trainings. Iran is not an exception.

Many developed countries recognized several decades ago that vocational training was the main requirement for human development. They put top priority for technical-professional training and took actions to increase this part of educational system both qualitatively and quantitatively. These countries have tried to find solutions to several problems confronting this area of education including the position of technical-professional training, interaction of vocational schools with users, and the costs of this type of training. The outcome of solving these

problems was economic development, reduced unemployment, and the like.

Two actions are to be taken in order to improve education efficiency (Dehghan, 2002).

- 1) Production and transfer of knowledge for training skills.
- 2) Establishment and transfer of norms and values which are required for development and creating a suitable personality system for it.

The first group of actions focuses on training different skill and expertise to interested individuals with the intention to transfer the knowledge and scientific heritage accumulated through generations. This heritage has to be transferred from one generation to another and its accumulation should provide the basis for creation and production of additional knowledge. Realization of this task requires suitable educational coverage and comprehensive general and specialty education. The growth of this type of education depends on the realization of this task within higher education or technical and professional education.

Education system acts as a basic element of economic growth for the first group of actions. Japan is one industrial country that has been able to create the highest level of change in social, economic, and technical structures through education. Japan reached to the present level of industrial growth by rapid development of its educational system and extending the reach of higher education to include the whole world. Reliance in education for economic growth has a long history in Japan and started in 17th century (Azkia, 2000, p. 62).

Extending a general education to the whole society cannot produce the special skills, efficient professionals, and specialty knowledge that are required for training creative individuals who can generate and push through development programs. For realization of the first group of actions, it is necessary to pay attention to the quality of education along with quantitative growth.

A quality education and learning system shall pay attention to educational indexes such as creation of opportunity and motivation, development of internal and sustainable motivation, and the development and generalization of expressional values in the learning process. The additional aspects to be considered in a quality education are the type of learning adopted including critical, questioning, or student oriented education in a cooperating educational environment versus competitive or individual oriented education system in a participatory and not authoritative education management system (Dehghan, 2002, p. 19).

The second group of actions is directed toward the establishment of a personality system suitable for development. The educational system

shall provide the required personality system with proper values, norms, intellectual ideas, and cognitive structures as a prerequisite for development.

Discussion and Conclusion

Objectives for technical and professional training school shall consider national educational objectives and the following issues:

- 1) **Education as an agent for change and development.** Michael Todaro believed that development programs in the past, especially during 1950s and 1960s, have traditionally been based on a national economic capacity for production and maintenance of an annual increase of 5 to 7 percent in national gross product and an assumption that the national economy to remain static at the initial economic conditions for a long time (Todaro, p. 86). Some scholars have reasoned that development is multi dimensional and shall include changes in infrastructure, social institutions, social attitude, values, and behavior, toward providing social equality and eradicate poverty (Saha, 1994).
- 2) **Education and Economic Development.** Education and development has commonly been keyed to economic development. Economic development models have been dominating since the time of economic growth theorems proposed by Adam Smith, John Stuart Mill and others since eighteenth century. Economic development theorems share one common point: human dimension is an agent of development but it is not the only agent. The role of human dimension in development is represented by the quality and skills of workforce.
The relationship between education and development is defined based on the same assumptions made by human asset theorem. This theorem states that any improvement in health, skills, and motivation of labor could improve worker productivity. Consequently, education is an influential agent in national economic development so long as it is able to provide quality improvement in a society.
- 3) **Education and Social Development.** The side effects of education on development may be overlooked if focus rests merely on economic dimension of development. The social aspects of development have equal importance as economic aspects. Social dimensions of development include quality of life, renewal of attitude, values, and believes, and fulfillment of the basic human needs. Economic development may not be as effective so long as these issues remain unresolved. Examining how education may affect or not affect these issues could provide a

wider prospective of the relation between education and development.

3.1 **Education and modernization.** Most of research into modernization is based on the definition proposed by Inkeles and Smith (1974). They tried to make the concept of "modern individual" more practical. According to their definition, a modern individual is:

- Willing to accept new experiments and is ready for social change;
- Is aware of various attitudes and believes but tend to have own views. He is realistic in his views and emphasize on present and future.
- Believes that any individual can be effective and, therefore, tends to make long term plans.
- Trusts social entities and individuals. Respects others' stand and competence.
- Highly values technical skills; pays lots of attention to technical training.
- Understands the logic behind production and industry.

The main point of Inkeles thinking is that the path toward development cannot be crossed without modern individuals. The followers of the modernity school believe that a modern individual is made by participating in modern entities with education and industry topping the list.

3.2 **Education, quality living, and basic human needs.** Providing for the quality of life and fulfilling the basic human needs are aspects of social development. A major part of population cannot effectively participate in the development process when there is a major discrepancy in the distribution of material products creating shortage of sufficient food, shelter, and clothing, (Saha, 1994, p. 88).

The relation between education and a quality living based on fulfilling basic human needs is almost similar to modernization because both emphasize on the changing individual. The difference is that modernization focuses on social-mental changes and living quality based on fulfilling basic human needs considers physical and social conditions of population. The effect of education on physical and social conditions is indirect and lower compared to its effect on attitudes and values (ibid)

- 4) **Education and Political Development.** Political development may be in form of highly consolidated policy making at the top echelon

with high cohesion and low dissension, or in form of participatory policy making with collective decision making and voting. Policy development may include socialization of politics, preparation for political leadership, policy integration, and policy awareness. Political development in form of participating politics and sharing political power provides the reason for linking education to economy and social development (ibid p. 89)

- 5) **Technical and professional training versus Technological changes.** Many countries have experienced rapid technological changes. Computers and other new technologies act as generating agents that constantly produce new products for users and introduce changes work procedures.

Companies and institutions in developed and developing countries use new technologies to improve workers' productivity and increase their competitiveness in international markets (Rumberger, 1981)

Technology changes are only one of the factors that affect the demand for trained workers. Other factors are:

- 5.1 Changes in demand for goods and services.

Production of some good and services require more trained workers.

- 5.2 Labor cost changes which depend on other production factors such as capital. Managers may change labor cost by substituting factors related to production, work, and services.

- 5.3 Changes in international competitive trend which may affect the structure and volume of export and import. This issue may change domestic production and the need for vocational training.

- 5.4 Changes in work structure and organization. Work may be organized in different ways. Work organization may increase or decrease the levels and types of skills required for a given work. Workers also need different levels and types of skills for performing their duties the best possible way in a given work organization.

- 5.4.1 Changes in employment arrangement and structure - Employment arrangement varies from one country to another and from one period to another. Industrial countries changed their economy from agriculture to industry during the second half of 20th century. They changed their base of economy to services during the last part of 20th century. Technological advancements have expedited economic transformation and the changes in economic structure by developing new

machineries, increasing products and services, and improving human assets.

Changes in the required work skills have affected the demand for skills training and the type of skills. For example: service sector requires higher skills than industry and agriculture sectors. Service sector advancements and its expanding employment have increased demand for skilled workers in the industrial world.

- 5.4.2 Changes in the required occupational skills.

Technological advancements have created a debate about whether technology increases or decreases the required skill levels of jobs. This debate started from the initial days of technological advancement and is still subject of debate in research and political arenas. Technological trends will not remain the same in the future the types and capabilities of a technology changes through time. Past technologies produced machineries with capability to reduce physical needs of work. Present and future technologies produce machineries with higher capabilities to substitute intellectual needs of work (Rumberger, 1981).

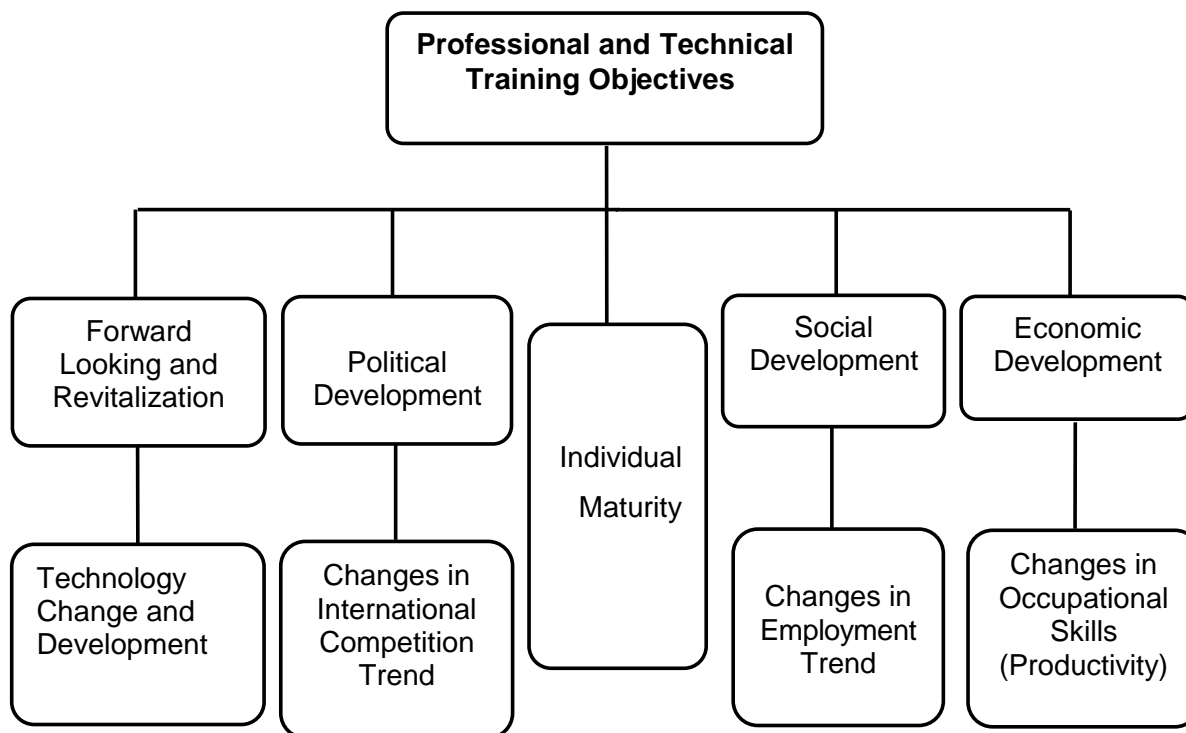
Technological changes affect the demand for trained workforce by affecting work influencing factors. New technologies can change the demand for products and services by improving productivity and lowering prices through introduction of new products and services. Technology can reduce the cost of investment and labor by by introducing productivity improvements. Advanced communication, transportation, and production techniques have increased international competitions by extending the markets for products and services in both developed and developing countries. Technology changes have facilitated the formation of new organizations that provide work related information to workers for better decision making and targeting their efforts.

- 6) **Individual Maturity** - There is a link between individual personality and technical and professional training. This type of training affects individual aptitudes, capabilities, and characters. Technical and professional training is required for building a modern and sustainable society with economic and social growth. Societies are mandated to provide an

environment that can provide for balanced and systematic growth of individuals as their basic right. Such an environment should enable individuals to strengthen their spiritual and personal values, and increase their capacity and abilities for better understanding, judgment, critical thinking, and expression of views.

Tremendous technical and scientific advancements of the past decades and the

anticipated future advancements represent the characteristics of the present era. That alone can justify why technical and professional training should be a part of education. Vocational training should pave the way for achieving social, cultural, and economic growth. It should advance individual capabilities to help them increase their contributions toward achieving social objectives.



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A Methodology for Developing C2 Complex Systems Simulator

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Abstract: The design and development of an appropriate simulator for C2 complex systems is field of research. Researchers in this field are trying to create simulation models to describe the behavior of C2 complex systems. Like any other application softwares, the design and development of C2 complex systems simulator needs a methodology to make analysis, design, and development more accurate and produce a high quality software simulation. C2 simulator software usually models and simulates C2 complex systems using multi agent approach. However, the multi agent simulator is basically different from the agent based business applications. Therefore for developing former one we need a special methodology. In this paper, a methodology based on Capra cognitive framework for modeling and simulating C2 complex systems has been proposed. This methodology determines the main steps for the analysis, design, and development of C2 simulator. In addition, since the proposed methodology utilizes the basic concepts of complex systems, it may be used for modeling the main concepts and components of other complex systems such as ant colony and stock market.

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1. Introduction

Today, the design and development of an appropriate simulator for complex systems modeling is one of the fields of research [1-5]. Researchers in this field are trying to extract the appropriate concepts, providing frameworks and computational methods and mechanisms in order to create simulation models to describe the behavior of complex systems. A complex system is made of many components and as a result of the interactions between them, the emergent behavior would appear [6-8].

Living systems such as cells, organizations, society, and the earth in which there is the concept of life and evolution are all examples of complex systems. In modern biocognitive, the main feature of living systems is life and life process is intertwined with cognition in such a way that they are inseparable and synonymous. In this view, all actions and reactions of living systems with the environment are cognitive. The living systems can be biological or social. In living systems, there are interactions between components for survival and evolution. The living system is a complex system that adapts with its surrounding environment throughout its life for survival and evolution. Adaptation means how a system responds to the changing environment and adapts with it [9].

The modeling of complex systems usually leads to a simulation software, in which researchers can simulate

and test their models and theories [10]. Multi agent systems (MAS) are a suitable approach for complex systems modeling [11-12]. Today, there are different methods, frameworks, architectures and methodologies that use the concept of MAS. It should be noted that many of the methodologies proposed based on the concept of multi agent systems are mainly for developing agent based business applications. It means that the main motivation for these methodologies is to design and develop the business application that is used in the real environment and not for an artifact which can be a simulation software. On the other hand, few methodologies that are available for designing and developing complex systems simulation are mainly based on ecology and biological viewpoints and have not taken much advantage of engineering principles. For example, Aumann has proposed a methodology for developing simulation models of complex systems [13]. This methodology has three parts: The first part of this methodology places the modeling process in the context of general research planning and thus emphasizes the process of synthesis. This part combines the constituent pieces of knowledge into a unified description of the entities and processes comprising the system to be modeled. The second part involves operationalizing this synthetic description into a composition of smaller models specified over three scalar hierarchical levels. The hierarchical structure of the decomposition also structures the explanations given about

system behaviors in that the “mechanism” for a behavior arises at the lower levels while its “purpose” is found at higher levels. The third part of the methodology involves using model assessment to explicitly establish the veracity of the links between the implemented model, the model design specification, and the synthesis.

As the design and development of multi agent simulation software is not completely the same as multi agent business applications, in this paper, we propose a special-purpose methodology for designing and developing C2 (Command and control) complex systems simulator. The proposed methodology is based on Capra’s framework. This methodology is used for simulator application development to explore capabilities efficiently for overcoming C2 complex systems. C2 is a concept for military operations. Command refers to the intelligent and, usually, human decision-making process. Control refers to the process of actual execution of the decisions [14-16]. C2 complex systems have been analyzed and modeled with variety of methods and approaches in various papers and reports [17-20]. On the other hand, C2 components cover the entire battlefield, so its modeling can help to examine the behavior of forces and analyze the efficiency of scenarios.

The paper is organized as follow. First, multi-agent systems, agent-oriented methodologies, frameworks and tools are introduced. Then Capra’s framework and the proposed methodology are explained. The main ideas of this methodology have been derived from Capra’s framework. It should be noted that the term framework in multi agent frameworks and Capra cognitive framework are referring to two different issues. In the former, framework is a software with which multi agent systems are designed and implemented. Multi agent frameworks are special software for developing multi agent systems. In the latter, framework is a kind of cognitive perspective for understanding biological and social phenomena. Having explained the proposed methodology, we will use it to describe modeling and simulation of C2 complex systems.

2. Multi agent Systems and Agent Oriented Methodologies

The concept of agent is a powerful and convincing way to describe a software entity that can act with a certain degree of autonomy in performing its duties. Although the agent concept is easily understandable, it has different definitions and interpretations in the papers and books on artificial intelligence. In some definitions, any object can be an agent and some others have narrowed this definition. Russell and Norvig, for example, define agent as an entity that senses and perceives the environment using sensors and based on this perception acts on the environment with actuators [21].

In general, the agent concept is a tool for understanding complex concepts. The concept of multi agent systems is formed when a set of agents interact with each other for problem solving. In other words, such systems solve a problem with a data oriented approach. That is, this approach is based on holistic thinking. However, top-down approach or reductionism can be used to analyze, design and develop multi agent applications [22]. There are various definitions and interpretations for multi agent systems. But, most authors and researchers assume multi agent systems as a system that consists of several agents interact with each other to achieve a certain goal [22-24]. Today, multi agent systems are used as an advanced method for simulation of the real world. This type of simulation provides the test bed for examining theories raised in different areas such as psychology, sociology, economics and military [10].

2.1 Agent-oriented Methodologies

Taking advantage of software engineering principles in the design and development of multi agent systems is very important. We need a methodology for analysis, design, and development of multi agent systems. Using the methodology, each of the main phases of software engineering (analysis, design, development, and maintenance) is divided into smaller steps. Nowadays, different agent oriented methodologies have been proposed for analysis, design and implementation of multi agent systems. Some of these methodologies are as follows: Gaia [25], MaSE [26], MESSAGE [27], AURL [28] and Tropos [29].

Gaia is a general methodology that supports both the micro-level (agent structure) and macro-level (agent society and organization structure) of multi agent system development. In the analysis phase, this methodology finds roles and interactions between agents in two separate steps. Roles consist of four attributes: responsibilities, permissions, activities, and protocols. Design phase consists of three steps: The first step is to map roles on to agent types, and then to create the right number of agent instances for each type. The second step is to determine the service model needed to fulfill a role in one or more agents. The final step is to create the acquaintance model for the representation of communication between the agents.

MaSE is similar to Gaia with respect to generality and supporting the application domain. The MaSE methodology is divided into seven phases in a logical pipeline. The first phase, capturing goals, transforms the initial system specification into a structured hierarchy of system goals. The second phase creates use cases and sequence diagrams based on the initial system specification. Refining roles, the third phase, create roles

that are responsible for the goals that are defined in first phase. Generally speaking, each goal is represented by one role, but a set of related goals may also map to one role. The fourth phase, creating agent classes, maps roles to agent classes in an agent class diagram. The fifth phase, constructing conversations, defines a coordination protocol in the form of state diagrams that define the conversation state for interacting agents. In the sixth phase, or assembling agent classes, the internal functionality of agent classes which is based on the type of agent architectures is created. System design, the final phase, creates actual agent instances based on the agent classes. The final result is presented in a deployment diagram.

AUML methodology is based on UML that extends UML for analysis and design of multi agent systems [30]. This methodology has tools for the representation of the agent class, describing the interaction protocol between agents, the internal behavior of an agent, describing the role, and has also a deployment diagram. As AUML methodology takes advantage of UML for modeling, it can be a modeling language as well. In addition to AUML, there are some other special purpose languages based on UML such as AML [31]. AML is used for specifications, modeling, and documentation of multi agent systems.

Tropos is an agent-oriented software methodology created by a group of authors from different universities in Canada and Italy. One of the noticeable differences between Tropos and other methodologies is its strong focus on requirements analysis. This methodology consists of five phases including Early Requirements Analysis, Late Requirements Analysis, Architectural Design, Detailed Design and Implementation [29].

2.2 Agent based Frameworks

In order to implementing the theoretical concepts of multi agent systems, it needs an intermediate layer. This layer provides fundamental components to manage the resources of agents. With this layer, developing an agent based applications becomes much simpler, because it provides facilities such as, agent identity, autonomy, communication, mobility and life cycle management. These facilities are supported by the agent based frameworks. Sometimes frameworks are called "platform" [23]. Cougaar , JADE , JACK , and RESTINA are examples of frameworks ([32- 34]).

Cougaar is a Java-based architecture for the construction of large-scale distributed agent-based applications. In other words, the goal of Cougaar is to provide developers with a framework to implement large-scale distributed multi agent applications. For this goal, Cougaar supports key functions such as Directory Services, Messaging, and Conflict Management.

JADE framework is a Java based agent platform used for developing multi agent systems. Similar to Cougaar, this framework has facilities such as Directory Services, Messaging, and Mobility. JADE, in other words, is utilized for developing multi agent distributed applications, and as a middleware, provides a set of services and Graphics User Interface (GUI) for debugging and testing the programs. In recent years, this framework has been extensively used in academic and industrial organizations [35].

RETSINA is developed by the Robotics Institute of Carnegie Mellon University. RETSINA is developed in C++ but is platform independent. Agent systems can be run on a number of different platforms and hosts (including handheld systems) and can be implemented in a number of languages. This framework has Directory Services, Messaging, and Semantic Interoperability. In Semantic Interoperability, which is a shared dictionary, the meaning of content is defined by KQML messages.

Agent based frameworks can be used for developing business applications. Thus, if the purpose of designing multi agent systems is developing business applications, agent based frameworks are suitable. These frameworks are mostly used in a real environment.

2.3 Multi agent Simulation Toolkits

Agent based frameworks such as JADE and Coagaar are mostly knowledge based systems. Knowledge in these frameworks is represented by one of the methods such as logic, rule, or a method that is supported by a given framework. However, some of the knowledge for modeling and simulation of complex systems such as C2 is implicit and cannot be represented by explicit knowledge. Multi agent frameworks, on the other hand, focus on modeling individual agents rather than social agents. To simulate complex systems with multi agent approach, each agent is described with a set of important and influential parameters. Therefore, simulation toolkits for agent-based modeling and simulation of complex systems are presented. These toolkits can model and simulate wide range of subjects including such as medicine, geology, sociology, and computer science. Examples of multi agent simulation toolkits are SWARM [36], RePast [37], and NetLogo [38].

SWARM is one of the first general purpose multi agent simulation toolkits that has been developed at the Santa Fe Institute to study complex adaptive systems. This toolkit has been designed and developed based on swarm intelligence. The goal of SWARM project was making a general purpose simulator for the simulation of artificial life. SWARM environment is made of many objects. An object in Swarm has three main characteristics: Name, Data, and Rules. An object's Name consists of a unique ID tag that is used to send messages to the object. The Data are whatever local data the user wants to have in the agent (e.g. internal state variables). The Rules are a set of functions that handle any messages that are sent to the object, including the "step" message.

RePast is a free open source toolkit created at the University of Chicago. This toolkit has a set of software libraries for constructing, running, and visualization. RePast borrows many concepts from SWARM agent-based modeling toolkit so they are similar in many cases.

NetLogo was originally designed for simple educational purposes but now many researchers use it as well. Many colleges have used it as a tool for teaching agent-based modeling. NetLogo environment enables exploration of emergent phenomena. It comes with an extensive models library including models in a variety of domains such as economics, physics, biology, chemistry, psychology, system dynamics, and many other natural and social sciences. Furthermore, NetLogo enables the quick and easy authoring of models. It is particularly well suited for modeling complex systems over time. Modelers can give instructions to hundreds or thousands of independent "agents", all operating concurrently. This makes it possible to explore the connection between the micro-level behavior of individuals and the macro-level patterns that emerges from the interaction among many individuals.

In addition to these toolkits, some other simulation tools have been introduced [39].

2.4 Agent Based Distillations

Agent based distillations (ABDs) represent an emerging technology within the field of combat simulation. Generally, distillations can be defined as a simulator attempting to model warfare scenarios by implementing a small set of rules that allow agents to adapt within each scenario [40-41]. Distillations are far less detailed than traditional simulations and rely on sensible global behavior to emerge naturally, while traditional models require explicitly this behavior to be programmed. This simplicity gives distillations the characteristics of speed, transparency, ease of configuration, and the ability to use the systems with minimal training. Today, there are a number of ABD systems such as ISSAC [42], EINSTEIN

[43], MANA [44], CROCADILE [40] WISDOM-I, WISDOM-II [45] and ACOMSIM [46].

3. Capra Cognitive Framework

The living systems that can be biological or social are assumed by many researchers as complex systems [47]. Hence, theories and frameworks for living systems can be utilized for understanding and modeling complex systems. In a living system, there are interactions among components for survival and evolution. Likewise, a complex system has many components and interaction between them forms an emergent complex behavior. In the study of living systems, we can use Capra cognitive framework. Capra has presented a unique framework for understanding the biological and social phenomena in four perspectives. Three out of four perspectives is about life and the fourth one is meaning. The first perspective is pattern that includes various relations among system components. The organization pattern of a living system defines the relation types among the system components which determines the basic features of the system. Structure, the second perspective, is defined as the material embodiment of system pattern. The Structure of a living organism evolves in interaction with its environment. The third perspective is the life process integrating the pattern and the structure perspectives [9].

When we try to extend new understanding of cognition to the social life, we immediately encounter many misleading phenomena - rules of behavior, values, goals, strategies, intentions, designs and power relations - that often do not have a role in non-human world, but they are essential for human social life. For expanding life to the social domain, meaning perspective is added to three other ones. Thus, we can understand social phenomena from four perspectives: pattern, structure, process, and meaning. Culture, for instance, has created and preserved a network (pattern) of communication (process) with embedded meaning. Material embodiment of culture includes art and literary masterpieces (structure) that transfer meaning from one generation to another.

According to Capra cognitive framework, any complex phenomena can be discussed and studied in four perspectives. In order to close these four perspectives to the terminology of complex systems modeling, we replace "pattern" with "network" and "structure" with "agent".

Pattern perspective is the relationship between components, thus network is a good terminology. Structure is a set of features that evolves during life. These features together will make the agent concept. Therefore, Capra cognitive framework is redefined in four perspectives: network, agent, process, and meaning (Fig. 1).

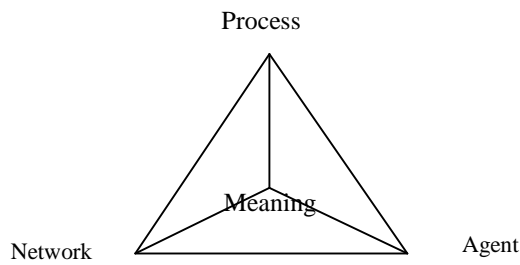


Fig. 1: Redefinition of Capra's Conceptual Framework for Complex System Modeling

4. The Proposed Methodology

Generally, methodologies such as Gaia, MaSE, and Tropos are suitable for developing agent based business applications in order to produce high quality software. These applications provide services for users in a real environment.

For designing and developing complex systems simulator, we need a more specific and appropriate methodology because the main purpose of simulator software is complex systems modeling. With this software, the behavior of complex systems is investigated under different conditions or capabilities. So, simulation software (exploratory application) is different from business applications.

One common approach for C2 complex systems modeling is multi agent approach. In this approach, main components of a C2 complex system are mapped to agents. Multi agent systems model and sometimes predict the behavior of C2 complex systems.

In redefinition of Capra cognitive framework (Fig. 1), agent, network, and process were determined as main perspectives for understanding and modeling complex systems. Mapping the meaning on to these three perspectives gives us the main capabilities of C2 complex system.

Our methodology focuses on exploratory application software in C2 complex systems. The proposed methodology has three main phases including analysis, design, and development (Fig. 2). If necessary, these three phases can be repeated many times spirally and the modeling and simulating will improve in each iteration.

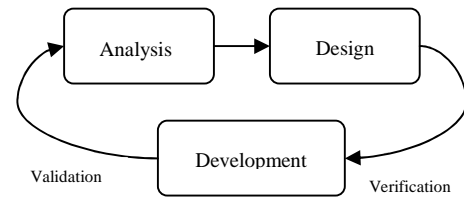


Fig. 2: Three main phases of proposed methodology (Spiral)

In the analysis phase of the proposed methodology, C2 complex system is defined and investigated from different aspects. It is usually necessary to acquire specialized knowledge from experts in that field. For this purpose, we can use questionnaires, interviews, or special tables. In defining a problem, three main questions must be answered:

1- What are the main components of a C2 complex system? Main components are autonomous and have the ability to affect and be affected. For example, in the complex system modeling of ant colony, ants are the main components.

2. What kinds of relationships are there between the main components? In other words, how the autonomous components use sensors and actuators to form relationships? Determining the relationships and network types is very important in C2 complex systems since it leads to information sharing and situation awareness. In an ant colony, for instance, communications and relationships are formed by stigmergy and pheromone.

3. What process is going to the run in a C2 complex system that uses main components and their relationships for evolution? The most important part of this process is decision making for survival. For example, in ant colony system, ants are more likely to choose the path with more pheromones. This type of decision making leads to relatively optimal decisions.

In the design phase, the concepts defined in the analysis phase are modeled and designed based on three perspectives including agent, network, and process. But the main question is which perspective is better to start? Regarding that the process perspective combines and intertwines network and agent perspectives to create meaning, therefore it is suggested that the first step in this phase be "process" design and modeling. It should be noted that the main cycle of simulator is based on process. This cycle determines main stages of simulation.

After designing the process, agent is modeled by main properties. In order to have modeling and simulation closer to reality, main properties of agent should be used for modeling. For example, in ant colony simulation, main properties for ant agent can be pheromone production, pheromone detection, and mobility.

What makes agent powerful in multi agent systems is the relation between agents. It means that agents have relation and communication with each other for achieving a given goal. Relationships and interactions between agents depend on the type of agent. In simple reactive agents such as ants, communication is achieved by stigmergy and for cognitive agents such as human by conversation. These relations form networks of agents. So, the third step of design phase is modeling the relation among agents. These relations can be a set of constraints such as hierarchy in organizations, or a set of rules. For example, if agent A is within the vision range of agent B, then agent B sees agent A. This vision relation is a link from agent B to agent A. Three steps of design phase in our proposed methodology are summarized as follow (Fig. 3):

First step: process design and modeling

Second step: agent design using main properties

Third step: determining and modeling necessary networks for describing the relation and communication between agents.

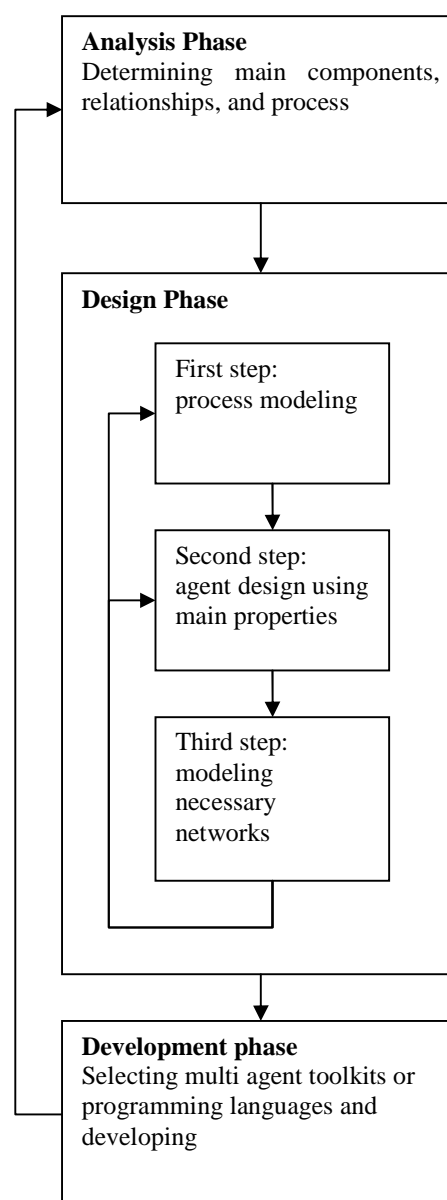


Fig. 3: Main phases of the proposed methodology with three steps of design phase

Of course, after performing these three main steps for the first time in the design phase respectively, each step can go back to one or two steps before for revision. For example, when certain networks are determined, some properties of agents might be added, revised, or redefined. In the end, a model is designed based on agent, network, and process perspectives.

After the design phase was repeated enough, development phase begins. In the development phase, we decide whether the existing multi agent toolkits, such as SWARM and NetLogo, are suitable for developing. If not, what

programming languages such as Java, C, Matlab are appropriate for developing simulator?

Since the proposed methodology emphasizes the main concepts and components and relationships between them, it is based on ontology. It means that this methodology determines what concepts, and components should be used for C2 complex systems modeling. In other words, this methodology expresses the meaning perspective (the forth perspective in Fig. 1) as ontology in agent, network, and process perspectives. This ontology determines general principles for simulator architecture. It also offers guidelines for the design and implementation of actual systems. For example, what principles and structures should be used for network design? What features are more important for agent design? What kinds of processes are suitable for modeling a given complex system? In brief, this methodology explores the capabilities. With this explanation, the proposed methodology emphasizes accuracy.

5. Developing a C2 Simulator Using the Proposed Methodology

The emergence of NCW theory is due to the Information era. NCW or Network Centric Warfare refers to the organization of services and how to fight in the information age [48]. NCW has made structural and process changes in C2, in a way that C2 is a decentralized and distributed system of command agents. C2 is a key concept in military environments and many researchers assume it as a complex system. C2 complex system has been modeled with different methods [18, 20, and 49].

Some researchers have paid attention to general aspects of C2 and some other to its specific ones. For example, Mofat and Lauren have assumed C2 as fractal process. Thus, all processes of C2 at different levels of command and control have the same and recursive structure [19, 50]. On the other hand, since C2 is a universal concept and covers the entire battlefield, most battlefield modelings are about C2 complex system. Today, many researchers use Complex Adaptive Systems theories (CAS) for modeling the battlefield or C2 complex system. In this approach, battlefield is a CAS that adapts and self-organizes with its environment. ISSAC [42], EINSTEIN [43], MANA [44], WISDOM-I, WISDOM-II [45] and ACOMSIM [46] are ABDs that have been designed and developed based on this approach. In most of these simulation environments, there has been some attention to agent, network, and process perspectives for modeling either implicitly or explicitly. WISDOM-II is an explicit example. However, for designing and developing these simulators, a special-purpose methodology has not been used.

We have used our proposed methodology for designing and developing the C2 complex system simulator. In the analysis phase, available ABDs were analyzed. Also,

specialists in the related field were consulted for better understanding of the subject. In this phase, combatant (people) was detected as the main component of the battlefield. Communications and interactions among combatants are formed by vision, communication, and hierarchical networks. Also, friendship and enmity among people are considered as a relation. Another relationship between people in the battlefield is engagement. In tactic level, OODA is a general process for decision making. In OODA process, each combatant observes the environment (Observe) and from the observation knowledge is made (Orient). The decision is made based on knowledge (Decide), and finally this decision is executed (Act). It is noticeable that OODA is one of the common processes for C2 specification.

In the design phase, the defined concepts are modeled based on agent, network and process perspectives. As a process perspective in redefined Capra cognitive framework (Fig. 1), MOODA [51] was used for developing C2 simulator. MOODA is the extended OODA and models decision making in this simulator. Observe, orientation, decision, and action are four main stages of MOODA process that are included in four modules. These modules make simulator engine. MOODA process has strengthened the learning concept with internal and external feedback loops (Fig. 4).

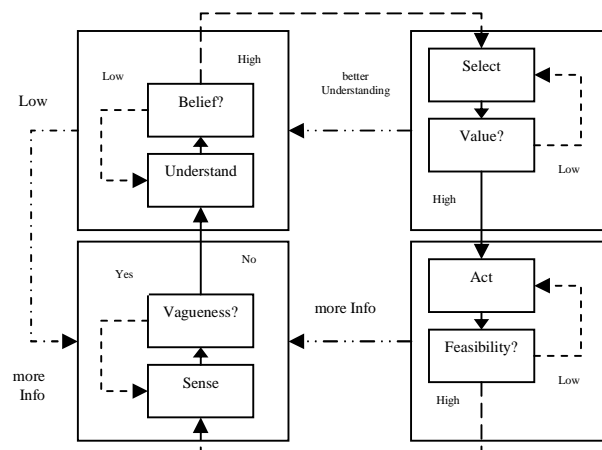


Fig. 4: The MOODA loop

Agents that model combatants in battlefield simulation can be represented by vectors of properties. These vectors include personalities and characteristics properties (Fig. 5). Tendency to friends and attacking the enemies are examples of agents' personality properties. The characteristics properties can be radius of vision, firing range, communication range, and rank of agents.

Personalities properties	Characteristics Properties
--------------------------	----------------------------

Fig. 5: Personalities and characteristics properties of Agents

Agents interact with each other in a battlefield simulator and graph can be suitable to model these interactions. Since in the analysis phase, vision, communication, hierarchy, friendship, enmity, and engagement have been determined as main relations between agents, therefore six graphs model them in the design phase (Fig. 6).

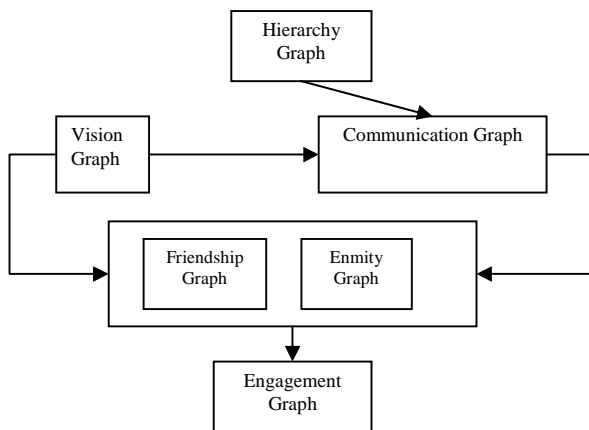


Fig. 6: Six graphs for modeling necessary networks

After designing and modeling battlefield in agent, network, and process perspectives, simulator development phase begins. In this phase, MATLAB programming was found suitable, because the relations between agents have been modeled with graphs and graphs in turn can be represented by adjacent matrixes and agents by vectors. It should be noted that the main data structure in MATLAB programming is Matrix.

6. Conclusion

Today, complex systems modeling and simulation such as C2 is one of the challenges for researchers in different fields. This modeling often leads to simulator software. Like any other software, C2 simulator developing needs a methodology. As software simulators are different from business applications, we need a special methodology for their design and development. In this paper, a methodology was proposed based on Capra cognitive framework for C2 complex systems modeling and simulation. This methodology suggests what concepts, and components should be used for C2 modeling and what kind of relationship is there between them. That is, the proposed methodology is based on ontology.

The main emphasis of this methodology is on design phase that models C2 complex systems based on agent, network, and process perspectives. It results in an appropriate

architectural design for C2 simulator and therefore high quality simulator software would be made. Using the proposed methodology, we have designed and developed C2 complex system simulator and explored agents' decision making for engagement. In addition, this methodology can be used for determining the main concepts and components of modeling other complex systems such as ant colony and stock market.

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Evaluation and Investigation of Risk Management in Iranian Construction Industry

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Abstract: This paper reports - on the basis of a questionnaire survey of the largest Iranian contractors - a perspective of construction risk, and the effective actions taken for the management of such risks, particularly those of time and finances. The study, the first in Iran, focuses on the assessment, allocation and management of construction risks. The paper also presents two types of risk management methods: preventive, which are effective at the early stages of the project life, and mitigative, which are remedial actions aimed at risk minimization during construction. The research found that contractors show more willingness to accept risks that are contractual and legal-related rather than other types of risks. The research results also indicated that the application of the formal risk analysis techniques in the Iranian construction industry is limited.

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1. Introduction

Risk analysis and management are important parts of the decision making process in a construction company. The construction industry and its clients are widely associated with a high degree of risk due to the nature of construction business activities, processes, environment and organization.

Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. Risk has been defined in various ways. Although Porter [17], Healy [10], Barrie and Paulson [2] and Perry and Hayes [16] have expressed risk as an exposure to economic loss or gain arising from involvement in the construction process; Moavenzadeh and Rosow [13] and Mason [12] have regarded this as an exposure to loss only. Bufaied [5] and Boothroyd and Emmett [4] describe risk in relation to construction as a consideration in the process of a construction project whose variation results in uncertainty in the final cost, duration and quality of the project. In order to emphasize the major objectives of survey on risk management actions, risk has been defined as the probability of occurrence of some uncertain, unpredictable and even undesirable event(s) that would change the prospects for the profitability on a given investment.

Recent economic conditions in Iran tend to force a certain attitude towards risks. As a result of economical recession, the number of business failures generally increases. Such situations can explain the desire to share the risks of financial failure. However, it should be recognized that all

risks are rightfully the owner's, unless transferred or assumed by another party for fair compensation. The principal guideline in determining whether a risk should be transferred to another should be based upon whether the party assuming the risk has both the competence to assess the risk and the expertise necessary to control or minimize it.

Insofar as risk analysis and management is important to the activities of the construction industry, little is known regarding the industry's response and the techniques employed for risk analysis and management in the Iranian construction industry. This can be attributed to three main factors:

- a) the Iranian economy depends largely on the oil revenues and the construction industry represents a small percentage of the GDP; specifically 2±3% of the total GDP and 5±6% of the non-oil sector in the 1990s [7];
- b) very limited research has been undertaken in the area of construction; and
- c) almost all the work force in this industry consists of mainly Iranian and some non-Iranian.

The objective of this paper is to present an attitude of a typically large Iranian contractor towards construction risk. The paper is concerned with the assessment and allocation of risk as well as the contribution of each risk type to project delay. The paper also investigates the best contractual arrangements and the most effective approaches towards preventing or minimizing construction risks (i.e., mitigating losses).

2. Questionnaire design

This paper is based on a survey that comprised of three parts. The first part is intended to provide insight into the current attitudes of the Iranian contractors towards construction risk identification and allocation; the second part is concerned with the significance of different risk categories; and the third part is related to the practical actions for managing these risks. To ensure obtaining complete and meaningful response to the questionnaire, an interview was conducted with each respondent to explain the objective of the study and to get input towards the questionnaire design, especially towards identifying risk types and management actions for controlling these risks. Accordingly, all experts have participated in the questionnaire design and then, responded to the questionnaire. The questionnaire survey was designed in a concise and precise way in order to obtain all the necessary information in a multiple choice format. The investigation was undertaken by collecting the responses to a questionnaire through guided interviews with major contractors in the Iranian construction industry. All contractors in Iran depending on their contract size are divided into four major ranks, as per the Central Tendering Committee governmental classification [8], where Rank 1 designates the largest contractors and Rank 4 represents the smallest contractors. To ensure the respondents' sufficient professional qualifications based on their positions, work experience and educational background, only contractors belonging to Ranks 1 and 2 were included in the survey. A total of 61 large contractors in Iran were surveyed; 15 of Rank 1 and 46 of Rank 2 [8]. This sample represents 94% of all contractors in Ranks 1 and 2.

The overall response to the survey comprised a total of 35 completed questionnaires, giving approximately 57% response rate. However, four of the returned questionnaires were incomplete and therefore only 31 returned questionnaires could be used for analysis. The effective response rate of 51% is considered acceptable and relatively high in the construction industry. In fact, this result has been achieved by guiding the whole questionnaire process through personal interviews with the respondents. The respondents are recognized experts in their respective organizations (mostly, directors and partners) with at least 10 years of construction experience.

3. Construction risk allocation

There are different types of risks associated with the construction activities. These are physical, environmental, design, logistics, financial, legal, political, construction and operation risks [16]. Table 1 illustrates 26 risk types included in the

questionnaire without any particular order. These risk types were generated based on: a) an extensive literature review, especially the work of Perry and Hayes [16], Fisk [9], Akintola and Malcolm [1] and Thompson and Perry [19]; and b) consultation with the key local experts who participated in the survey.

The responses to each question were divided into two groups: risk allocation and risk significance. For risk allocation, the respondent must select the party actually taking the risk from one of the following three options: owner, contractor or shared by both the owner and contractor. The results of this part of the survey are summarized in terms of percentages of the total number of respondents who chose the appropriate selection, as given in Table 1. For example, the first row of Table 1 shows that the risk allocation due to permits and regulations is attributed to owner, contractor and shared categories, 74%, 12% and 14%, respectively.

To better understand the distribution of risk types between the owner and/or contractor, the author assumed a minimum response rate of 70%. Table 2 shows the risk allocation using such an assumption for all the risk types listed in Table 1.

According to the survey, a total of 13 construction risks were allocated to the contractor, ranging from availability of labor, material and equipment (response rate 97%) to inflation (response rate 70%). A total of four construction risks were allocated to the owner, ranging from delayed payment on contract (response rate 77%) to scope of work definition (response rate 71%). Responses in favor of sharing the risk ranged from change order negotiations (response rate 76%) to financial failure of any party (response rate 72%). Five risk questions pertaining to risk allocation have undecided results.

4. Significance of risk

The degree of impact for each risk type was included in the questionnaire under the heading "Significance." The questionnaire was designed to examine practitioners' observations and judgments in determining the relative significance of each risk category. Although the degree

of impact varies from project to project, the questionnaire is expected to elicit a general assessment of the significance of risk. Each respondent was required to rank each risk on a scale from 1 to 10 by considering its contributions to project delays. Rank 1 is assigned to a risk that would give the lowest contributions to delays while Rank 10 is allotted to a risk that would cause the highest contribution to delays. The rank range of 1 to 3 denotes risks that are not significant; 4 to 7 indicates significant risks and 8 to 10 shows very

high significant risks, as listed in the last columns of Table 1.

The findings of the survey concerning the relative significance of the risks in the local construction practice are summarized in Table 3. The figures within the table represent the number of respondents who gave the relative contribution rank to each risk. For example, there are three respondents who ranked the risk permits and regulations, with the highest rank value of 10.

In order to quantitatively demonstrate the relative significance of the risks to project delays, a weighting approach is adopted. The principle is that the risk with the highest contribution rank would be assigned the largest weight. The figures in brackets in Table 3 are weighted scores for each risk at different contribution rank. Each individual's weighted score is obtained by multiplying the number of respondents with the corresponding weight. The figures in the last column of the table give the total weighted scores for each risk.

Fig. 1 shows the relative significance of the 26 risks obtained from the survey results in the ascending order.

5. Risk management actions

Managing risks means minimizing, controlling, and sharing of risks, and not merely passing them on to another party [9]. The methods of managing risks are retention, transfer, mitigation, and prevention of risks or any combination thereof.

In the survey, two kinds of management actions are presented to the respondents: preventive action and mitigative action. Preventive actions are used to avoid and reduce risks at the early stage of project construction, yet they may lead to submitting an excessive high bid for a project. Mitigative actions are remedial steps aimed at minimizing the effects of risks. The survey presents seven preventive and six mitigative actions.

These actions were generated based on:

- (a) related research work on construction risk management, and
- (b) input, revisions and modifications from local experts. The methodology was similar to the one adopted for generating the risk types described in the previous section.

5.1. Preventive actions

Thompson and Perry [19] conclude that risk management is most valuable at an early stage in a project, for example at the proposal stage, where there is still some flexibility available in design and planning to consider how the serious risk might be avoided. Table 4 represents the number of respondents who gave the different degrees of effectiveness for each of the seven preventive methods. The degree of effectiveness ranges from

very high (5), to very low (1), or inapplicable (0). In order to quantitatively demonstrate the relative degree of effectiveness between the methods, a weighting approach is adopted. Based on the same procedures used in the previous section, each degree of effectiveness stands for the value of its relative weight between all the options. The figures in brackets within the table are weighted scores for each method and the last column shows the total weighted scores.

The first preventive method recommended by the respondents is produce a proper schedule by getting updated project information and the last recommended preventive method is transfer or share risk to/with other parties.

5.2. Mitigative actions

Whilst some project delay risks can be reduced through various preventive actions at early stages, the delay of progress still occurs in many projects during the construction process. A recent industry study has indicated that over 80% of projects exceed their scheduled time even with the employment of software techniques for project development [20]. When delay happens, contractors can adopt various mitigative actions to minimize the effects of the delay.

Table 5 represents the six mitigative methods being proposed to the respondents. The figures within the table represent the number of respondents who gave different degrees of effectiveness for each of the methods. In order to quantitatively demonstrate the relative degree of effectiveness between the methods, a weighting approach was adopted as shown previously in this paper. The figures in brackets within the table are weighted scores for each method and the last column shows the total weighted scores.

The first mitigative method recommended by the respondents is coordinate closely with subcontractors, and the last recommended mitigative method is change the construction method.

6. Implications of findings

6.1. Risk allocation and significance

Table 2 demonstrates that half of the survey risks, i.e., 13 risks, were allocated to the contractors. This shows that the contractors accepted or shared most of the risks identified in this paper. They held the owner responsible for only four risk types, i.e., only 15% of all construction risks.

The risk, availability of labor, material and equipment, received 97%, the highest response rate in favor of the contractor. This might be attributed to the fact that subcontracting is a typical practice in the Iranian construction industry. However, the

conditions in the subcontracts normally do not include clauses stating the number of workers that subcontractors should provide at the site. Subcontractors normally allocate their manpower to different projects in a selective manner so as to achieve maximum profit for their own business. This leaves the main contractor less control over the number of workers at the site.

Labor disputes recorded 96%, the second highest allocation score in favor of the contractor. Yet, it was the least significant risk category between the survey risks (Fig. 1). This result is expected since the construction industry in Iran is not influenced by any power group, i.e., no labor unions exist. Thus, there is no fear from general labor strikes that would paralyze the Iranian construction industry.

Both coordination with subcontractors and productivity of labor and equipment risk categories gained 94% of allocation score in favor of the contractor. In fact, not only did contractors designate them as their responsibilities, but most researchers also support this position. [14]

The risks that accompany safety and accidents were overwhelmingly considered to be a part of the contractor's responsibility. Only three differing opinions were identified for this category. In fact, contractors are better able to control such risks by supervising the application of safety precautions inside the construction sites. Moreover, the existence of insurance premiums for accidents and injuries can mitigate some of these risk consequences.

Quality of work and accuracy of project program are the other two risk categories that were consistently allocated to the contractor, since the contractors are in a better position to control these risks.

Contractor competence is conceded industry-wide as a risk to be borne by the contractor. This risk was ranked as the seventh highest significant risk category that a contractor in Iran could face (Fig. 1). Actually, current sluggish economic growth and highly competitive market in Iran have forced contractors to reduce or even ignore their profit so as to remain competitive.

Defective materials risk category is one of the major dispute sources in Iran, since the quality of project finishing in Iran is normally high and the special material is commonly acquired from overseas.

Two risk categories which can ruin a contractor who is trying to perform under a lump sum contract were reported by the respondents as risks that Iranian contractors should bear. These two risks are differing site conditions and adverse weather conditions. This result reflects the fact that most owners of the construction projects in Iran are legally protected from liability of these risks by assigning some exculpatory clauses in their contracts. These risk categories increase the

probability of uncertain, unpredictable and even undesirable factors in the construction site. However, adverse weather conditions received the second least significant risk category among the surveyed risks. It is well known that Iran weather is extremely hot during summer, causing significant delay to the progress of a project, especially in critical activities such as concreting. As a result, Iranian contractors are expected to pay special attention to the cost effects of weather conditions, e.g., working in night shifts.

Allocating actual quantities of work to the contractor represents a trend in the attitudes of contractors to assume more risk for the quantities of work in the bidding process as well as in submission of the in-progress work payment schedules. This attitude is important in the performance of a lump sum contract, since the price is based on a predefined amount of work.

The last risk category that was recorded in the contractor's side is inflation. Contractors considered this risk category as an oscillating risk category where its threat increases when inflation increases and vice versa.

Concerning the risks that were allocated to the owner, the highest response record was 77% for delayed payment on contract. This risk category is one of the most debated ones. Under the law, this item can be claimed as part of loss and expense. [11]

Permits and regulations, changes in work and scope of work definition were allocated to the owners with 74%, 72% and 71%, respectively. Allocating changes in work risk category to the owner reflects a trend in which contractors are not very much concerned with obtaining payment for a change in the work, since the cost impact of change orders can be claimed later.

Change order negotiations risk category joined the shared risks. This means that contractors in Iran feel confident to engage in negotiations for such risk category, thus such risk is suitable to be shared. War threats risk category also joined the shared risks. Recently, the unstable political events in the Persian Gulf region reflect the greatest unpredictable cost overburden that a contractor could face. As a matter of fact, the Iranian government is a major client for large contractors and government projects are large enough to keep an awarded contractor busy for a number of years. Such matters could adjust the contractor's risk premium taken through long-term plans, and impose a trend of sharing such an unpredictable risk with the owner.

Financial failure was awarded the highest significant rank of the survey risks (Fig. 1). Financial risks to contractors include whether the contractor has enough cashflow on time to enable him or her to progress with the work, or financial failure of the owner or subcontractors. [1] This

result might be attributed to the recessionary period that Iran has been experiencing in the 1990s.

More contractors are currently failing. As a matter of fact, four of the biggest construction companies in Iran (representing 21% of Rank 1 total contractors) closed their operations or filed bankruptcies in 1998 and 1999. As the probability of financial failure increases, contractors, understandably, prefer to share this uncontrollable risk. However, as the economy of the country improves, the significance of this risk is expected to decrease.

The survey results also show that contractors suffer from insufficient or incorrect design information. This result was obtained from ranking the defective design risk category as one of the five most significant risks to project delays. This risk joined the undecided risks, despite the fact that major allocation percent was heading towards owners who were in a better position to supply sufficient and accurate drawings on the design and services.

Delayed dispute resolution came in the undecided risks, despite the fact that allocation of percentages reflected that contractors were more willing to become involved in dispute resolution.

Table 6 presents a summary for the analysis of the risks allocation and significance results.

6.2. Risk management actions

According to the survey results (Table 4), produce a proper program using subjective judgment and produce a proper schedule for resource procurement by getting updated project information are the two most effective risk preventive actions. Judgment or subjective probability uses the experience gained from similar projects undertaken in the past by the decision maker to decide on the likelihood of risk exposures and the outcome [18]. Judgment and experience gained from previous contracts may become the most valuable information source for the use when there is limited time for preparing the project program. Construction, however, is subjected to a dynamic environment, that is why risk managers must constantly strive to improve their estimates. Even with near perfect estimates, decision making about risk is a difficult task. Thus, depending only on experience and subjective judgment may not be enough, and updated project information should be obtained and applied. Consequently, a significant number of respondents, 90%, considered getting more updated project information at the project planning stage to be the most effective risk preventive method.

Make more accurate time estimation through quantitative risk analyses techniques such as Primavera Monte Carlo program [15] was not considered to be a very highly effective preventive method for reducing the effects of risks. This tends

to support Birch and McEvoy [3], that the approach of risk analysis is largely based on the use of checklists by managers, who try to think of all possible risks. Insufficient knowledge and experience of analysis techniques, and the difficulty of finding the probability distribution for risk in practice could be the two main reasons for such a result.

Add risk premiums to time estimation were not recommended by the practitioners to be an effective preventive method. Risk premiums in construction projects take the form of contingencies or added margins to an estimate to cover unforeseen eventualities [6]. The amount of the premium varies between projects and is mostly dependent upon the attendant risk and decision makers risk attitude. Yet, this result was expected since taking into consideration such risks' premiums would increase the priced bid and would consequently decrease the probability of gaining the bid due to the highly competitive Iranian construction industry market.

The survey also indicated that the method of transfer or share risk is considered to be ineffective for preventing risks where it recorded the lowest weighted effectiveness score (Table 4). As a matter of fact, the development of the subcontracting system in the local construction industry brought a considerable increase in the number of subcontractors with multiple specializations in a construction project, where many of them have very limited technical and financial ability. However, most general contractors need to establish a long-term working relationship with a particular subcontractor and material vendor. Since the long-term transaction relationship between the parties should prevail, a very few general contractors could exercise the practice of shifting risk to subcontractors.

On the other hand, the most effective risk mitigative method was coordinate closely with subcontractors (Table 5). Despite that this shall be recorded as a recommendation from general contractors; it may hold an explicit announcement that subcontractors bring additional risks to general contractors. These risks include uncertainties related to a subcontractor's technical qualifications, timeliness, reliability, and financial stability [3], causing a time and/or cost increase during construction. This mitigative method was recorded as one of the most five significant risks in the Iranian construction industry (Refer to Fig. 1).

Increase manpower and/or equipment were the second most effective mitigative method for minimizing the impacts of delay while change the construction method was rarely used as a mitigative method. This could mean that the number of workers on site is one of the most important variables to project progress, since construction projects generally include many labor-intensive

operations. In fact, as pointed out before, shortage of manpower in subcontractors' firms is one of the most serious risks to project delays. Therefore, increasing the work force normally speeds up progress, subject to the availability of materials and supervisors, physical constraints of the site, and construction sequence.

Tables 7 and 8 summarize the findings of the survey on the effectiveness of preventive and mitigative methods.

7. Conclusions

This paper described the current views and practices of major contractors in Iran regarding allocation and significance of 26 risks presented in a questionnaire survey (Table 1). It also investigated the differing effectiveness of various preventive and mitigative riskmanagement actions being utilized in the local industry (Tables 4 and 5). The survey presented the experience of the largest Iranian contractors towards construction risk according to the CTC governmental classification. Although, it is generally recognized that the risk should be transferred to the party that is in the best position to deal with it, the survey indicated that Iranian local contractors are often responsible for most risk factors. Contractors considered themselves responsible to take care of the risks associated with physical and environmental problems. The risks of this type include differing site conditions and adverse weather conditions. The study also showed that the use of risk analysis techniques for managing and controlling construction risk is generally low among the largest Iranian contractors, with the exception of subjective judgment and practical experience.

The attitudes toward risks that are determined by economic conditions are also discussed. Financial failure has been considered to be the most significant risk category a contractor could suffer from in Iran. Actually, due to the reduction of oil revenues and the current unstable political situation, there are a few government projects left for bidding by large contractors. This may put some large contractors in a position where they barely recover the office overheads. It also forces the contractors to bid in a highly competitive construction industry market. Therefore, they should normally minimize their markups to maximize their chances of winning projects, and they may not take into consideration any risk premiums or contingency allowance in an estimate. Such situation might have been quite different if this survey had been conducted in the 1980s since responses are affected by the economic and political conditions of a country. The findings also indicate that coordination with subcontractors as well as increase of manpower and equipment are

considered to be the most effective risk mitigative methods utilized in the Iranian construction industry market. This result has highlighted the fact that subcontracting work agreements hold the key to mitigate the losses of delay impacts that a general contractor has to bear in Iran.

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Table1:Percentage of respondents towards risk allocation and significance

Types of risks	Risk allocation			Risk significance		
	Owner	Contractor	Shared	Not (1-3)	Significant (4-7)	Very (8-10)
Permits and regulations	74%	12%	14%	10%	61%	29%
Scope of work definition	71%	16%	13%	29%	32%	39%
Site access	52%	22%	26%	16%	65%	19%
Labor, material and equipment availability	0%	97%	3%	0%	19%	81%
Productivity of labor and equipment	0%	94%	6%	0%	32%	68%
Defective design	52%	16%	32%	0%	23%	77%
Changes in work	72%	10%	18%	13%	65%	22%
Differing site conditions	21%	73%	6%	6%	84%	10%
Adverse weather conditions	6%	71%	23%	32%	68%	0%
Acts of God	15%	10%	75%	55%	26%	19%
Defective materials	0%	74%	26%	16%	58%	26%
Government acts	23%	35%	42%	19%	65%	54%
Accuracy of project program	3%	84%	13%	3%	45%	52%
Labor disputes	0%	96%	4%	42%	52%	6%
Accidents/Safety	0%	90%	10%	29%	65%	6%
Inflation	7%	70%	23%	23%	55%	22%
Contractor competence	16%	75%	9%	6%	19%	75%
Change order negotiations	21%	3%	76%	3%	87%	10%
Third party delays	16%	58%	26%	3%	19%	78%
Coordination with subcontractors	0%	94%	6%	3%	19%	78%
Delayed dispute resolutions	29%	16%	55%	6%	65%	29%
Delayed payment on contract	77%	9%	14%	0%	16%	84%
Quality of work	0%	85%	15%	6%	39%	55%
Financial failure	7%	21%	72%	0%	10%	90%
Actual quantities of work	18%	72%	10%	6%	39%	55%
War threats	26%	0%	74%	32%	26%	42%

Table 2: Results of risk allocation

Risk allocation	Risk description	Risk allocation	Risk description
Contractor	Labor, material and equipment availability Labor disputes Productivity of labor and equipment Coordination with subcontractors	Owner	Delayed payment on contract Permits and regulations Changes in work Scope of work definition
	Accidents/Safety Quality of work Accuracy of project program	Shared	Change order negotiations Acts of God War threats Financial failure
	Contractor competence Defective materials Differing site conditions Actual quantities of work Adverse weather conditions	Undecided	Site access Defective design Government acts Third party delays Delayed disputes resolution

Table 3: Contribution of risks to project delays (risk significance)

Types of Risks	Contribution rank to delays										Total weighted scores
	1	2	3	4	5	6	7	8	9	10	
Permits and regulations	1 (1)	2 (4)	0 (0)	14 (56)	1 (5)	1 (6)	3(21)	5 (40)	1 (9)	3 (30)	172
Scope of work definition	0 (0)	0 (0)	9 (27)	1 (4)	3 (15)	3 (18)	3(21)	5 (40)	0 (0)	7 (70)	195
Site access	2 (2)	0 (0)	3 (9)	5 (20)	8 (40)	3(18)	4(28)	4 (32)	0 (0)	2 (20)	169
Labor, material and equipment availability	0 (0)	0 (0)	0 (0)	0 (0)	3 (15)	0 (0)	3(21)	9 (72)	3 (27)	13 (130)	265
Productivity of labor and equipment	0 (0)	0 (0)	0 (0)	2 (8)	3 (15)	4 (24)	1 (7)	10 (80)	4 (36)	7 (70)	240
Defective design	0 (0)	0 (0)	0 (0)	0 (0)	2 (10)	4 (24)	1(7)	8 (64)	4 (36)	12 (120)	261
Changes in work	0 (0)	0 (0)	4 (12)	4 (16)	4 (20)	5 (30)	7(49)	6 (48)	0 (0)	1 (10)	185
Differing site conditions	0 (0)	0 (0)	2 (6)	8 (32)	6 (30)	7 (42)	5(35)	2 (16)	0 (0)	1 (10)	167
Adverse weather conditions	2 (2)	1 (2)	7 (21)	10 (40)	7 (35)	4 (24)	0(0)	0 (0)	0 (0)	0 (0)	125
Acts of God	3 (3)	2 (4)	12 (36)	0 (0)	4 (20)	4 (24)	0(0)	3 (24)	0 (0)	3 (30)	143
Defective materials	2 (2)	0 (0)	3 (9)	1 (4)	8 (40)	5 (30)	4(28)	4 (32)	2 (18)	2 (20)	183
Government acts	2 (2)	2 (4)	2 (6)	7 (28)	5 (25)	3 (18)	5(35)	1 (8)	3 (27)	1 (10)	163
Accuracy of project program	0 (0)	0 (0)	1 (3)	4 (16)	6 (30)	1 (6)	3(21)	6 (48)	4 (36)	6 (60)	220
Labor disputes	7 (7)	0 (0)	6 (18)	5 (20)	6 (30)	1 (6)	4(28)	2 (16)	0 (0)	0 (0)	125

Accidents/Safety	0 (0)	7 (14)	2 (6)	5 (20)	6 (30)	3 (18)	6(42)	0 (0)	2 (18)	0 (0)	148
Inflation	2 (2)	0 (0)	5 (15)	6 (24)	2 (10)	1 (6)	8(56/)	3 (24)	3 (27)	1 (10)	174
Contractor competence	1 (1)	0 (0)	1 (3)	2 (8)	1 (5)	0 (0)	3(21)	14 (112)	3 (27)	6 (60)	237
Change order negotiations	0 (0)	0 (0)	1 (3)	7 (28)	6 (30)	7 (42)	7(49)	0 (0)	2 (18)	1 (10)	180
Third party delays	1 (1)	0 (0)	0 (0)	2 (8)	2 (10)	8 (48)	5(35)	6 (48)	4 (36)	3 (30)	216
Coordination with sub contractors	1 (1)	0 (0)	0 (0)	0 (0)	4 (20)	0 (0)	2(14)	12 (96)	8 (72)	4 (40)	243
Delayed dispute resolutions	0 (0)	1 (2)	1 (3)	2(8)	7 (35)	2 (12)	9(63)	4 (32)	2 (18)	3 (30)	203
Delayed payment on contract	0 (0)	0 (0)	0 (0)	2(8)	0 (0)	0 (0)	3(21)	4 (24)	9 (81)	14 (140)	274
Quality of work	0 (0)	1 (2)	1 (3)	2(8)	0 (0)	4 (24)	6(42)	13 (104)	2 (18)	2 (20)	221
Financial failure	0 (0)	0 (0)	0 (0)	1(4)	1 (5)	0 (0)	1(7)	6 (48)	2 (18)	20 (200)	282
Actual quantities of work	2 (2)	0 (0)	0 (0)	1(4)	1 (5)	1 (6)	9(63)	4 (32)	7 (63)	6 (60)	235
War threats	5 (5)	1 (2)	4 (12)	0(0)	3 (15)	1 (6)	4(28)	3 (24)	3 (27)	7 (70)	189

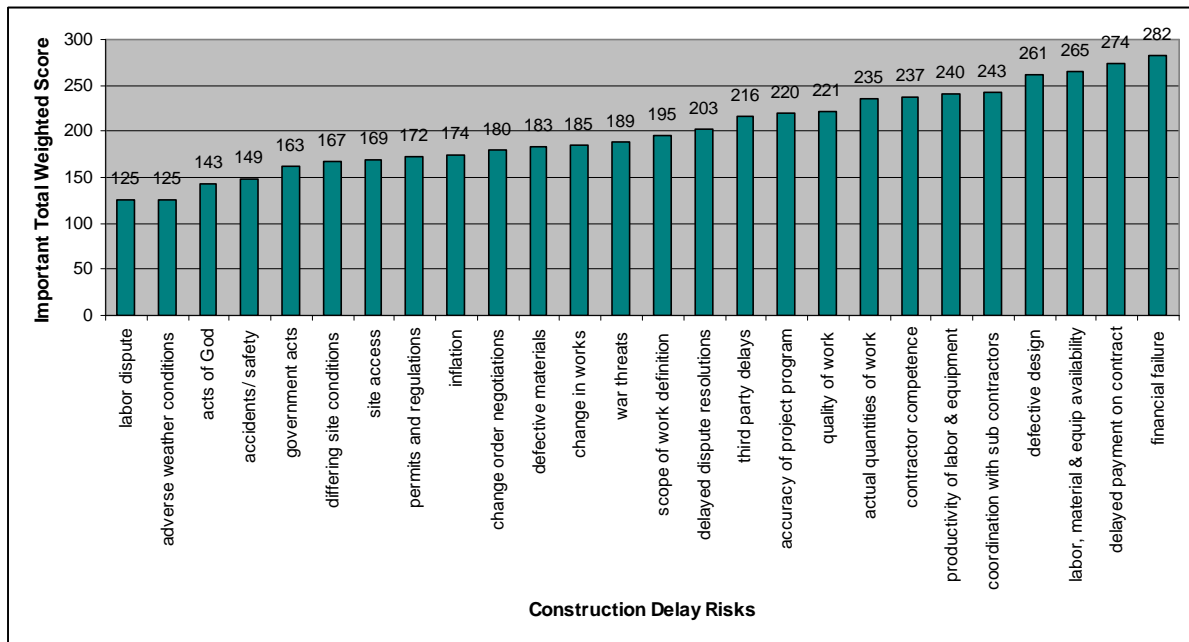


Fig. 1. Results of the survey on risk significance

Table 4: Relative effectiveness of preventive methods (survey results)

Preventive method	Effectiveness of preventive methods						Total weighted scores
	V.high 5	High 4	Moderat 3	Low 2	V.Low 1	In appl 0	
Utilize quantitative risk analyses techniques for accurate time estimation	6 (30)	10 (40)	8 (24)	3 (6)	3 (3)	1 (0)	104
Depend on subjective judgment to produce a proper program	15 (75)	11 (44)	5 (15)	0 (0)	0 (0)	0 (0)	134
Produce a proper schedule by getting updated project information	15 (75)	13 (52)	2 (6)	1 (2)	0 (0)	0 (0)	135
Plan alternative methods/options as stand-by	8 (40)	12 (48)	6 (18)	0 (0)	2 (2)	3 (0)	108
Consciously adjust for bias and add risk premium to time estimation	4 (20)	8 (32)	12 (36)	2 (4)	4 (4)	1 (0)	96
Transfer or share risk to/with other parties	1 (5)	11 (44)	7 (21)	4 (4)	5 (5)	2 (0)	85
Refer to previous and ongoing similar projects for accurate program	8 (40)	12 (48)	8 (24)	5 (5)	2 (2)	0 (0)	116

Table 5: Relative effectiveness of mitigative methods (survey results)

Preventive method	Effectiveness of preventive methods						Total weighted scores
	V.high 5	High 4	Moderat 3	Low 2	V.Low 1	In appl 0	
Increase manpower and/or equipment	15 (75)	8 (32)	6 (18)	2 (4)	0 (0)	0 (0)	129
Increase the working hours	6 (30)	16 (64)	9 (27)	0 (0)	0 (0)	0 (0)	121
Change the construction method	1 (5)	8 (32)	10 (30)	4 (8)	2 (2)	0 (0)	77
Change the sequence of work by overlapping activities	7 (35)	15 (60)	7 (21)	2 (4)	0 (0)	6 (0)	120
Coordinate closely with subcontractors	19 (95)	9 (36)	3 (9)	0 (0)	0 (0)	0 (0)	140
Close supervision to subordinates for minimizing abortive work	12 (60)	10 (40)	5 (15)	3 (6)	1 (1)	0 (0)	122

Table 6: Summary of the findings of the survey on risk allocation and significance

Type of risk	Summary of results
Permits and regulations	Its owner should be responsible for this risk. Contractors do not think of this risk as an important one. The relative significance placed it as the eighth one from the last
Scope of work def.	This risk belongs to the owner and is expected to stay that way. This was a risk with amid-level significance
Site access/right of way	This risk should be either a shared or owner responsibility. This risk was considered to have low importance, as it ranked seventh in relative significance
Availability of labor, material and equipment	This risk scored the highest in allocation to the contractor. The significance of this risk places it within the top five most important risks in the Iranian construction industry
Productivity of labor and equipment	The results overwhelmingly assigned the contractor to be responsible for this risk
Defective design	Contractors assigned high significance for this risk. This risk should be either owner's responsibility or shared. Its significance was high especially for contractors working for a lump sum contract
Changes in work Differing site conditions	The owner is responsible for this risk. Its significance was ranked in the lower-mid range. Surprisingly, this risk was allocated to contractors. This means that contractors in Iran are acting as the insurers of the owners. However, its importance was low as the relative significance placed it as the sixth from the last
Adverse weather conditions	The survey indicated that the contractor must assume this risk. This risk was determined to be the second lowest significant risk of the survey
Acts of God	The view of contractors is that this risk should be shared. It was determined to be of little significance
Defective materials	This risk was found to be the responsibility of contractors since they are most certainly in the best position to handle it. This risk ranked in the lower-mid range of significance
Government acts	This risk should be either shared or contractor responsibility. It was found to have low significance
Accuracy of program	Contractors assign this risk to themselves. They ranked it in eighth position of significance
Labor disputes	Contractors are responsible for this risk, and it is expected to continue as such. However, its significance was the least among the surveyed risks
Accidents/Safety	Contractors believe that they have sole responsibility for this risk. Yet, its relative significance placed it in the least five significant risk categories
Inflation	The survey showed that this risk depends on the economic condition of the country. Currently, the inflation rate is low, so contractors are more willing to accept this risk
Contractor competence	Contractors assumed responsibility for their competence and ranked this risk as having high significance
Change order negotiations	This risk is usually shared and is expected to remain that way. The level of significance was in the lower-

	mid range
Third party delays	This risk should be either a shared or contractor responsibility. This risk is considered to be important, as it was assigned in the upper mid-range
Coordination with subcontractors	The survey results overwhelmingly assigned the contractor responsibility for this risk, and it is expected to continue this way. This risk was considered as one of the top five most significant risk categories
Delayed dispute resolution	The results of this survey indicated that this risk should be either owner or shared responsibility. Contractors assigned a relatively high significance level to this risk
Delayed payment on contract	The results indicated that owners should assume this risk, and that they will continue to do so. This risk is considered to be extremely important by contractors as it was ranked second in relative significance
Quality of work	Contractors consistently assign this risk to themselves as they only can handle this task. They also ranked it as a significant one
Financial failure	The survey showed that contractors must assume this critically important risk, assigning it the highest significance rating. Yet, this risk is a result of economic conditions. While in a recessionary period, the significance increases and the contractor desires a risk sharing approach
Actual quantities of work	Contractors seem to remain in favor of assuming this risk. This risk was considered important as it was ranked eighth in relative significance
War threats	This risk just came in the middle range of relative significance of surveyed risks. Its significance may decrease as the political circumstances in the Persian Gulf region become more stable. A shared responsibility was the best approach

Table 7: Summary of the findings of the survey on risk preventive methods

Preventive method	Summary of results
Application of risk analysis techniques	This method was not considered one with very high efficiency in preventing risks. It was ranked as the third recommended method to be employed by practitioners
Depend on subjective judgment	This method was considered the second highest effective method for preventing risk. Yet, it cannot be regarded as a formal technique
Utilize updated project information	This method was the best recommended preventive method to be utilized at the early stages
Plan alternative methods as stand-by	This method was rarely used as it was assigned the fifth recommended preventive method from the contractor's point of view
Add risk premium to time estimation	This method is of moderate effectiveness as a preventive method and is rarely taken into account by Iranian local contractors
Transfer or share risk	General contractors did not consider this approach as an effective method as it was ranked as the last recommended preventive method
Refer to similar projects	The survey revealed that this method was considered of moderate effectiveness as it was ranked in the fourth place among the surveyed preventive methods

Table 8: Summary of the findings of the survey on risk mitigative methods

Mitigative method	Summary of results
Increase manpower and equipment	This method was considered as the second effective method for mitigating losses. It reflects the fact that shortage of manpower is one of the most serious risks to project delays in Iran
Increase the working hours	Productivity is the main item adversely affected by this approach. The survey showed that contractors consider this method as a relatively effective mitigative method
Change the construction method	The practitioners have considered this method as the lowest effective remedial method to be employed for mitigating risk impacts
Change sequence of work by overlapping activities	The survey results indicated that this method was moderate in its effectiveness as a mitigative method. However non of the respondents gave it the very low effectiveness category
Coordinate closely with subcontractors	The contractors have considered this method to be the highest effective remedial method for mitigating the losses encountered in a construction project. Thus, local subcontractors could be holding the key to projects delays
Apply close supervision of abortive works	This approach was ranked as the third effective mitigative method to be followed for minimizing losses. However, it unfolds the fact that most local subcontractors have lack of technical ability to fulfill contracted works

10/30/2012

First description of the adult stages of *Postorchigenes* sp. (Trematoda: Lecithodendriidae) and *Malagashitrema* sp. (Trematoda: Homalometridae) infecting the common chameleon *Chamaeleo chamaeleon* (Reptilia: Chamaeleonidae) in Egypt

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Abstract: In the present study, the morphological and morphometric characterization of two species of digenetic trematodes infecting the large intestines of the common chameleon *Chamaeleo chamaeleon* (Reptilia: Chamaeleonidae) were described by means of light microscopy as a first description. 30 and 37 out of 115 (26.1 % and 32.1%) of this lizard species were found to be naturally infected with *Postorchigenes* sp. (Trematoda: Lecithodendriidae) and *Malagashitrema* sp. (Trematoda: Homalometridae) respectively. *Postorchigenes* sp. possesses a body which is oval, spinulate with an oral sucker bigger than acetabulum. The prevalence of *Postorchigenes* sp. reported from the present study were agreed with the previous studies carried out by Kennedy *et al.* (1987) who described a three species of digenea from seven species of lizards in Indonesia. *Malagashitrema* sp. possesses oral sucker larger than acetabulum. The presence of *Malagashitrema* sp. proved that *Malagashitrema* is a genus with species linked to *Chamaeleo* spp. These trematodes adapted to different areas, making their presence are possible in different geographical regions in the world and appears to be a species adapted to *Chamaeleo* spp.

[Kareem Morsy; Nadia Ramadan; Salam Al Hashimi; Medhat Ali; Abdel-Rahman Bashtar. **First description of the adult stages of *Postorchigenes* sp. (Trematoda: Lecithodendriidae) and *Malagashitrema* sp. (Trematoda: Homalometridae) infecting the common chameleon *Chamaeleo chamaeleon* (Reptilia: Chamaeleonidae) in Egypt.** *Life Sci J* 2012;9(4):400-405] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 60

Key words: Digenea - *Postorchigenes* sp. - *Malagashitrema* sp. - *Chamaeleo chamaeleon* - Light microscopy.

1. Introduction

Chameleons (family Chamaeleonidae) are a distinctive and highly specialized clad of lizards. They are distinguished by their zygodactylous feet, their separately mobile and stereoscopic eyes, their very long, highly modified, and rapidly extrudable tongues, their swaying gait, the possession by many of a prehensile tail, crests on their distinctively shaped heads, and the ability of some to change color.

The original description of *Malagashitrema aphallosum* (Capron *et al.*, 1961) led to the creation of a new subfamily, Malagashitrematinae (Capron *et al.*, 1961) that the same authors incorporated in the family Allocreadiidae Stossich, 1903. Yamaguti (1971) placed the mentioned subfamily within Homalometridae (Cable et Hunninen, 1942), including parasites exclusive to chameleons, with a single genus *Malagashitrema* (Capron *et al.*, 1961). Up to the present, only two species of this genus have been described: the type species, *M. aphallosum* in *Chamaeleo* spp. (*C. verrucosus*, *C. oustaleti*, *C. lateralis*, *C. brevicornis*, *C. pardalis*) in Madagascar (Capron *et al.*, 1961 and Brygoo, 1963a) and *M. cameroonense* Fischthal, 1976 in African chameleons (*C. cristatus* and *C. africanus*) (Fischthal, 1976). The detection of *M. aphallosum* in *C. parsonii* Cuvier, 1825 represents a new

identification of this digenean species in a Malgache chameleon, furnishing new data about the morphometry of this parasite (Capron *et al.*, 1961). *Postorchigenes* is a genus of family Lecithodendriidae which includes digenetic trematodes with large acetabulum and vitelline glands extends laterally at the two sides of the body in the anterior region. Some *Postorchigenes* species were reported in 7 species of lizards in families Gekkonidae, Agamidae, Lacertidae and Scincidae from Indonesia (Kennedy *et al.*, 1987). There are 13 genera of lizard in Family Gekkonidae from Southeast Asia (Bellairs, 1969), among these, 7 species of 5 genera were reported in Thailand, *Cosymbotus platyurus*, *Gehyra* sp, *Gekko gecko*, *Hemidactylus frenatus*, *H. gamoti*, *Phyllodactylus melanostictus*, *P. siamensis* (Nabhitabhata J; Personal communication). Since no data are available for helminth parasites from Egyptian reptiles specially *Chamaeleo chamaeleon* so the present paper gives the first information about trematode parasites infecting this reptilian species by the determination of the prevalence, intensity and habitat of two digenetic trematodes in common chameleon *Chamaeleo chamaeleon* collected in South Sinai, Egypt. Also this study describes the worms recovered morphologically and morphometrically by means of light microscopy.

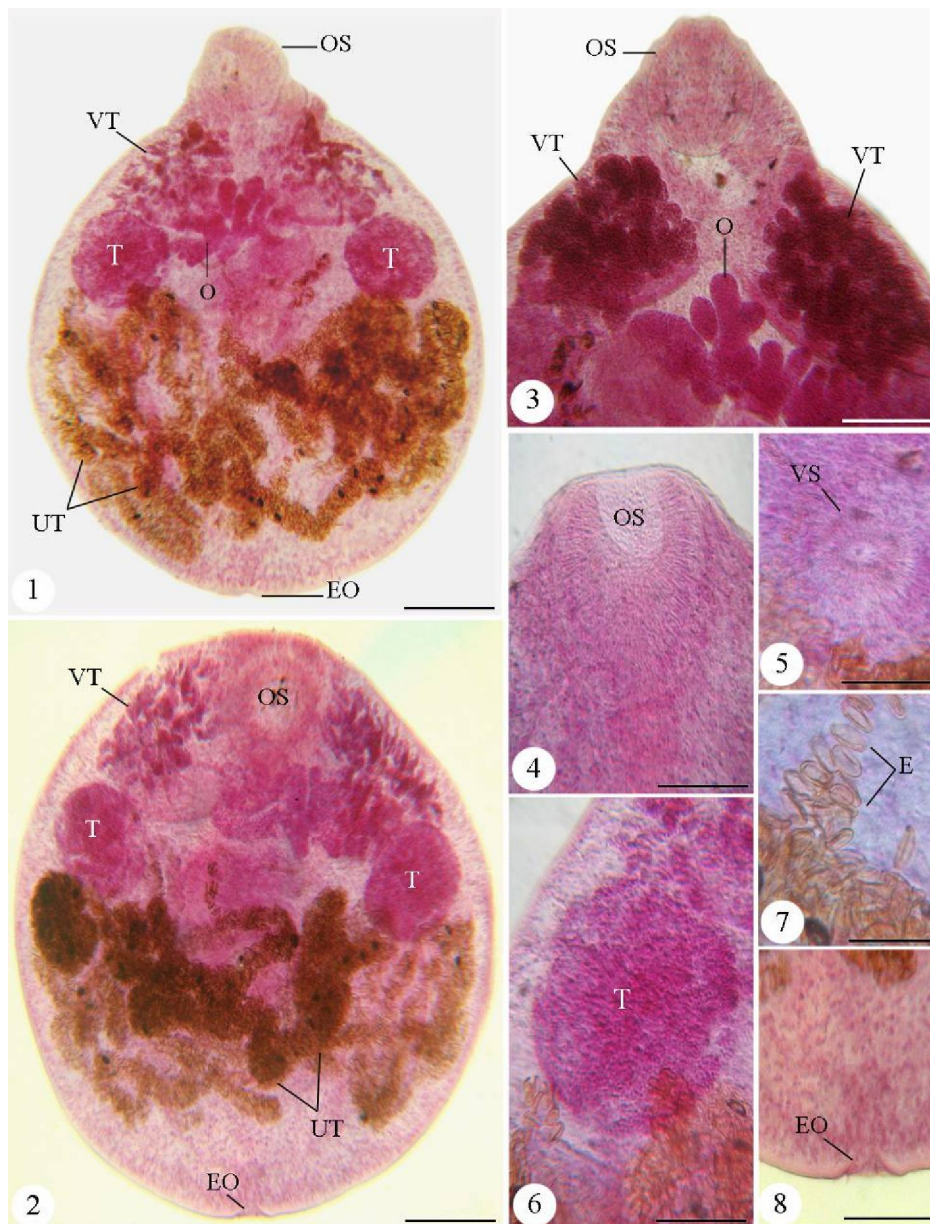


Fig. 1-8: Photomicrographs of the adult *Postorchigenes* sp. **1, 2** Whole mount preparations of the adult worm which is oval in shape terminated at the excretory opening (EO) and with a large anterior oral sucker (OS), median ventral sucker (VS), two oval testes (T) located laterally, a branched ovary (O) above the ventral sucker, lateral vitelline glands (VT), uterus (UT) which fill most of the posterior body region (Scale bar, 1mm). **3** High magnification of the anterior body showing the oral sucker (OS), a branched ovary (O), and the lateral vitelline glands (VT). (Scale bar, 0.4mm) **4-8** High magnifications of: **4** oral sucker (OS) (Scale bar, 0.3mm), **5** ventral sucker (VS) (Scale bar, 0.3mm), **6** Testis (T) (Scale bar, 0.4mm), **7** Eggs (E) (Scale bar, 0.4mm), **8** Excretory opening (EO) (Scale bar, 0.4mm).

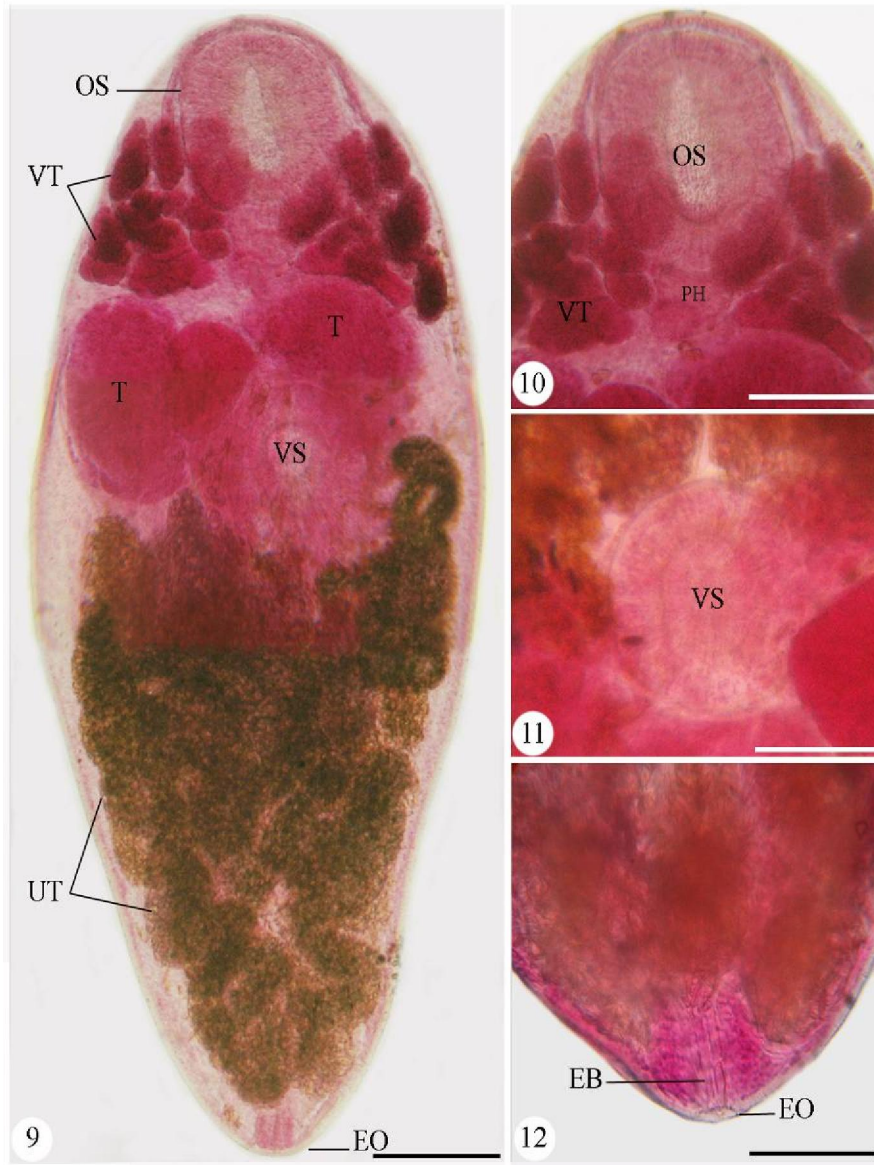


Fig. 9-12: Photomicrographs of the adult *Malagashitrema* sp. **9** Whole mount preparations of the adult worm which terminated at the excretory opening (EO) with an anterior oral sucker (OS) nearly equal in size with a ventral sucker (VS) situated at the anterior third of the body, two ellipsoidal testes (T) enclosing ovary (O) in between, lateral vitelline glands (VT), uterus (UT) which fill most of the posterior body region (Scale bar, 0.3mm) **10-12** High magnifications (Scale bar, 0.2mm) of : **10** Anterior body showing oral sucker (OS), Pharynx (PH) and the lateral vitelline glands (VT). **11** ventral sucker (VS), **12** Excretory canal (EB) terminated at the excretory opening (EO).

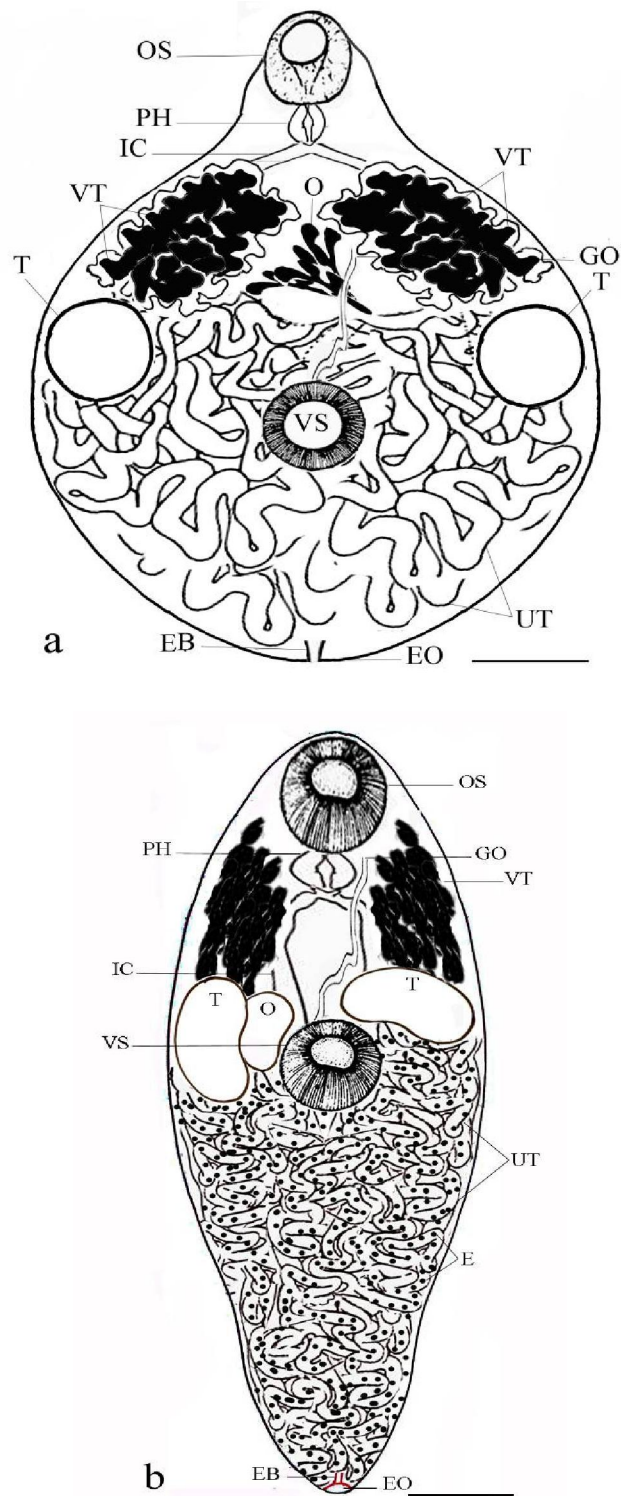


Fig.13: Line diagram of the adult worms of: **a** *Postorchigenes* sp. (Scale bar, 1mm). **b** *Malagashitrema* sp. (Scale bar, 0.3mm). Oral sucker (OS), ventral sucker (VS), pharynx (PH), intestinal caeca (IC), testis (T), ovary (OV), uterus (UT), vitelline follicles (VT), excretory bladder (EB), excretory (EO) and genital openings (GO).

2. Material and Methods

Lizards were collected by hand or noose from south Sinai, Egypt during the period of 2011. Each lizard was killed within 8-24 hrs after capture with an intraperitoneal injection of a dilute solution of sodium pentobarbital or exposure to chloroform and fixed in 10% formalin and then stored in 70% ethanol. The flukes collected from the stomach and intestines were washed out with normal saline (0.7% NaCl). The worm washing processes are repeated several times to remove any mucus or debris from their surface, then flukes were fixed in 5% formalin, flattened by repression and stained in acetic acid Carmine for 45 min, washed in tap water, dehydrated through a graduated series of alcohol (50 %, 70 %, 90 %, 100 %), cleared in xylene, mounted in Canada Balsam, and examined under the microscope. Taxonomic identifications of the digenean worms were based on Yamaguti (1971). Illustrations of the presented new species were made through the aid of a drawing tube.

3. Results

Thirty out of 115 (26.1%) of the common chameleon *Chamaeleo chamaeleon* (Reptilia: Chamaeleonidae) were found to be naturally infected with the digenetic trematode *Postorchigenes* sp. belonging to family Lecithodendriidae and 37 out of 115 (32.1%) of the same lizard species were found to be naturally infected with *Malagashitrema* sp. (Trematoda: Homalometridae). The two species of digenetic trematodes were described for the first time in Egypt from this host species.

Postorchigenes sp.

Taxonomic summary

Type-host: *Chamaeleo chamaeleon* (Family: Chamaeleonidae).

Site of infection: infecting the intestine of the host lizard.

Type-locality: South Sinai, Egypt.

Prevalence: 290 lizard samples were examined for digenean parasites, 30 (74.1%) fish were infected.

Materials deposited: Slides were deposited at Zoology Department museum, Zoology Department, Faculty of Science, Ain Shams University, Egypt.

Description: Body oval, spinulate 0.8 - 1.7 (1.3±0.2) mm long by 0.60 - 1.40 (1.0±0.2) mm wide (10 specimens). Oral sucker larger than acetabulum 0.13- 0.18 (0.15±0.02) mm in diameter. Acetabulum small, pre-equatorial 0.08-0.12 (0.09±0.02) mm in diameter. Prepharynx absent, esophagus short, ceca extending posterior to testes 0.08 - 1.4 (1.1±0.2) long by 0.14-0.19 (0.15±0.02) mm wide. Testes oval, nearly symmetrical, post-acetabulum, in middle level of the body 0.17-0.22 (0.20±0.02) mm in diameter. Cirrus pouch on left side of acetabulum 0.29-0.35 (3.1±0.2) mm long by 0.10-0.16 (0.12±0.02) mm wide. Genital pore posterolateral to acetabulum.

Ovary on right side of acetabulum, branched 0.25-0.32 (0.26±0.02) mm long by 0.20-0.25 (0.21±0.02) mm wide. Vitelline glands extending transversely across the entire body between pharynx and acetabulum. Uterus occupying hind body and bifurcation. Excretory vesicle V-shaped.

Malagashitrema sp.

Taxonomic summary

Type-host: *Chamaeleo chamaeleon* (Family: Chamaeleonidae).

Site of infection: infecting the intestine of the host lizard.

Type-locality: South Sinai, Egypt.

Prevalence: 290 lizard samples were examined for digenean parasites, 37 (74.1%) were infected.

Materials deposited: Slides were deposited at Zoology Department museum, Zoology Department, Faculty of Science, Ain Shams University, Egypt.

Description: Body large, smooth, 2.2- 3.7 (2.4±0.2) mm long by 0.90 -1.30 (1.1±0.2) mm wide (10 specimens). Oral sucker larger than acetabulum, 0.35-0.42 (0.39±0.02) mm in diameter. Prepharynx absent, esophagus short, ceca wide straight, terminating near posterior extremity, 1.62-2.12 (1.9±0.2) mm long by 0.22-0.30 (0.27±0.02) mm wide. Acetabulum in anterior half of body. Testes slightly lobed, symmetrical, partly in acetabulum zone, 0.38-0.45 (0.42±0.02) mm in diameter. Cirrus pouch pre-acetabulum 0.39-0.50 (0.41±0.02) mm long by 0.10-0.15 (0.13±0.02) mm wide. Ovary in between lobes of testes 0.22-0.30 (0.23±0.02) mm in diameter. Vitelline follicles numerous, in extracecal fields, in anterior third of the body. Uterus occupying posttesticular region. Excretory bladder tubular.

4. Discussion

Thirty (26.1%) and thirty seven (32.1%) of 115 *Chamaeleo chamaeleon* harbored two new helminthes representing 2 species, these are *Postorchigenes* sp. belonging to family Lecithodendriidae, and *Malagashitrema* sp. of family Homalometridae. Many studies were carried out to determine the prevalence of digenetic trematodes and helminth parasites in different lizard hosts (Yamaguti, 1958; Al-Barwari and Nassir 1983; Kennedy *et al.*, 1987; Goldberg *et al.*, 1993; 1994; Didyk *et al.*, 2007; Yildirimhan *et al.*, 2011). The prevalence of *Postorchigenes* sp. (26.1%) reported from the present study were agreed with the previous study carried out by Kennedy *et al.* (1987) who described a three species of digenetic trematodes from seven species of lizards from Indonesia. Also they found that prevalence and intensity of *P. geckonum* and *P. ovatus* were similar in males and females of each host species examined except for the gecko *Gehyra mutilata*, in which females had a significantly higher prevalence of infection of both parasites than

males and this difference is possibly due to differential food preference.

The presence of *Malagashitrema* spp. proved that *Malagashitrema* is a genus with species linked to *Chamaeleo* spp. These trematodes adapted to different areas, making their presence are possible in different geographical regions in the world and appears to be a species adapted to *Chamaeleo* spp. (Casanova *et al.*, 1994). In the 298 specimens of the ten chameleon species analyzed by Capron *et al.* (1961), *M. aphallosum* was detected with a general prevalence of a 2,340% 1,340% in *Chamaeleo oustaleti*, 0.670% in *Chamaeleo lateralis* and 0,330% in *Chamaeleo verrucosus*.

In the only specimen of *C. parsonii* analyzed by the above-mentioned authors, as well as those species of chameleons from which only a few specimens were analysed (1 of *Chamaeleo minor*, *C. rhinoceratus* and *C. boettgeri*; 2 of *C. guentheri* and *Chamaeleo* sp.; 25 of *C. pardalis*), *M. aphallosum* was not detected. In a larger sample (627 chameleons), Brygoo (1963a) detected the digenean in 3,820% of the hosts, amplifying the host range with two new species, *C. pardalis* and *C. brevicornis*, with a prevalence of 7,01 % and 4,00% respectively. The absence of this parasite in *C. parsonii* in Brygoo's study (1963a) could be due to the low number of individuals of this species analyzed (n=8). The presence of *Malagashitrema* in most of the examined *Chamaeleo* lizards by previous studies in addition to our identification supports the hypothesis formulated by Brygoo (1963b) referring to the endemic character of this trematode species in *Chamaeleo* spp.

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9/3/2012

Use of 8-hour and 12-hour Urine Sample for Prediction of Significant Proteinuria

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Abstract: The combination of hypertension and proteinuria such as preeclampsia during pregnancy markedly increases the risk of prenatal mortality and morbidity. 24hour urine protein estimation is the gold standard for assessment of proteinuria. This study was undertaken to determine whether an 8hour & 12hour protein estimation correlated with that of a formal 24hour collection. The study population included 65 pregnant women over 20 weeks gestation with hypertension admitted for assessment of proteinuria in Bandar Abbas Dr. Ali Shariati hospital. Urine samples were collected over 24hours with the first 8hours, next 4 hours, and remaining 12 hours collected in separate containers. The urine volume, and total protein levels were measured in the 8, 12, and 24 hours samples and compared each other. Of 65 patients 35 had no proteinuria, 27 had mild proteinuria and 2 had severe proteinuria. 8 hour sample predicted significant proteinuria with sensitivity of %63, specificity of %91 positive predictive value of %86 and negative predicative value of %82. Total protein values for 8 and especially 12hour sample correlate positively with values of 24hour sample for patients with proteinuria.

[Minoo Rajaei, Parvaneh Pazouky, Maryam Azizi Kutenaee, Laila Haghani, Pouneh Nekouei, Mitra Ahmad Soltani, Soghra Fallahi. **Use of 8-hour and 12-hour Urine Sample for Prediction of Significant Proteinuria.** *Life Sci J* 2012;9(4):406-408] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 61

Keywords: Pregnancy, Proteinuria, Preeclampsia

1. Introduction

Hypertension is among the fatal triad of maternal mortality rate (1). Proteinuria is a sign of worsening hypertensive disease, specifically preeclampsia (2, 3). Significant proteinuria is defined by 24hour urinary protein exceeding 300 mg per 24hour, or persistent 30mg/dl (1+ dipstick) in random urine samples (1, 4). The 24hour urine collection has been the gold standard for making the diagnosis of significant proteinuria in patients with pregnancy induced hypertension (5). The test takes the 24hours to complete, which leads to delay diagnosis and inaccurate results as the result of incomplete collection. This precludes the use of a shorter collection period or the use of a random urine sample for protein concentration measurements, the latter of which would be the most practicable. The degree of proteinuria may fluctuate widely over any 24hour period, even in severe cases (6). Therefore, a single random sample may fail to demonstrate significant

proteinuria (7). This study was undertaken to determine whether an 8hour & 12hour protein estimation correlated with that of a formal 24hour collection.

2. Material and Methods

This is a cross-sectional study on pregnant women over 20 week gestation with the diagnosis of Pregnancy Induced Hypertension. The study population included 65 pregnant women in Bandar Abbas Dr. Ali Shariati hospital. Patient's urine was collected over 24hours in the first 8hours, next 4hours, and remaining 12hours collected in separate containers. The urine volume and total protein and creatinine levels were measured in the 8, 12, and 24 hours samples and compared. The first lab test was dipstick test, and then trichloroacetic acid 12.5%. First sample: First, six cc of the 8hour urine were taken. Second sample: the remained sample of 8hour sample plus 4hour sample was added and six cc of

the result solution was considered as the second sample. Third sample: the 12hour sample was added to the 24hour sample and six cc of the solution was examined as the third sample. Proteinuria was defined as 100 mg or more protein in the 8 hour sample, 150 mg in 12hours and 300 mg in 24hours sample. The amount measured was multiplied by 3 and by 2 respectively. Pearson's correlation coefficient, specificity, positive predictive value and negative predictive value were determined. The 8 and 12hour results were compared with the 24hour results by use of simple regression analysis. The Pearson's coefficient was 0.873 and 0.890 respectively.

3. Results

Table 1 and 2 summarizes the results of the study. Of 65 patients 35 had no proteinuria, 27 had mild proteinuria and 3 had severe proteinuria.

Table1. Cases characteristics

Min-max	SD± mean	Details
17-42	29.031± 6.162	Age (yrs)
21-39	31.846± 4.563	Gestational age (weeks)
30-5130	449.9± 765.2	8hour protein
28-5800	507±812	12hour protein
20-2880	418±507.9	24 hour protein
109-1300	532.1±219.3	8 hour urine volume
260-2740	987.1±493	12 hour urine volume
420-3840	1675.2±699.4	24 hour urine volume
0.4-0.8	0.52±8%	Serum Cr

Table 2. Comparing 8 hour and 12 hour random urine collection

12 hour urine	8 hour urine	Random	Cases
28 (43%)	22 (33%)	35 (53%)	Proteinuria cases (%)
24	19	22	positive
4	3	13	False positive
37 (56%)	43 (66%)	30 (46%)	Non proteinuria cases %
32	32	23	Negative
5	11	7	False negative
82%	63%	75%	Sensitivity
88%	91%	63%	Specificity
85%	86%	62%	PPV
86%	82%	76%	NPV

Eight hour sample predicted significant proteinuria with sensitivity of %63, specificity of %91 positive predictive value of %86 & negative

predictive value of %82. 12hour sample predicted significant proteinuria with sensitivity of %82 specificity of %88 positive predictive value of %85 negative predictive value of %86.

4. Discussions

There remains considerable variation in the use of methods for assessing the amount of protein excretion as well as doubts about many of the techniques used (8-11). However it is acknowledged that estimation of urinary protein excretion over a 24h period is the reference, or gold standard, method. This approach, however, is considered by many to be impractical in some circumstances, particularly in the outpatient setting, because of the difficulties associated with obtaining a complete collection. In a study of elderly patients, Mitchell et al. (12) had to discard >20% of the samples returned because they were considered to be incomplete; Chital et al. (13) In their study had to discard 10% of the samples received for similar reasons. The need for a 24h collection is a result of the high degree of variation in the urinary protein concentration during the course of the day. Several authors have investigated the variation in protein excretion during the day and found that values can vary from 100% to 500%. Factors, including (a) variation in water intake and excretion, (b) rate of diuresis, (c) exercise, (d) position, and (e) diet. The variation may be further exacerbated by pathologic changes in blood pressure and renal architecture (6). Although the dipstick technique is fast but it can only measure albumin in the urine and it can make false negative results. It can even have the inter-rater error of measurement (14). Meyer and colleagues detect a 34% negative predictive value and 92% Positive predictive value for dipstick technique (7). Other studies have assessed the value of single voided and 2hour protein estimations... The quantitative assessment of single and 2hour protein specimens has been shown to be accurate when compared with to standard 24hour estimation and were both time and cost- effective. Samantha et al demonstrated moderate correlation between the standard 24hour urinary protein estimation and two hour estimation (15). Otero pinto et al suggested that 8 and 12hour proteinuria can be used as a tool to perform and early diagnosis of preeclampsia (16). Our study shows that total protein values for 8 and specially 12hour sample correlate positively with values of 24hour sample for proteinuria.

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8/08/2012

Some aspects of chemical procedures & application trends of polyaniline as an intrinsically conductive polymer

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Abstract: Intrinsically conducting polymers (ICPs) have been studied extensively due to their intriguing electronic and redox properties and numerous potential applications. Polyaniline, its derivatives and composites has been recognized as ICPs. These polymers are attractive materials owing to good stabilities, easy synthesis, desirable conductivity; exhibits extraordinary electronic properties. Because of this; they finds a wide variety of applications such as electromagnetic, interference shielding, energy storage, catalysis, chemical sensing, biochemistry, smart clothing, corrosion devices and microwave absorption industries. However, it is inherently brittle and poor in processability; To improve these restrictions and extend it functions, the fabrication of it advanced composites has attracted a great deal of attention & various procedures have been adapted. The scaled-up assays in this area, offers a wide scope of scattered literatures frequently utilized for “experts in the field”. Assembling this ill-matched data was the main purpose our ventures in this article. Science; Assays, gaps, particular themes in other papers overall assessed; aligned in this review article & outlined in sub-topics such as fundamental concepts, engaging procedures, improvement methods and application trends for emerge literature approvable in advanced science & educational journals.

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Keywords: polyaniline, inherently conductive polymers, doping, processability, composites.

1. Introduction

1.1. Some fundamental concepts & research importance angle

With the discovery in 1970 of intrinsically conductive polymers (ICPs), an attractive subject of research was initiated because of the interesting properties and numerous application possibilities of ICPs and since the successful synthesis of conducting polyacetylene in 1977 by Shirakawa et al, ICPs have generated tremendous interest due to their potential applications in various fields such as electromagnetic interference shielding, energy storage, catalysis, chemical sensing, biochemistry, smart clothing, corrosion devices electrochromic display devices, separation membranes, anticorrosive coatings and microwave absorption industries.

ICPs are inherently conducting in nature due to the presence of a “*conjugated electron system*” in their structure. ICPs have a low energy optical transition, low ionization potential and a high electron affinity. A high level of conductivity (near metallic) can be achieved in ICPs through oxidation–reduction as well as “*doping*” with a suitable dopant. ICPs are a novel class of “*synthetic metals*” that combine the chemical, electrochemical and mechanical properties of polymers with the electronic properties of metals and semiconductors. Although a variety of ICPs have been

synthesized and investigated, polyaniline (PANI) is known as having, probably the best combination of environmental stability, good conductivity and low cost. The field of PANI’s composites will be widely discussed & expand because from economic point of view, PANI is significantly superior to other ICPs, the aniline monomer is less expensive than the other monomers used for ICP. The synthesis of PANI is very simple, properties can be tuned easily, and it has numerous application possibilities . As a consequence, polyaniline , its derivatives and composites have very strong potential on a large scale for the industrial applications mentioned above and many of the other potential uses for it have yet to be explored because of a number of obstacles that need to be overcome. All these factors contribute to PANI being superior to other ICPs.

On the other hand, PANI is hygroscopic, mechanically weak and its processability is poor, it degrades before melting, it is insoluble in common organic solvents, it is soluble only in concentrated sulfuric acid under specific conditions. The common usage of this material has been restricted due to its insolubility, infusibility, modest environmental stability, and incompatibility with common polymers due to the rigid chain originating from an extended conjugated double bond which renders it unprocessable. However, limitations of processability such as low mechanical

strength, poor flexibility have prevented PANI from making significant commercial impact. Special attention is paid to improve the processability of the PANI and several approaches have been developed, various procedures and improvement methods and processes, have been adapted. The scaled-up and reliable procedures for optimize electrical conducting & enhance processability offers a wide range of possibilities to preparation it composite materials for extend it functions & expand further applications. A wide range of procedures, composites, strategies for change reaction mediums for improvement of PANI's composite restrictions that in various literatures were scattered; outlined by disciplines of educational literatures in this article [1,2].

1.2. Aim of this review

Since a vague signpost or a detour down a side trail could well have audience of journal lost and wondering, for help them that follow the development of article's contents, was attempted clear signals in the form of clearly worded topic sentences, relevant support, reasonable interpretations of material, and logical conclusions authorized. In the other researches & review literatures, there are common literature procedure of hard approach, introducing of total or few application aspects & regretfully follow a lot of obscure sources have been demonstrated, therefore in practice, mostly utilized for "experts in the field". Furthermore web texts of other review articles about application aspects of ICPs & PANI, accompanied in the way majority of nonscientific aims.

In this work, catching the attention of a wide audience will be purposed; therefore in the first place, only useful references, i.e. mainly primary, facile available, reliable & essential sources have been referenced, interpreted the literature rather than just listing results and if two or more authors disagree, express who is correct, were avoided topics that require hard-to-get documents such as patents, government reports or obscure journals; Second, chief points of recent articles edited in a flexible & expandable literature with supported of trace engaging aspects of PANI such as its advanced composites, fundamental concepts based on recent approaches, terms of polymerization conditions, some of it applications and so on. In the third place, an enjoyable article was authored that research motivation aspects is overcome & supported by persuasive evidence, therefore any current interested to polymeric chemists in all levels can utilized it.

In the field of ICPs based on PANI, chief points including chemical, electrochemical, template, enzymatic, plasma, photo and a number of other procedures. Which of this items is again subdivided; such as, chemical polymerization is subdivided into

heterophase solution, interfacial, seeding, metathesis, self-assembling, sonochemical etc. polymerizations. The rapidly expanding subjects of these procedures are generating many exciting new materials with novel properties. It is therefore, of immense significance to explore whether & applying of conducting polymers can lead to better performance in these already established areas, and whether reliable and scalable synthetic methods can be developed for the procedures of produce conducting polymer composites in order to provide the necessary materials base for both research and applications. The main objective of the present article is the matching of chief points from various literatures such as: polymeric conductivity & processibility fundamentals, setups, procedures and to penetrate into exact application aspect of them. The aim of this attempt was to produce/show derivatives, grafts, blends & composites of PANI companion in the way, provide specific application.

Since the various procedures, chemical improvements & processes, application aspects scaled-up, enormously expanded & overlapped in the available literature reviewed for this study; as mentioned above, attempts only *"useful & engaged of them, instanced to make this article to form clear ideas of investigate subject and for enhance visualization of interests in the field"*. In other word, these articles creates reader's interest in the subject of ICPs based on PANI composites and provide them with enough & exact information about field's topics to understand other expert research sources that have enough & exact experimental methods, results and discussion.

2. General baseline

The ICPs polymers are conducting systems that have conjugated π electrons. Conjugated polymers consist of alternating single and double bonds, creating an extended network. The movement of electrons within this framework is the source of conductivity. However, dopant is required to increase the level of conductivity for this type of polymers. The ability of polymers to become electrically conductive was shown when a scientific breakthrough demonstrated that to become electrically conductive, a polymer must imitate a metal, which means that electrons in polymers must be free to move and must not be bound to atoms. Most polymeric materials are poor conductors of electricity because a large number of free electrons are not available to participate in the conduction process. In principle, an oxidation or reduction reaction is often accompanied by the addition or removal of electrons. Therefore, a polymer might become electrically conductive by removing electrons, a process described as *"doping"*.

Amongst the generation of ICPs, polyaniline (PANI) is one of the most promising candidates and a lot of

studies have been devoted to the polymer. The reason is that PANI is easy to synthesize and is rather environmental stable combined with a high conductivity (Figure 1). However, PANI in its conducting form is also intractable in nature. Subsequent developments to modify PANI into a processable form by means of counter ion induced processing, backbone substitution with alkyl chains etc. led to the use of PANI in a number of applications, usually in (nano)composites where PANI in dispersed form acts as a conductive filler. Upon mixing PANI with conventional polymers, the strong

electrostatic interactions between PANI molecules results in a phase segregated morphology leading to loss of connectivity between the dispersed PANI particles and hence poor conductivity. Thus, a high(er) filler content is a prerequisite to achieve the necessary so-called “*percolation threshold*”. The downside of increasing the PANI concentration is a loss in physical and mechanical properties of the composite/blend(Figure1)[3].

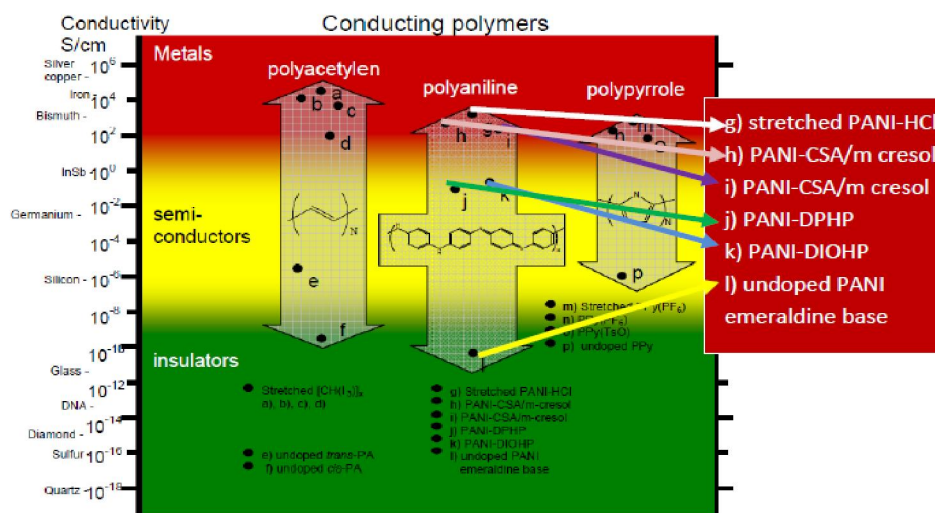


Figure 1. Electrical conductivity of PANI as a ICPs (original Figure from[3])

2.1. The course of aniline oxidation at various acidities

Polyaniline is typically prepared by the chemical oxidation of aniline or anilinium salts, such as aniline hydrochloride or aniline sulfate, in acidic aqueous medium, ammonium peroxydisulfate (APS) being the most common oxidant (Figure 2). Hydrogen atoms abstracted from the aniline molecules during their coupling to oligomeric and polymeric structures are released as protons, i.e., sulfuric acid is a by-product. The pH thus always decreases in the course of aniline oxidation. Such process is sometimes called a “*falling pH*” method of PANI preparation [4,5].

PANI is a semi-crystalline, heterogeneous system with a crystalline (ordered) region dispersed in an amorphous (disordered) region as shown in Figure 3d. It is similar to a Quasi-Metallic Island surrounded by a non-metallic amorphous zone (Figure 3). The crystalline domains are metallic in nature, where conduction occurs through electron delocalization or hopping of the charge carrier due to the ordered structure. The conduction in the metallic region occurs

by the hopping of charge carriers through the polaron structure [5].

1. Some approaches for the synthesis of PANI

2.1 Interfacial polymerization

Water-soluble polyaniline can be prepared via the interfacial polymerization route in the presence of PSS dispersed in the water phase. In this setup, the aniline monomers and the PSS are dissolved in CHCl_3 organic phase and the aqueous phases, respectively, with the reaction taking place at the interface. Polyaniline is formed at the interface where the aniline monomer and PSS are found within 10 min in a process by which aniline is protonated by the PSS in the presence of the oxidant, ammonium persulfate. During this oxidative polymerization of aniline, the PSS act as a proton source for the doping agent and provides the necessary counterions to the developing charged polyaniline. The excess sulfonic groups can improve water-soluble properties and the resultant polyaniline easily dispersed in aqueous solution(Figure 4.) [6].

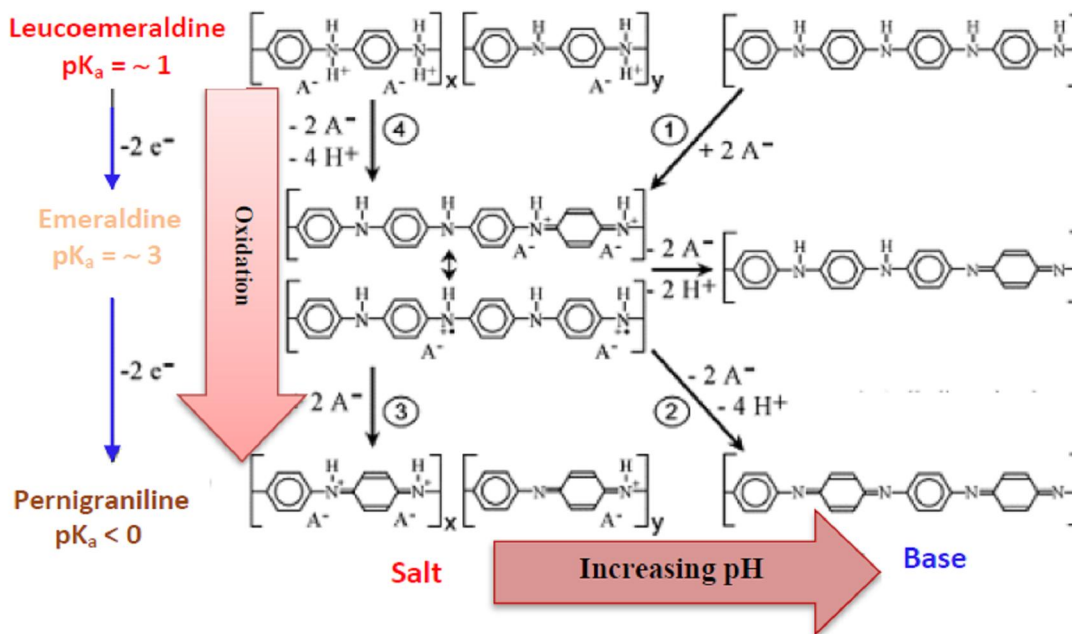


Figure 2. Polyaniline (PANI) has three electrochemical states: leucoemeraldine, emeraldine, and pernigraniline. Not only are ions exchanged, but in aqueous electrolytes there is also proton exchange, since the different states have difference pK_a. In PANI is thus considerably more complex to use for actuators, since oxidation can result in either an expansion or a contraction, depending on pH [6].

2.2 Rapid mixing of reactants

This is the simplest method for synthesizing PANI and in place of conventionally slow addition of the aqueous APS solution, the aniline monomer is mixed rapidly with APS solution. Here, the initiator molecules are consumed rapidly after the initialization of the polymerization reaction due to the even distribution of aniline monomer and APS molecules in the solution [7].

2.3 Sonochemical synthesis

Jing et al.(2007) has reported the synthesis of PANI similar to the synthesis procedure of conventional PANI. The acidic APS solution is

added dropwise to an acidic aniline solution, and subjected to the ultrasonic irradiation which results to the high yield of PANI. It has been found that the excessive addition of aniline monomer or APS could contribute to the continuous formation of the primary PANI products or could lead the agglomeration of PANI. Unlike conventional procedure where irregular morphology of PANI is obtained, the sonochemical synthesis strictly prevents the further growth and agglomeration and thus, generates uniform morphology of PANI [8]. Figure 5 shows SEM images of dried-down polyaniline colloids [8].

Physical terms	Chemical terms	
Non-doped state		Undistributed conjugation
Neutral soliton		Free radical
Positive soliton		Carbocation
Negative soliton		Carbanion
Positive polaron		Radical cation
Negative polaron		Radical anion
Positive bipolaron		Carbocation
Negative bipolaron		Carbodianion

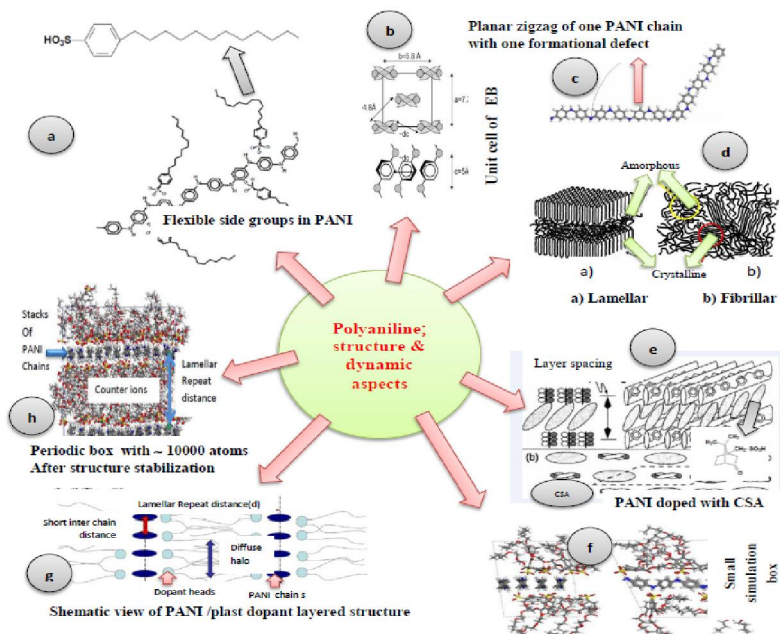
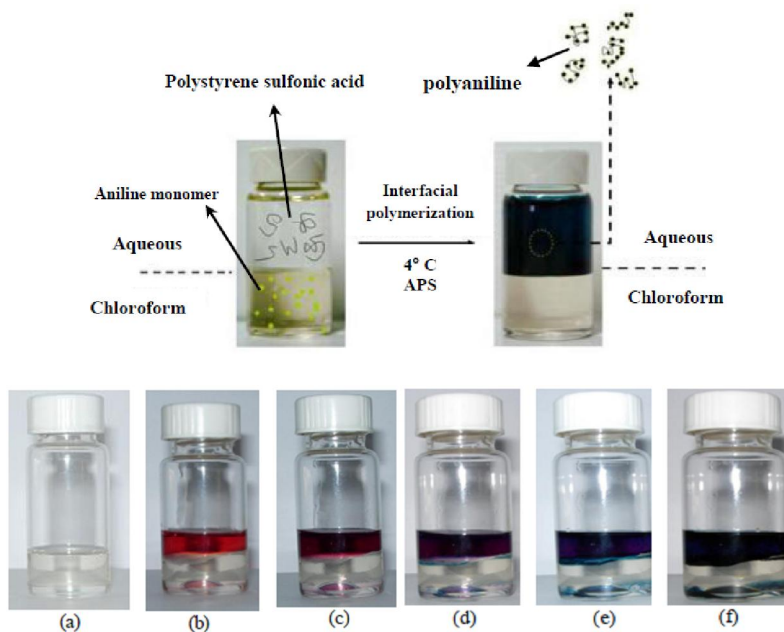


Figure 3. some aspects of structure & dynamic of PANI (original Figures from [5]).



2.4. Electrophoretic synthesis

The first step of a reaction requires a preparation of conducting PANI through the chemical procedure using APS as oxidant. In the second step, a stock solution of

PANI (1 mg/ml) is prepared in the formic acid and the colloidal suspension is prepared by adding 100 ml of the stock solution into acetonitrile for the preparation of an electrolyte. In the colloidal suspension,

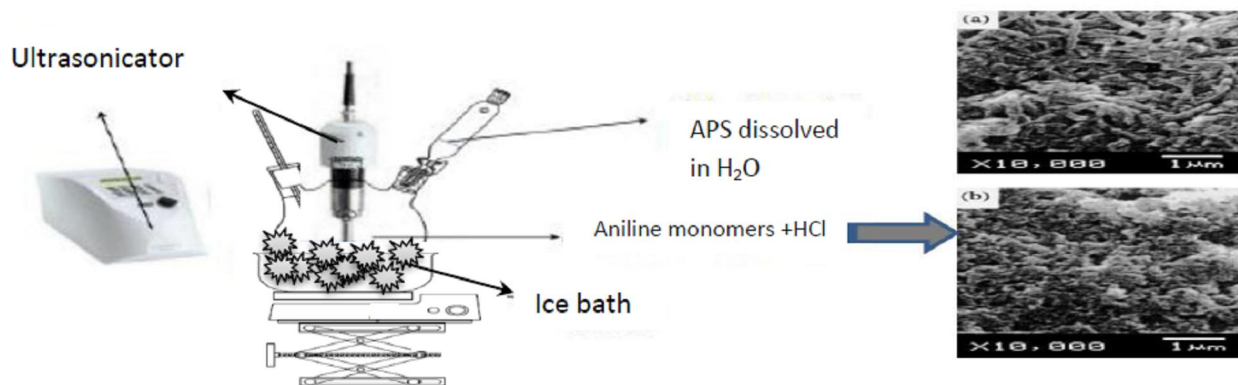


Figure 5 . Polymerization of aniline under ultrasonic irradiation . SEM photographs of the dried-down polyaniline colloids formed (a) without and (b) with ultrasonication (SEM Figures from [8]) .

PANI dissociate into ions due to high dielectric medium which is offered by acetonitrile and thus, results to the formation of the positively charged PANI. The last step involves the electrophoretic film deposition where under the influence of applied voltage for a required time duration, positively charged colloid spheres of PANI in acidic colloidal suspension starts moving towards the negatively biased fluorinated tin oxide glass (FTO) electrode. This stepwise growth synthesis produces the uniform nanostructures of PANI on the surfaces of the FTO glass substrates [8].

2.5. Kinds of Doping

2.5.1. Self-doping

'Self-doping' is the most successful approach for increasing the solubility of conductive polymers in aqueous solution. When ionizable functional groups that form negatively charged sites are attached to the polymer chain to make the polymer conducting, it is referred to as 'self-doping' or when the group is an acid, 'self-acid-doping'. The distinctive properties of self-doped conducting polymers are their water solubility, electroactivity and conductivity over a wider pH range (in the case of polyaniline), and thermal stability [9].

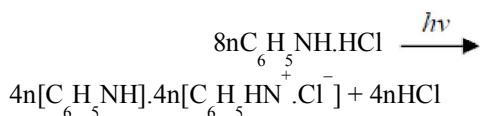
2.5.2. Secondary doping

It was shown that the effect of the secondary doping was based primarily on a change in molecular conformation of the polyaniline from compact coil to expanded coil. The secondary dopant is an inert substance solvent. Its function is to solvate the counter anions of the polymers; increase the repulsion between positively charged polymer backbones; decrease the aggregation and, therefore, increase the crystallinity and conductivity of the polymer films. The interaction between solvent molecules and polyalkylthiophene had been reported in the literature. The degree of conjugation in doped regio-regular polyalkylthiophene

solutions related directly to the dielectric constants of the solvents [9].

2.5.3. Radiation doping

To improve the conductivity further, conducting polymers have been irradiated with x-rays, gamma radiation, and gamma and electron beams. When ionizing radiation interacts with polymer materials active species such as free radicals are produced, thereby initiating chemical reactions including crosslinking, chain scission, and grafting.



The usage of radiation technology compared to chemical one has the advantages of pureness, no chemical catalysts, wider applications, easy process and commercial production [9].

3. Measurement of electrical conductivity

There are few methods for determining the surface resistivity of a material using common techniques such as the four-point probe method and the Van der Pauw method.

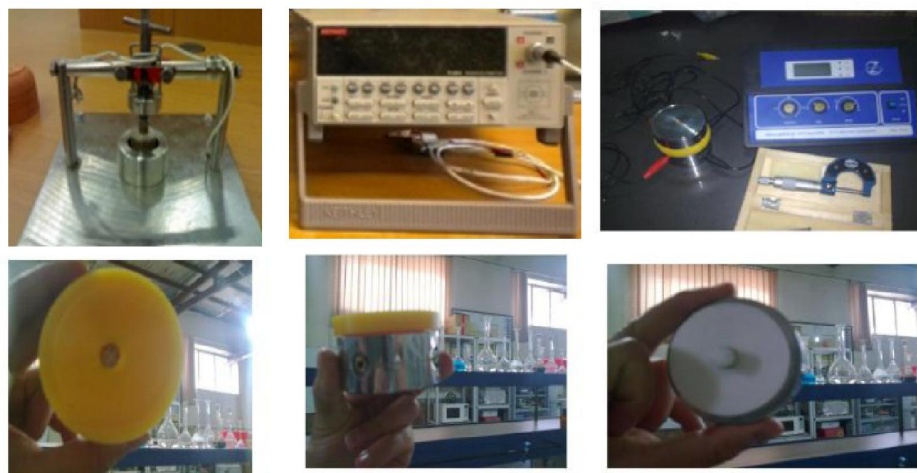
$$\sigma = \frac{\ln 2}{\pi d} \left(\frac{I}{V} \right)$$

3.1. Four-point probe method

Electrical conductivity measurements were performed by standard four-probe (4-point) method. A Keithley source meter and a Keithley electrometer were used as constant D.C. source and volt meter, respectively. Low temperature conductivity measurements were made using Sumitomo cryogenic, as shown in Figures 6.

The conductivity (σ) was calculated from the relation (1). (1)

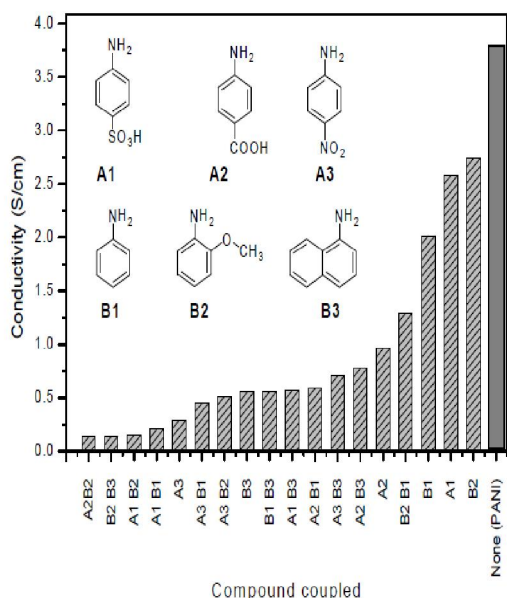
Where I, V and d are applied current, measured voltage and the thickness of the pellet, respectively [11].



4. Chemical procedures

4.1. Combinatorial coupling of diazonium salts with polyaniline

The low solubility of conducting polymers in most solvents makes them ideal to perform combinatorial chemistry reactions on the polymer. Recently, combinatorial reactions have been used to produce conjugated polymers with success. To extend the method to conductive polymer modification, diazonium coupling with polyanilines was chosen as synthetic method (Figure 7.), the decrease in conductivity is only of one order of magnitude. Such decrease is a reasonable trade-off for the improved solubility [10].



4.2. Composite formation

The first and the most widely used conducting polymeric systems are the composites in which an insulating polymer matrix is filled with a particulate or fibrous conductive fillers such as a carbon or a metal to impart high conductivity. Applications for such composites are wide spread, these are used for interconnections, printed circuit boards, encapsulations, die attach, heat sinks, conducting adhesives, electromagnetic interference (EMI) shielding, electrostatic discharge (ESD), and aerospace engineering. into account, the following aromatic amines were chosen for a first trial. It is possible to couple type an amines (non activated) with type B amines (activated) to produce azo dyes terminated in $-NH_2$. These azo dyes could be diazotized and coupled with PANI. The effectiveness of the diazonium salts coupling to PANI was tested.

As the aspect of chemical industries such as corrosion fields, composites of polyaniline, have been extensively used as anticorrosive coatings on metals. However pure coatings of polyaniline and its derivatives suffer from poor mechanical properties and adhesion strength. To improve the anticorrosive efficiency, mechanical properties and adhesion strength, polyaniline composites were prepared and applied on various metals for corrosion protection. Composite materials nowadays play an increasingly important role due essentially to their lighter weight and better corrosion resistance [10].

4.2.1. Conducting polymer composite of multiwall carbon nanotubes filled-polyaniline

Tubular composite of protonic acid doped polyaniline (PANI) with multi wall carbon nanotubes

(MWNT) can be synthesized by in situ chemical oxidation polymerization [11].

4.2.1.1. Composite formation mechanism

The formation of tubular composites is believed to arise from the strong interaction between aniline monomer and MWNT. The interaction possibly comes from the π - π electron interaction between MWNT and the aniline monomer. Such strong interaction ensures aniline monomer adsorbed on the surface of MWNT during the formation of tubular composite. MWNTs therefore serve as the template and the core during the formation of the tubular composites. Due to the random formation of MWNT bundles, there are some "special gaps" between individual MWNTs as shown in Figure 8 [12].

4.2.2. Preparation methods of different polymer based conducting composites from polyaniline

The methods of preparation of polymer-conductive filler systems depend primarily on the type of polymer, its initial form and the properties of the conductive filler. All the methods of composite preparation are discussed below:

4.2.2.1. Melt mixing

This is a popular method of composite preparation. This process involves the mixing of different components with a polymer at a temperature beyond the melting point of the polymer. The melt mixing procedure has also been successfully employed to form elastomer-PANI composites.

4.2.2.2. Mill mixing

This method is based on the incorporation of filler along with other ingredients into the rubber matrix in an open mill or internal mixer.

4.2.3. Solution/dispersion mixing

This method involves the dissolution/dispersion of PANI and a matrix polymer either in the same solvent or in a different solvent, stirring of the mixture and finally drying out of the solvent.

4.2.4. Composite preparation through in situ and/or graft polymerization

This method involves either: (a) preparation of both

PANI and the counterpart of the composite simultaneously in the same medium; or (b) dissolution/dispersion of the counterpart of the composite in a suitable solvent/water and polymerization of aniline in that medium; or (c) dissolution/dispersion of PANI in a suitable solvent/water and preparation of the counterpart of the composite in that medium.

4.2.5. Composite preparation through electrochemical polymerization

This method involves the dispersion of the counterpart of the composite either in water or in a solvent containing aniline, acid or dopant and potential cycling is then repeated at the working electrode.

4.2.6. Composite preparation through thermal reflux method

Pd-PANI composite has been prepared by the thermal reflux method, where the reaction mixture containing $\text{PdCl}_2 \cdot 5\text{H}_2\text{O}$ and aniline in methanol/water (1/1.5) was refluxed for 3 h at a temperature of 50 °C.

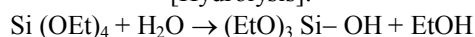
4. 2.7. Composite preparation through sol-gel process

As discussed above, many researchers tried to find a solution for better processability of PANI such as mechanical blending, solution blending, electrochemical deposition, and chemical surface deposition. The solution blending method, one of the promising methods, is solubilizing polyaniline in a variety of solvents including non-polar solvents. With counter ions used for doping polyaniline.

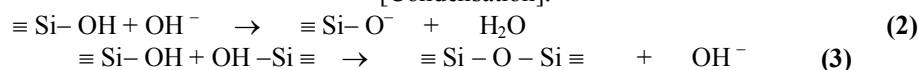
4.2.7.1. Hybrid composite film formability

There are several factors affecting formation of silica gels, i.e., water contents, additives, gelation time, etc. but the most important factor of silica particle polymerization is the pH of the medium. Figure 8. illustrates the poly-merization of aqueous silica sol under different pH. The sol-gel process involves the hydrolysis-condensation reaction of TEOS including Eqs. (2, 3) [11].

[Hydrolysis]:



[Condensation]:



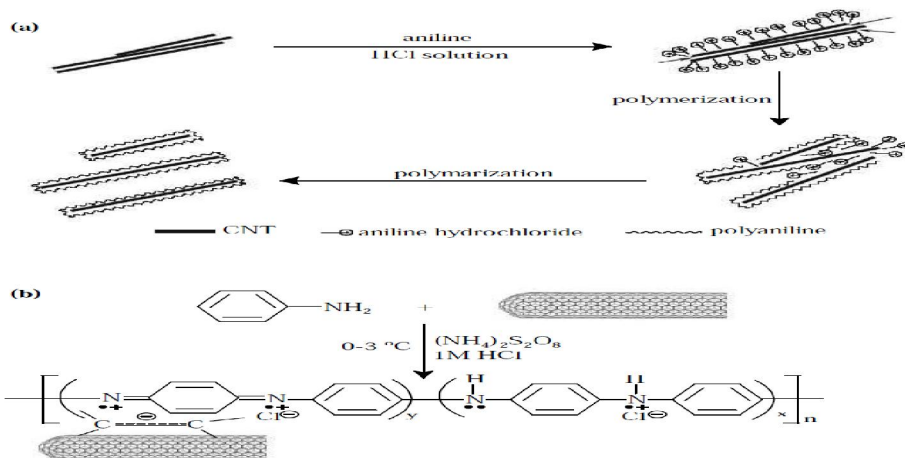


Figure 8. Schematic diagram of (a) the formation mechanism for tubular composites of MWNT and PANI, (b) in-situ polymerization and proposed composite interaction[11].

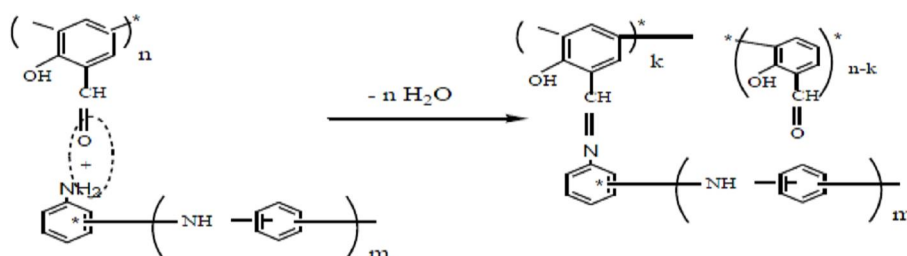


Figure 9. The preparation of graft-copolymer – copolyanilinehydroxybenzaldehyde (CAHB) has been carried out by joint condensation of oligoaniline(OA) & oligo-hydroxybenzaldehyde (OAHB) containing active amine & aldehyde groups respectively[13].

4.2.8. Template polymerization

One of the most effective and simple techniques of nanostructure formation is template synthesis. In this synthesis the desired material with the required shape is

synthesized within the pores of a template and the template is then dissolved, leaving the material with the shape of the pores of the template. The template method has been used both for chemical and electrochemical polymerization in order to obtain conducting polymer nanotubes. Template-based methods have attracted great attentions as a viable technology enabling to manipulate a length and a diameter of nanowires (Figure10).

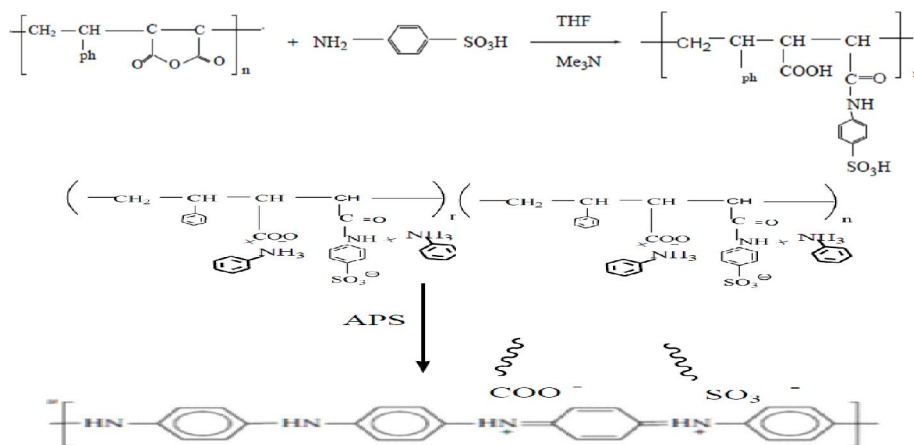
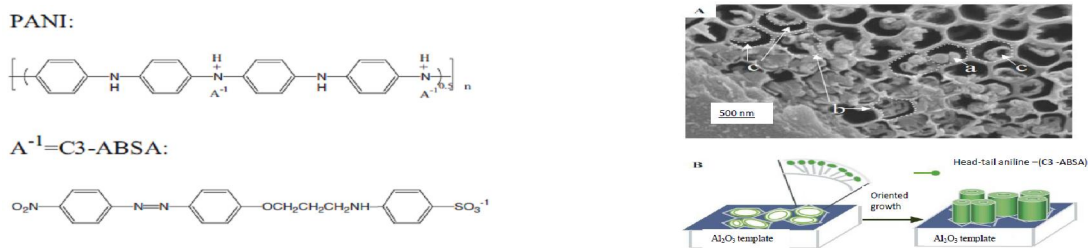


Figure 10. Synthesis route of PSMA & template [16]



Recently, various approach has veloped to synthesis PANI in the presence of matrix and template . The chemical and electrochemical oxidation of aniline followed by photonic doping has been reported for obtaining the polymer in conducting form. For practical applications, a conducting polymer must be cost-effective to synthesize, have good chemical and

electrical stability and be able to be easily processed. Many methods have been reported to obtain applicable materials. Compared with other methods, template polymerization methods require only regular apparatus, and the resulted conducting polymer materials are often orderly arranged. (Figures 11,12.)[16] .

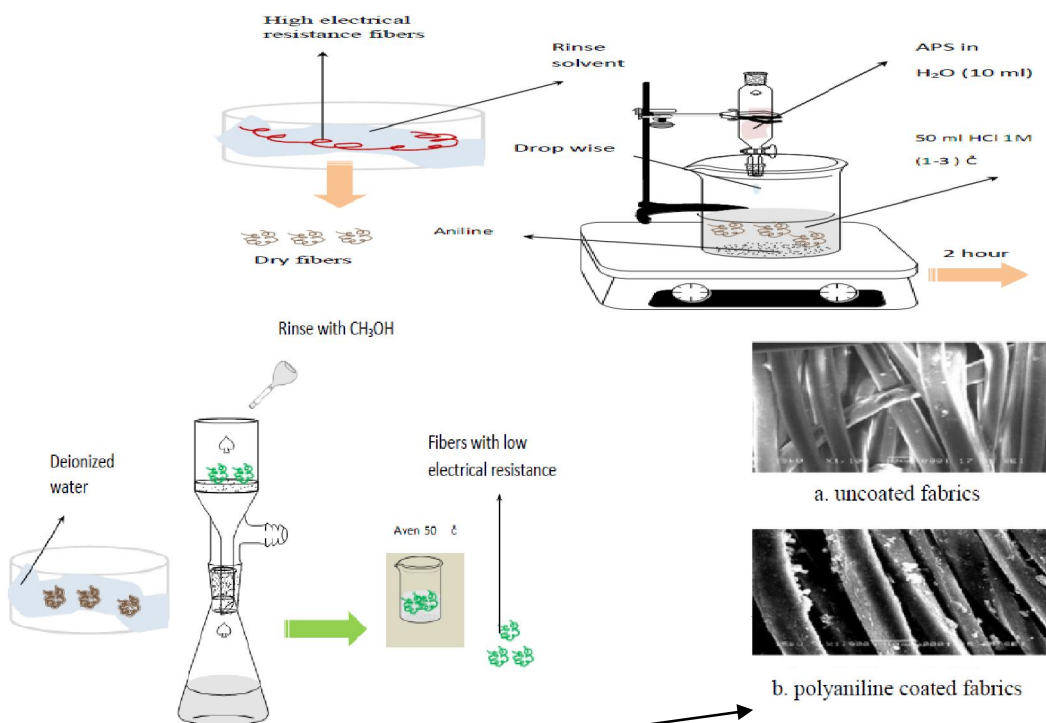


Figure 13. Coating processes of conducting polyaniline on to a flexible substrate such as textile fabrics & SEM observation of polyaniline coated fabrics (a,b) (SEM Figures from [16]).

Since the discovery of electrical conductivity in ionic polymers, various ionically ICPs or polymer electrolytes have been prepared for a wide range of applications. The most interesting property of ICPs is their high (almost metallic) conductivity, which can be altered by simple oxidation or reduction and also by bringing the material into contact with different compounds.

The first and most widely used conducting polymeric systems were composites in which an insulating polymer matrix was filled with particulate or

fibrous conductive filler, such as a carbon or metal, to impart high conductivity. Applications for such composites are widespread; these composites are used for interconnections, printed circuit boards, encapsulations, die attach, heat sinks, conducting adhesives, electro-magnetic interference (EMI) shielding, electrostatic discharge (ESD) and aerospace engineering. Unfortunately, these conductive fillers will impart heavy weight, poor surface finish, poor mechanical properties and easy oxidative degradation to the end product.

The preparation of PANI composites with various materials has received great attention because of their unique properties and applications in various electrical devices. However, the main problem associated with the effective utilization of all intrinsically ICPs (ICPs), including PANI, is inherent in their lower level of conductivity compared to metal and their infusibility and poor solubility in all available solvents. Polymer composites containing PANI (matrixes) have received much attention because of the resultant combination of improved processability and fairly good mechanical properties coupled with good conductivity [16].

4.2.9. Polyaniline nanofibers

Nanofibers with diameters of tens of nanometers appear to be an intrinsic morphological unit that was found to “naturally” form in the early stage of the chemical oxidative polymerization of aniline. In conventional polymerization, nanofibers are subject to secondary growth of irregularly shaped particles, which leads to the final granular agglomerates. The key to producing pure nanofibers is to suppress secondary growth [17].

5. Application aspects

5.1. Conductive polymers for corrosion protection

The potential of conducting polymer coating for corrosion protection is a topic of current controversy. In general, efficacy of conducting polymers very much depends on how they are applied and on the conditions of the corrosion experiment, i.e. depending on the exact conditions a conducting polymer may have excellent protection capability or may lead to a disastrously enhanced corrosive attack (Figure 14) [18].

5.2. Coating of conducting polyaniline

Coating of conducting polyaniline on to a flexible substrate such as textile fabrics and sheets can retain the flexibility of the fabrics and the electrical conductivity of the ICPs. The electrical conductivity of polyaniline coated textile structures can be assorted by varying the concentrations of monomer, dopant, oxidizing agent and the polymerization parameters such as time and temperature. However, the amount of polymer deposition i.e. thickness of the coated layer can directly influence the fabric electrical conductivity. The coating of such conducting polymer-metal nanocomposite on the substrates typically requires more than two steps including purification steps:

5.2.1. Coating of the substrates with a conductive polymer

5.2.2. Application of metal nanoparticles onto the conducting polymer shells.

It was reported that conducting polymer-noble metal nanocomposites can be synthesized by a one-step chemical oxidative polymerization using metal salts as an oxidant. It was demonstrated that chemical oxidative polymerization using metal salts such as hydrogen

tetrachloroaurate(III), silver nitrate (AgNO_3), palladium(II) chloride (PdCl_2), which act both as an oxidant and as a source of metal atoms, yielded well-dispersed metal nanoparticles in/on bulk ICPs [19].

Henry et al. and Fujii et al. [17] suggested that PdCl_2 acts as an efficient oxidant for pyrrole to form PPy-Pd composite in aqueous media (Figure 15).

The solution processability and film-forming capability are of critical importance for the applications of a polymer. Since, polyaniline is insoluble in water, it has been known to have poor water processability, likely due to the irregularly shaped micron-sized morphology. Therefore, an adduct such as a water soluble polymer [e.g., poly(N-vinylpyrrolidone), PVP] is needed to form a polyaniline colloidal dispersion. However, polyaniline synthesized by either interfacial polymerization or rapidly mixed reactions exhibit excellent water dispersibility due to its uniform nanofibrillar morphology. For example, when purified by dialysis or centrifugation, polyaniline nanofibers readily.

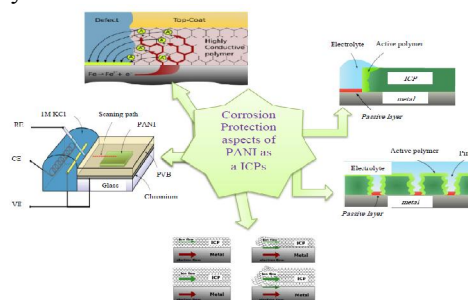


Figure 14. Conductive polymers for corrosion protection (original Figures from [18].)

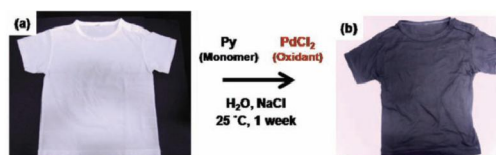


Figure 15. Digital photographs of T-shirt (Cotton 100%) before (a) and after (b) PPy-Pd nanocomposite coating [17].

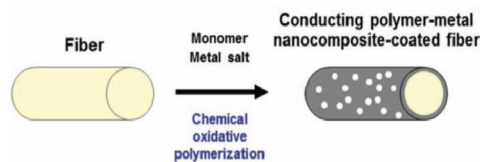


Figure 16. facile syntheses of fibers coated with conducting polymer-noble metal nanocomposites in aqueous media disperse in water without any adduct. Casting such dispersion onto a substrate, a mat of a random nanofiber network is obtained. (Figure 15) [17].

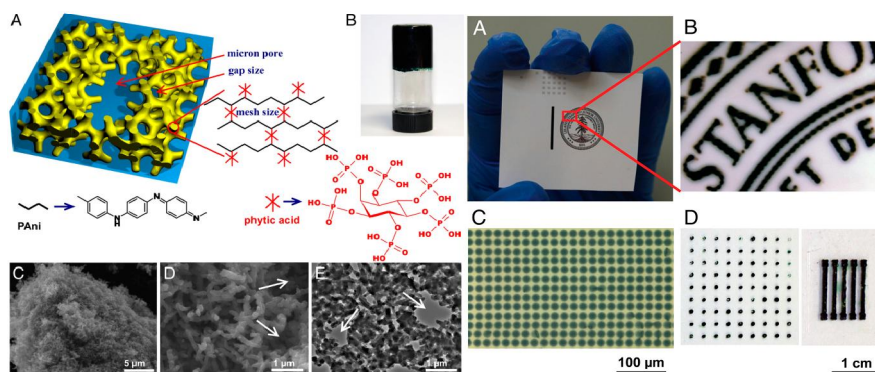
5.3. Conductive polymer hydrogels

Hydrogels are polymeric networks that have a high

level of hydration and three-dimensional (3D) microstructures bearing similarities to natural tissues. Hydrogels based on conducting polymers [e.g., polyaniline (PANI),] combine the unique properties of hydrogels with the electrical and optical properties of metals or semiconductors thus offering an array of features such as intrinsic 3D microstructured conducting frameworks that promote the transport of charges, ions, and molecules. Conducting polymer hydrogels provide an excellent interface between the electronic transporting phase (electrode) and the ionic-transporting phase (electrolyte), between biological and synthetic systems, as well as between soft and hard materials. As a result, conducting polymer hydrogels have demonstrated great potential for a broad range of applications from energy storage devices such as biofuel cells and supercapacitors, to molecular and bioelectronics and medical electrodes (Figures 17,18) [20].

Other potential applications of these ICPs are in

chemical, biochemical and thermal sensors, artificial nerves, drug release systems, antistatic clothing, ion exchange membranes, electromechanical actuators and 'smart' structures. Interest in ICPs has its origins in the possible commercial applications of these materials. The commercial applications are based on the promise of a novel combination of light weight, processibility and electrical conductivity. Some of conducting polymer can change their optical properties on applications of current or voltage and therefore may find useful applications as heat shutter and light emitting diode (LEDs). These polymers have following important applications and are used in Electrostatic materials Molecular electronics Conducting adhesives Electrical displays, Electromagnetic shielding Chemical biochemical and thermal sensors, Printed circuit boards Rechargeable batteries and solid electrolytes, Artificial nerves Drug release systems, antistatic materials, Antistatic clothing.



6.7. Other applications of ICPs

Optical computers, Piezoceramics Ion exchange membranes, Active electronics (diodes transistors) Electromechanical actuators, Aircraft structures 'Smart' structures, Switches, Welding of plastics, Corrosion protection, Loudspeakers.

6. Conclusions

This review has attempted to outline various aspects of polyaniline (PANI) as intrinsically conducting polymers (ICPs). All considered features present strengths and weaknesses for any specific application some advantages or problems need to be evaluated and some of fitted literatures of this article; fundamental concepts, chemical structure of monomers, kind of dopants, procedures & environment for polymerization are required for obtaining high quality composites represented.

The investigations of PANI's composite materials are an active exploration of the research because of its low cost, easy polymerization of its monomers, and unique properties. Important progress in the

preparation of its composites and application of PANI has been reported consistently in the literature within recent years.

The choice of dopants, kind of functional groups on monomer derivatives, chemical structure of other elements such as grafts or template, reactant concentrations, ratio oxidant/monomer and polymerization conditions such as ultrasonication, are important to obtain a regular PANI structure with high possible molecular mass, size/nanosize of particles or immixing with other elements in its composites/nanocomposites. Low cost, easy polymerization and improvement performance of PANI makes these polymers the most promising composite materials for application in different industrial fields. New procedures of alternative polymerization for blending that can improve the properties of PANI composites, should promote future development of PANI in different application fields.

PANI literatures not only have been widely studied as research field, but also education regards especially in the view point of audience motivation. However, in this

work some aspect that would enhance performance would be to overcome the educational broadening that is often observed. More recently, an increasing number of papers on ICPs and PANI composites have been produced. PANI is a competitive element in conducting polymers for the stability and low cost preparation of the imprinted composites, compared with other conductive polymeric products. Today there are already conducting composites commercially available for application in various devices. However, the main problem associated with the effective utilization of all intrinsically conducting polymers (ICPs), including PANI, is inherent in their lower level of conductivity compared to metal and their infusibility and poor solubility in all available solvents (weak processability). Polymer composites containing PANI (matrixes) have received much attention because of the resultant combination of improved processability and fairly good mechanical properties coupled with good conductivity. In other review literatures, education aspects, have not yet been thoroughly attended. Enough regards in these areas are only just beginning to emerge and there are several potential aspects to be explored that could produce progress in the next few years in chemical education fields.

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The Relationship Between A Woman's Position During Labor And The Level Of Feeling Pain In The Active Phase Of Labor

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Abstract: Many pregnant women worry about labor pain and they are mostly willing to perform cesarean delivery. Nowadays many pharmacological and non-pharmacological methods are used to reduce labor pain. The present study aimed to investigate the effect of changing a woman's position in the active phase of labor on the level of feeling pain during the delivery. This clinical trial was performed on 400 pregnant women in the active phase of labor who were selected according to the purposive sampling method. Samples were asked to fill out the questionnaire and personal questions, after that they placed in a sitting position and then after 15 minutes they changed their position and placed in a supine position. Changing the position iterated every 15 minutes and the level of pain in lower back and abdomen were determined by a pain ruler and finally the results were recorded. Data were analyzed through independent T-test and Chi-square. The majority of women who were in sitting position had lower abdominal pain rather than who were in supine position and changing the position from sitting to supine intensified the pain more than before. There is a significant relationship between a woman's position during labor and the level of feeling pain in lower back and abdomen in the active phase of labor ($p=0/000$). Sitting position can reduce lower back pain and also lower abdominal pain; it can also change the level of severe pain into the moderate one and the level of moderate pain into the mild one in the active phase of labor.

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Keywords: Sitting Position; Supine Position; Labor Pain

1. Introduction:

Delivery is a normal physiological process but many women during pregnancy are worried and have severe anxiety about the labor pain, so in order to deal with this fear, they are willing to perform cesarean delivery in a way the nowadays elective cesarean delivery has been increased. The main factor of labor pain is uterine contractions and cervical dilatation and the amount of pain depends on the intensity and duration of uterine contractions and also the rate of cervical dilatation. Many researchers try to reduce labor pain and in this way they want to help physiological delivery and also prevent the trend of increasing cesarean section that is due to fear of childbirth. Nowadays many pharmacological and non-pharmacological methods are used to reduce labor pain. Given that drug use may be associated with complications for the mother and her fetus, tendency to use non-drug treatments to relieve pain and suffering is greater. There are various non-pharmacological methods that have been proposed to reduce labor pain including breathing exercises, muscle relaxation, lumbosacral massage, listening to music, showering, moving and changing the position during the delivery. There are many positions that are suitable for women in labor including lying, standing, sitting, squatting, running, walking and etceteras. Given that labor pain is a physiological process and these kinds of pain are completely normal, note that the health status of the fetus should be considered, so these women need to be

carefully monitored. However, pregnant women in many hospitals of Iran (maternity unite) lie back on the bed and they pass labor stages in this position, and usually have no mobility and remain in the supine position. This position for a long time leads to uterine artery pressure. Consequently, the volume of blood returning to the heart decreases and this phenomenon leads to hypotension and sometimes placental dysfunction, and also fetal heart rate may decrease and as a result leads to cesarean delivery. The present study aimed to investigate the effect of changing a woman's position in the active phase of labor (dilatation 5-8 cm) on the level of feeling pain during the delivery. Finally if we could achieve significant results, our method can be used as a simple and non-pharmacological method so that to reduce labor pain in labor centers.

2. Methodology:

In this clinical trial, among the pregnant women who were admitted in Hazrat-e Zeinab (PBUH) Hospital, 400 people were selected randomly. The sample size (using the formula to determine the volume) consists of two groups; they were 400 people, in total. Nulliparous women with no risk of term pregnancy (37-42 weeks), having a fetus and normal fetal heart rate that displayed the head of the fetus, ruptured membrane and had spontaneous onset of labor and also were in 5-8cm dilatation, and did not receive pain medication and oxytocin during labor, were selected too. Some people, who need intervention (like

cesarean section) and preferred special delivery system, were excluded. At first, we explained the process to the selected people and after that samples were asked to fill out the questionnaire and personal questions, then they placed in a sitting position and after 15 minutes they changed their position and placed in a supine position. Changing the position iterated every 15 minutes. We chose 15 minutes because during the active phase, the cervix is opened 2 cm per hour and pain increases with progression of labor. Therefore, the suitable time for changing the position is a time in which from accelerating the delivery phase, the increased pain can be measurable. In each position, we asked women to measure their pain with a ruler. The pain ruler is scaled from zero to ten and two ends of it are symbols of min pain to max pain. The intensity of pain that participants felt in their lowerback and abdomen from each position, and the pain that immediately started from each contraction was measured through pain ruler; researchers categorized the levels of pain from the following pain ranges:

Max pain	Mid pain	Mild pain	Min pain
10-8	7-4	3-1	0

In the present study, pain intensity of the participants was only compared to themselves; the selected women (placing in sitting or supine positions) every 15 minutes reported their intensity of pain and

because of this we can assert that the accuracy of this research is outstanding. During the study due to the accelerated delivery, the pregnant women had vaginal examination because doctors wanted to know that the cervix is open or not. The information about the intensity of pain (in the lower back and abdomen) according to pregnant women’s position (sitting or supine position) in various cervical dilatations was collected. During the study, due to fetal distress and intolerance of a particular situation, ten women were excluded but the study continued with 400 remaining people. Then data were analyzed through independent T-test and Chi-square.

3. Results:

The age range for the participants were from 15 to 39 and their mean age was 21/6 ±3/6. The education of these women was 50% a diploma. The comparison of pain intensity in lower back and abdomen (in both sitting and supine position) at 5 cm cervical dilatation are shown in table 1.

By using Chi-square test we found out that there is a significant relationship between lower back pain in sitting position and lower back pain in supine position in 5 cm cervical dilatation (p=0/000). The Chi-square test also showed that there is a significant relationship between abdominal pain in sitting position and abdominal pain in supine position in 5 cm cervical dilatation (p=0/000).

Table 1- the comparison of pain intensity in lowerback and abdomen (in both sitting and supine position), in Nulliparous women who are in the active phase of labor at 5 cm cervical dilatation.

The intensity of abdominal pain					The intensity of lower back pain					Supine position	
Max	Mid	Mild	Min		Max	Mid	Mild	Min			
% #	% #	% #	% #	% #	% #	% #	% #	% #	% #		
0 0	0 0	83 44	17 9		0 0	0 0	28/8 24	17/2 5		MIN	
0 0	81 145	19 34	0 0		0/5 1	89/1 163	8/2 15	2/2 4		MILD	
47/7 72	43/7 66	8/6 12	0 0		55/9 95	38/8 66	5/3 9	0 0		MID	
52/9 9	47/1 8	0 0	0 0		61/1 11	38/9 7	0 0	0 0		MAX	
$\chi^2 = 328/963$					$\chi^2 = 339/666$					p= 0/000	

By using Chi-square test we found out that there is a significant relationship between lower back pain in sitting position and lower back pain in supine position in 6-7 cm cervical dilatation (p=0/000). The Chi-square test also showed that there is a significant relationship between abdominal pain in sitting position and

abdominal pain in supine position in 6-7 cm cervical dilatation (p=0/000).

The comparison of pain intensity in lower back and abdomen (in both sitting and supine position) at 6-7 cm cervical dilatation are shown in table 2.

Table 2- the comparison of pain intensity in lowerback and abdomen (in both sitting and supine position), in Nulliparous women who are in the active phase of labor at 6-7 cm cervical dilatation

The intensity of abdominal pain					The intensity of lower back pain					Supine position	
Max	Mid	Mild	Min		Max	Mid	Mild	Min		Sitting position	
% #	% #	% #	% #	% #	% #	% #	% #	% #	% #		
0	0		80	201	0	0	100	1	0	0	MIN
0	0		4		0	0					
0	92/7	89	7/3	0	0	93/2	6/8	4	00		MILD
0			7	0		55					
72/1	15	27/4	59	5	1	0	68/6	28/2	2/9	8	0/41
				0		0	190	78			
78/6	16/7	14	4/8	0		77/8	49	20/6	13	1/6	1
66			4	0						0	0
$\chi^2 = 323/217$					$\chi^2 = 134/713$					p= 0/000	

The Chi-square test also showed that there is a significant relationship between abdominal pain in sitting position and abdominal pain in supine position in 8 cm cervical dilatation (p=0/000). In this research, there is not a significant relationship between education and the intensity of abdominal pain.

The comparison of pain intensity in lower back and abdomen (in both sitting and supine position) at 8 cm cervical dilatation are shown in table 3.

3.3.2 The aeration rate was controlled by the

oxygen concentration in exhaust gas

The simulation result of variations of compost indexes, are listed in Table 2. With developed dynamic simulation model, Air flow was adjusted so that outlet oxygen concentration in the exhaust gas remained a proper range to optimize the aeration costly. When the oxygen concentration was controlled the range from 10% to 18%, At the same conditions, the experimental results are shown in Figure 8.

Table 3- the comparison of pain intensity in lower back and abdomen (in both sitting and supine position), in Nulliparous women who are in the active phase of labor at 8 cm cervical dilatation.

The intensity of abdominal pain					The intensity of lower back pain					Supine position	
Max	Mid	Mild	Min		Max	Mid	Mild	Min		Sitting position	
% #	% #	% #	% #	% #	% #	% #	% #	% #	% #		
0	0	0	0	0	0	0	0	0	0	0	MIN
0				0	0	0					
0	94/1	16	5/9	1	0	100	0	0	0	0	MILD
0				0	0	3				0	
82/7	17/3		0	0	94/8	4/6	6	0	0	0	MID
13	28		0	0	16	8	1	0	0	0	
98/6	1/4	3	0	0	95/5	4/5	10	0	0	0	MAX
			0	0	213			0	0	0	
$\chi^2 = 163/5$					$\chi^2 = 55/851$					p= 0/000	

Discussion:

The results showed that the majority of women who participated in this research, in the active phase of labor, by changing from supine position to sitting position felt less pain on their abdomen, and the intensity of pain in sitting position is much less than supine position. In Shimada et al. the pain scores for those in sitting position was much less than those in supine position. Their result is similar to us, and we can conclude that the pain in sitting position is possibly in connection with the nerves of Sacroiliac joint or SI joint and their surroundings.

According to the study that was carried out by Pierce et al. and was planned for evaluating the relationship between the decreased lower back pain and abdominal pain during the first stage of labor, the analyzed data showed that the majority of patients felt persistent and cramping pain in their abdomen and lower

back while placing in supine position. These results are against our achievements. The present study proposed that sitting position can reduce pain in abdomen and lower back, and also this can change the intensity of pain from severe pain into the moderate one and the level of moderate pain into the mild one in the active phase of labor. These findings are in the path of Melzack et al.

Melzack investigated the intensity of pain in sitting and supine positions. According to the study, 35% of pregnant women had abdominal pain and 50% of them had lower back pain in sitting position, these finding were against the results of Molina et al. They reported that the position (sitting or supine) will not influence the intensity of pain.

Robert et al. concluded that patients at 6 cm cervical dilatation prefer to place in sitting position, and at the end of the delivery, they would prefer side-

sleeping. Cherzanofsky's research showed that vertical position of women had significantly shorter phase of maximum slop but the intensity of pain did not differ. These findings are against our results. Mendez et al. proposed that the intensity of contractions was significantly higher in standing position, lower frequency of contractions and uterine activities were greater in this position. Less pain was considered during the time of uterine contractions and patients felt more comfortable in supine position. These findings are on the path of our achievements. Bloom et al. in a randomized study (among 1000 women) could find out that, walking is neither safe nor risky. In fact, walking does not have any influence on the active phase of labor.

Davim et al. did a research on the effect of non-pharmacological methods and reducing the intensity of pain by changing the position, and they finally concluded that these methods are applicable and appropriate and they can at long last reduce the intensity of labor pain. We can certainly assert that their findings are in the path of our achievements. The significant issue that should be note in this research is that changing the position from supine to sitting had more effect on reducing the lower back pain than abdominal pain and on the other hand, if the dilatation is greater and if the delivery is close, the intensity of pain will be lesser.

Therefore, in the active phase of labor we should allow pregnant women to change their position from supine to sitting (vice versa) because in this way the intensity of pain will be lesser. Of course we had some restrictions in the head of us, including the effect of time (morning, noon, and night) and chronobiological effects on the intensity of pain. Learning about the pain ruler was after admissions to the hospital and in the onset of labor, so this may slightly reduce the accuracy. This research only focused on supine on the bed and sitting position on the chair, there are some other positions that may reduce the pain even better but we restricted ourselves to this but note that further investigation is needed too. Among the labor stages, we only focused on the active phase of labor at 5-8 cm cervical dilatation, but it should be better to research on the second phase of labor, too. We only selected Nulliparous women in order to integrate the sample size; further investigations can be based on Multiparous women.

Conclusion:

Sitting position can reduce lower back pain and also lower abdominal pain; it can also change the level

of severe pain into the moderate one and the level of moderate pain into the mild one in the active phase of labor.

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Analyzing the Roots of Mystical Morality and Its Application in the Modern Societies

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Abstract: In analyzing the issue raised, first the mood, morality and mystical morality were defined, and the Islamic and non-Islamic roots of asceticism, and mysticism were studied. Then, the reasons for developing the mystical morality, including anti oppression, introspection, popularity, political power and the equality of the morality with the mysticism, and the asceticism foundation were considered. Then, through comparing the specifications of this morality and the needs of the modern societies, it was found out that the mystical morality (with roots in asceticism and mysticism) is able to solve the spiritual problems and the ethical needs of the societies. Moreover, it was explained that the specification of tolerance and intolerance against the strictness of the religion methods is regarded as the superiority of the mystical morality.

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Keywords: morality, mysticism, asceticism, Islam, religions, jurists

1. Introduction

Morality is the plural form of mood, which means: “the internal face and the egoistic determined figure, based on which the optional good and evil deeds and words are issued by a man without thought (Superson, Anita (2009).” the mystical morality has various definitions in the mystics and jurists’ literature. Based on the definitions of their scholars in their books and works: “the most significant characteristics of whom, is their morality.... Abu Bakr al-Kattani said that: mysticism is the wellness of the mood, the one who has a better morality than you, is superior to you in mysticism.” There are some differences between the mystical and Sufism morality, similar to the differences that exist between mysticism, and Sufism, regarding the meaning of knowledge. Saadi Shirazi, states some part of

*These differences as the following:
The scholar, the ascetic, and the Sufi, are all children
in this way there’s no man, except the divine mystic*

Based on the definitions of mood, morality, and “knowledge,” one can state that the mystical morality includes God’s recognition and knowledge, and issuing the words and deeds based on that. The mystical morality with the roots in asceticism, mysticism, and historical events and trends appeared at the end of the third century, in the presence of such mystics as Rabia al Adawiyah, Al-Fozail ibn Iyaz, Sahl al-Tustari, Ibrahim ibn Adham, Mansour Hallaj (Wainwright, William J.1976). Since recognizing this morality is impossible without knowing its roots, it is necessary to discuss this issue in detail in this article

1.1. The Roots of Mystical Morality

In this regard, researchers have stated different opinions. Some groups know the basis in the Islamic practices; while some other know it based on the non-Islamic practices. In order to achieve a suitable conclusion, both opinions should be studied.

2.1. The Islamic Roots of Mysticism and Sufism

Stating some samples from Quranic verses, the prophet’s tradition, methods, practices, and the behavior of the Prophet’s (PBUH) followers and companions, will determine the details, and the Muslim Sufis’ behaviors and deportments in this regard, and then we will find out their similarity and consistency as the result of adapting the fundamentals of their religions with these verses and traditions (Smith, M. 1944).

3.1. The Quranic Verses:

The Quranic verses know that quitting the worldly life for the eternal hereafter life the reason for God’s satisfaction. Moreover, they warn Muslims about the world’s unreliability, and invite them to abstemiousness and piety, to observe the divine virtue, and to ignore the worldly affairs. Moreover, they regard His satisfaction achievement as the best reward for the good men, and call on all the good-hearted believers to follow this way, and believe that the only way to prosperity and happiness and to achieve the divine Heaven, is to ignore the deceptive religions, and to believe in the high thoughts of the resurrection, instead. Some of the Quranic verses have reminded some aspects of mysticism, and God’s secrets, which pay the attention of all the believers to their depth. When the Muslims paid attention to the wonderful, delicate, and revealed Quranic words, they found out that God has devoted life to the human by blowing his soul into their bodies (FAZLMUHAMMAD, RAHMAN

ANSARIRAHMAN.1977), and has denoted the warmth of love and friendship to their cold bodies, they felt God even closer to them than their jugular vein. They presented the familiar message of their God, and called on them for grace and kindness from the window of the divine mercy despite of all the negligible of the human existence, or when, they heard the divine thanks and grace like friendly speeches. Their enthusiastic souls were so restless, that became stranger not only from the world and its pleasures, but also from themselves. Through hearing his verses of mercy in describing the blessings, and the Heaven adornment, and eternal comfort, and enjoying them, and relaxing next to the black-eyed nymph, and wearing silk clothes, and staying in luxurious palaces, the true believers make the burned and thirsty Arabs, who lived in deserts and were annoyed and irritated by the violence of the ignorant traditions, familiar with the way of asceticism, which was like a lifeline that directed the lost Muslims toward it, fearlessly. Besides, these verses, there are some other verses which call the believers to hope and fear. Fear from the agony, and painful fire which was completely tangible for the Arabs at that time added on their fear and terror, and encouraged them to the ascetic worship to escape from this painful destiny and fearful warning. Some verses depicted the scenes, which delighted every thoughtful man with at least amount of imagination faculty so much that cried sometimes, and died at the moment. The fearful expressions, which set the man's existence on fire, immediately, and make him cry and die of fear, have not been less in all this Heavenly Book. Saleh Morry recited this verse, for some of the ascetics: "On the day when their faces shall be turned back into the fire, they shall say: O would that we had obeyed Allah and obeyed the Apostle!" he became unconscious when he heard this verse, when he became conscious again, he asked Morry to add something to this, since he saw himself sad. Then I recited that: "And if they want to quit there and return, they will be burned again." He fell down and died. Yet, another clear sign in the Quran is about the people who think, and consider the earth and sky and the creatures in it, and find out the glory of its creator. They are the ones, who pray their God, while they are sitting down, or standing up, and are blessed and happy with the scent of his memory (Diana L. Eck.1993). A higher level is the verses, which call on people to humanity and obedience to God and His servants, and call them God's servants. This ascent ladder pulls them so that it pours the love and affection like an elixir on their earthly existences, and makes them Heavenly in the process of this lovely worship (Shirazi, Mullā Şadrā, 2004).

4.1. The Prophet's Tradition

The practical trainings of the Prophet Muhammad (PBUH), and his life, made the God's verses very clear. The prophet was a good paradigm for the Muslim pious, and righteous. The prophet suggested the correct styles of the social life, especially supporting the truth, and fighting against oppression, considering the wife and children and managing the worldly affairs warned them on the extremes, and kept them away from laches and rigid and meaningless worship by negating the monasticism (Goldziher, Ignác (1981). The prophet (PBUH), did not accept the excess in asceticism, and worship, and called people on the middle way. Therefore, he banned Uthman ibn Mazun, from the ascetic radical deeds, and advised the person who had put the camel halter in his nose, and had given the control of it to another person in the Tawaf. Moreover, he prohibited ibn Omar, from long fasting in days and nights, and permanent prayers, and abandoning the life. The prophet (PBUH) is regarded as the full mirror of asceticism; it was the man who was known for his simple life, contentment, and God's servant, and being kind with the God's servant. He even left his wives, when they asked him more than they were expected to, and secluded him ascetically. Omar Ibn Al Khattab states that: I went to see the Prophet in this mood, and I saw him sleeping on a harsh mat, and when the figure of the mat was copied on his blessed body, said crying: "the pagan Kasra and Cesar are living in luxury, but the God's messenger is living in this poor way?!. He said: "wouldn't you like to own the hereafter, and they to own the world? (Alkhuli Muhammad Ali.1987). Aisha, the Prophet's (PBUH) wife says: "Sometimes, there wasn't any light in the Prophet's house for forty nights, and there wasn't any food, except the date, and water. In some of the Sufism resources, it's been stated that the Prophet's shirt and mat were not more than two Drachma, and when he buys new shoe laces, he asks for his old one, when he is praying, so that he's not distracted by them(Alkhuli Muhammad Ali.1987). The Prophet ignored going to the luxury houses, and warned the others as well. Hasan Basiri says that, "in the Prophet's houses, one could touch the ceiling... There was a curtain in the Aisha's house. The Prophet said: whenever, I look at it, I remember the world. Take it, and give it to someone else." He closed stones on his abdomen because of starving, and he and his families did not eat anything for a couple of nights. Aisha says: "sometimes, the prophet (PBUH) did not eat anything for three days, and most of his food was the date and oat bread (Alkhuli Muhammad Ali.1987).

5.1. The Prophet's (PBUH) Pious Companions

This bright light (the Prophet Muhammad (PBUH), started shining in the darkness of the desires

of the wealth and power owners of that time, for the righteous, so that, not only their ways, but also their souls and bodies were illuminated. These people, whose souls were illuminated by the beam of that light, went on the way, whose Prophet had gone. The samples of the Soffa companions' lives, which are full of asceticism and poverty, shows the greatness of the believers who were highly interested in the divine blessing and prayed him; while sometimes, forty people of them had only one date to eat. It seems that the prophet's prayer in the mystical interpretation of the Quranic term which says: "... don't reject them" has been addressed them, then he said: "O' God, give me a poor living and a poorly death, and raise me with the poor people in the Resurrection Day (Esmail Sieny Mahmoud).

Imam Ali (PBUH), whose life is a complete sample of asceticism and piety, is regarded as the most ascetic companion of the Prophet (PBUH). He says about the Prophet's (PBUH) life: "He left the world, while he was starving, and entered the Hereafter calmly, and he never built a house, he ate his meals on the floor and did not ride on a horse without a packsaddle, and mended his clothes. During Imam Ali's (PBUH) life, one can see some wonderful scenes of ascetic life as well. Mending his own torn shoes, and having oat bread on the table cloth, and eating salt instead of stew, wearing harsh woolen clothes, and spending long nights to worship and pray. Furthermore, when he was the Caliphate, he took a sack of food to the poor people's houses at nights, sympathized with poor people and suffering people, and shortened his long sleeve, to accompany with the poor and suffering people. It is available among the people, in the historical books, and Imam Ali's (PBUH) biography, that he was very strict with his family and his close connections. His anti-world sermons and orders as well as his ascetic lifestyle are like the proverbs. The other companions had also an ascetic lifestyle. Master Zarrinkoob has quoted from a famous historian: "wearing rough clothes, and eating less food, and going to the bazaar on foot, and wearing mended clothes, and wearing Tasoumeh instead of shoes. Tasoumeh: Baghdadi people attribute it to a pair of shoes which are mended, and the one who has some wounds on his feet and cannot wear normal shoes, wear them. Abu Zar Ghaffari, did not permit anyone to collect money and wealth for more than one day. Hudhayfah bin al-Yaman said: "the best day of mine, is the day, when my family says that there's nothing at home to eat. Khabbab ibn al-Aratt (73) was crying when he was about to die, because of the property he owned. When Salman Farsi was the Emir in Madaen (Ctesiphon), wove baskets in order to supply his life, and even, it's been stated that he did not build any house for him

and he slept in the shadow of the walls. In Kimya-e-Sa'adat, it's been stated that: "... someone entered Abu Zar's house. There was nothing at home. He said: isn't there anything in your home? He replied: "there's a home of ours, whatever we achieve, we send there. Ali (PBUH), bought a shirt for three Drachmas, and in terms of ascetic life, simple life, and in order to reject the self-glorification, shortened its sleeve. Sufyan Suri's (D, 161) clothes and shoes cost less than two Drachmas.

6.1. The Followers

Some of the prophet's (PBUH) followers, followed the Prophet in asceticism similar to his companions, and went on his way, and wished to be like him. Uwais Qarni was at his mother's service, and didn't find a chance to meet the prophet (PBUH); however, when he was informed that the prophet's tooth has been broken, broke all his own teeth, because he didn't know which of the prophet's tooth has been broken. The leaders Imams (PBUH), who were the Prophet's successors, denoted a complete paradigm of mystical and ascetic morality, to the society. Zayn al-'Abidin (PBUH), did not quit the night prayer neither at his homeland, nor in travel." A nomadic man, cursed Hasan ibn Ali ibn abi Talib's (PBUH) parents. Imam asked him "are you thirsty, or hungry? Why do you behave like this?" in reply, he cursed Imam again. Imam asked his slave to give a bag of Dinar to him, and apologize him since he did not have more than this at home to denote him... "The nomadic heard these words and said " I bear witness on the son of the messenger of Allah, peace be upon him... narrating this, Hajvery, has known this kind of behavior as the scholars' characteristics, whose behavior does not change against the insult or praise of the other people. About that honorable Imam, it's been stated that he has gone to Mecca, on foot, for twenty times, and has offered his property for the sake of God, twice a year, and has divided his property three times a year with the poor people. Furthermore, al-Hajvery has some narrations about Imam Husayn's (PBUH) benefaction. He has also stated about Imam Muhammad Sadiq (PBUH), that once, he was sitting with the people around him and was telling them: "Let's swear allegiance on the issue that each of us who found salvation among us, intercedes the other on the Doomsday. They replied: O' the son of the Messenger of God, you don't need our intercession, because your ancestor is all the creatures' intercessor. He said: I feel ashamed to look at my ancestor's face, because of all I have done." This sentence is seeing the self-errors, and this characteristic, is one of the perfection characteristics. in the furtherance he says: "If I express the sentence of the prophet Muhammad's family, and count their magnanimities, not only this book, but also many

books cannot include even ten out of one hundred of them. Moreover, about the other followers: "Rabi ibn Khuthaym (63), became sick, he rejected to be cured and said: "neither the sickness, nor the doctor will remain. Saeed ibn Musayyab (d 94/95), said the Fajr prayer with the ablution of Isha prayer for fifty years, Hasan Al-Basri (d 110) had a unique ascetic humility in his behavior.

7.1. The non-Islamic Roots of Mysticism and Sufism

The most important issues in this regard, is that the Sufism is affected by the Christianity, Zoroastrianism, and the Iranian's methods and opinions (especially in the era of conquests, and after that), Indian's opinions, the Neo-Platonism, Greece, Mani, Gnosticism thoughts, and other divine and non-divine teachings (Dina Le Gall).

8.1. Christianity

It seems that what is stated in some of the Sufis's methods and beliefs as their divine traditions, are just the "Christian monks, or the Jesus's teachings" or at least the closest methods and ways to their tradition. For example, abstaining the non-vegetarian foods for the Sufis is the Christian monks' beliefs (Hawting, Gerald R. (2000). Wearing woolen clothes, as well as a cassock, and cloak, are among the Christian monks' traditions. The convent, as the cultural center of Sufis, is one of the gathering places of the Christian monks. Paying attention to the rosary is one of the remembrances of the Nasari Persians. The element of trust is regarded as one of the most significant elements of the Sufi's thoughts among the Christian monks' opinions. Being satisfied with the other's aggrieve, which is regarded as the despising the self and achieving the sincerity in the Sufism's narrations, is among the Jesus's trainings. The lovely and sincerely prayer, which is regarded as the most significant opinion of "lovely Sufism" has been derived from the Jesus's trainings, and it seems that the story in which the Jesus paid attention to the group who were worshipping God sincerely, is the origin for the lover Sufism's narration that: I worship you not because of fear from the Hellfire, and not because of the interest in heaven, but because I have found you deserved to be worshipped; therefore, I worship you (Arberry, A.J. 1991). The notion of the divine love, for the Muslim Sufis, is among the Christianity trainings. In the Gospel of Matthew, it's been stated that: "If I speak in the tongues of men and of angels, but have not love, I am only a resounding gong or a clanging cymbal. If I have the gift of prophecy and can fathom all mysteries and all knowledge, and if I have a faith that can move mountains, but have not love, I am nothing. The fact that what effects Maroof Karkhi's parents (about 200), have been Christian, and Junayd Baghdadi

(297), both of whom are regarded as the cornerstone of Mysticism, has been trained by his Christina parents, have had in the Sufism's thoughts, should be considered. Among the effects of the Christian's monk on the Muslims, the narration of one of early Islam ascetics, named Uthman ibn Mazun; who was willing to sterilize himself like the Christian monks, and divorce his wife so that he spends more time to the austerity and more asceticism, and leave his children to worship God much more, but since the Prophet Muhammad (PBUH), the prophet, opposed him and guided him to change his mind, he didn't do that.

9.1. Zarathustra and the Iranian Thoughts

Zarathustra's effect, his trainings, and the Iranian's thoughts and traditions, on the Muslim Sufis due to the conquests [the Arabs and Iranians wars] and blending the Muslims' behavior with them, and the presence of a Persian man called Salman Farsi (36, 37) beside the Prophet (PBUH) should be considered and investigated. The issue of the joiner, and presence, which is the desired destination of the lover Sufis, is one of the Avesta issues and its mystical specifications. Moreover, the issue of guardianship which gives the complete authority to the guardian to manipulate in the affairs since, because of his divine caliphate, can be regarded as a synonym for "Xwarrah" or "Farrah" appointed to the Zarathustra (Rabb, Muhammad 'Abdu. 1971). Considering the issue of good and evil is regarded as the Zarathustra's trainings, and the imagination of the good, which is related to the life, happiness, and the world's prosperity, is inspired by the Zarathustra's trainings, and of course, the mystic, and the Sufi's happiness is derived from the same happiness. Therefore, "I'm happy in the world, because the world is happy with him. And one should add the belief in the invisible world, which has complete similarity with the Sufi and mystic's opinions (Jamal Malik, John R. Hinnells). Among the historical samples, the effect of the Iranian culture on the Islamic Mysticism is the point, which is stated by Dr. Ghasem Ghani as the following: "... when the Arab Muslims won over the Iranians in the wars, and since the Iranians regarded them with contempt, and didn't consider any value for them, and since they were defeated in the military battles, and engaged in a mental battle; the result of this mental battle was "Shiite" and "Mysticism (Field, Claud. 1910). Since the effect of Salman Farsi's words and deeds in the Islamic mysticism, enjoyed the both important currents of Sassanids' era, which are "Zoroastrianism" and "Christianity" seems inevitable. In some of the Sufism sources, about Salman Farsi, it's written that; he was mistaken by the workers and porters, when he was the governor of

Madaen (Ctesiphon), because of his poor clothes, and sometimes he was ordered to take some loads, which was accepted by him with humility. Some sources narrate the Caliphate's II chiding, of his simplicity and the issue that he was regarded as the Muslims' disgrace (Boyce Mary.2009). Some of the European researchers believe that mysticism has its roots in Iran, and they tried to blend and combine Shahab al-Din Suhrawardi (539-632) with the Zarathustra's ones.

10.1. Buddha

The effect of Buddha's thought in the Sufis relates to the roots of this thought. The one-thousand year trainings of Buddha in Balkh and the East of Iran, before conquering the India, show this influence (Burt, E.A. 1955). The eightfold position of the mystical deportment and its stages has been regarded as the basis of this mystical deportment for the Muslim Sufis, and the mystical authorities. Probably the notion of abandoning the world and the Sufis' austerity has derived from the Buddhist thought, and has prevailed among them. The method, which states that one should resort intuition, and spiritual travel, to achieve God, and the foot of intellect, and emotion is wooden and lame in the square of existence and understanding the God's beauty beam, is stated the philosophers of the Alexandrian School, which is inspired by the Neo-Platonism thoughts, and this notion has not been free from the effect of the deep and heavenly philosophy of Buddha. In most of the Sufism's narration, the story of Ibrahim Adham (161, 162) the Emir of Balkh, who has left the monarchy suddenly and tended to mysticism, is similar to the narration of a Chinese prince. Narrating this story and the similarities completely, master Zarrinkoob concludes that "despite all, the imagination that one can appoint all the phenomena of mysticism and its expansion to the Buddhist influence is indeed unrealistic, and baseless.

11.1. The Hindi Thoughts

The effect of Hindi thoughts and the essence of Upanishad's trainings (the stages of mystic's travel to become Brahma), the collection of Hindus' thoughts which is highly similar to the Sufis' words, have been studied, and it seems that the mystical meaning of the minor self-destruction in the general existence has a Hindi origin.

12.1. The Views of Plotinus, and Neoplatonism's Thoughts

Publishing the views of Plotinus, and the philosophy of the Neo-Platonism among the Muslims, has been effective more than anything else in mysticism and Sufism, and they have given the theoretical base to the mysticism thought, which includes practical asceticism, and the issue of pantheism won the attention of Sufism's opinion in

the philosophy of Neo-Platonism. As far as we know, the Neo-Platonism thought, results finally in the divine love, and any effort to perceive it, and submergence and the connection to the existence of God. This philosophy as well as the way to love God that are regarded as the mere way of mystical behavior for some groups of Sufis, are adapted by the Neo-Platonism philosophy. The issue of pantheism of Neo-Platonism and different analysis of that was so effective on the Muslims' works, that the Muslim mystic scholars such as Al-Farabi, Avicenna, and Ibn Rushd (Averroes) weren't deprived of this effect. The Philosophy of Illumination and considering it, which was later known as the wisdom of illumination, and Shahab al-Din Suhrawardi became its pioneer and the leader, is one of the Neoplatonism cultural effects.

13.1. The Greek Thoughts, the Religions of Gnosticism and Mani

Some of the European researchers believe that the Islamic mysticism is derived from the Greek thoughts especially Hellenism and due to the closeness of the Gnosticism opinions with mysticism and Sufism, it can be regarded as the effective factors on it. The Gnosticism thought believes that the creation of human is based on the three elements of material, self, and soul, and there's a clear difference between the soul and the material. The result of this insight is the absolute pessimism in the world of material, and escaping from the world, and its manifestations and the tendency to asceticism, and austerity. This issue, as well is regarded among the first issues of mysticism. The effect of these trainings has been clearly observable in the Sufism's opinions, and it seems that the theory of wisdom and knowledge in the first Sufis' notions has been achieved from their connection with the Gnosticism. The Sufis' word Sediq, which is attributed to the complete clergyman, is inspired by the Manichaeism. Of course, the Mani religion is a mixture of the Zoroastrian, Christian, Greek, and ancient myths religions.

2. Summary

Through studying the mysticism and Sufism foundations in Islam, and other religions, it seems that remembrance of some points and comparing those help us in more correct conclusion. One of these points is the mystic moderation for the abstemious Muslims: the asceticism and piety of the Muslims in the early Islam, was a moderate behavior, so that they worshipped God and stood against the hardships of life. For example, Umar bin al-Khattab governed large Islamic countries of in the asceticism and abstemious and leaving the world. It seems that when he was praying God and fighting against the world, imagined the map of war and fighting with Cesar and Kasra and he did not think only about one

aspect of life (isolation and Christian monk-like isolation). It is the just opposed point of the ascetic mysticism of the Muslims with the Christian monasticism and other similar religions. Ali ibn Abi Talib's (PBUH) various wars in his short-term caliphate (35-45 AH) with the opponents as well as the exact and accurate management of the Islamic society and paying attention to the asceticism and mysticism and poor life of that Imam⁸³ are all the samples of the issue that the Islamic mysticism has roots in its scholars' methods and basics. Therefore, we find out that the roots of asceticism and piety are so widespread in the Islamic trainings that have won the attention of many Muslim ascetics and destroyed any possibility of the tendency to the other religions. The life of the prophet Muhammad's (PBUH) followers, especially the sinless Imams (PBUH) is the sequence of this way. The Sufis' accurate attention to the tradition of those scholars in the books and works of their elders show this issue and confirm it.

1.2. The Historical Roots of the Islamic Mysticism and its Effect on Forming the Mystical Morality

The historical currents of the early Islam, and the appearance of the Bani Umayyah (41-132 AH) have weird and wonderful effects in the creation of the asceticism and mysticism movements. These political-social revolutions resulted in the "introversion" which is the Islamic mysticism theme. The introversion, the theme of mysticism and asceticism: we observed that how "mysticism" was born from the thought of asceticism, worship, and fear of the punishment and hope in the Heaven. Furthermore, we understood that how the pious ascetic, formed its method in fighting with the power, and keeping the Sharia, and adding the knowledge and virtue. It seems that this isolation from the society of powerful men and the politicians, and a kind of getting out of the situation created at that time, are the result of rigidity, and strictness of some of the jurists. It means that except the thought and the way of Muslim Sufis, there are other groups of Muslims who pays attention to the exterior of the deeds more than the interior of them (Schimmel. A.M.1975). In their belief, for the believer, the apparent behavior of a Muslim and knowledge to the etiquette and Sharia practices are enough. In acting upon the God's commands, and through using the Quran, they believed that any interpretation is the interpretation to the final judge, and determined some Hereafter punishment for it, and documented their words to the Prophetic Hadiths, and presented them as the executive provisions (Spencer Trimingham.1971). This group that was called as the "Jurists" in the history of the Islam, and are compatible with the administration system, accepts

the commands issued by the Caliphs, and the governors, by justifying the Quranic verses, and sometimes presented in the governors' court, and sometimes found positions, as the judge, or advisor, and of course, the Chief Judge. The Muslim Sufis, who are the followers of the ascetics and abstemious people of the early Islam, and the true-hearted who ran away from corruption, sin, and the protesters to the royal government of Bani Umayyah, become more introvert to run much more from the deceptive appearances of the world, and more sincerity and purity and tended to the truth of mysticism which is "introversion", and paid special attention to the depth of religious trainings, to fight against the superficial observers. This process of movement and choice has the historical backgrounds and events related to it, which are the roots of introversion current of the Sufis. By looking at and imagining the past events, such as Ali ibn Abi Talib's fights with the cruelty, and his lack of success, and the event of Ashura as well, and the innocent martyrdom of the Prophet's (PBUH) son, and the companions of that Imam, who have started their movements as the "reform and guidance "in the religion of his ancestor, and the successive uprisings such as the "Tavvabin Movement" (the movement of those who repented), which resulted in harder political despotism, and the too much injustice of Bani Umayyah, and such events, which continued until the fall of Umayyad, they isolated from the world with their first motivation, and started purifying the inner of themselves. This kind of lifestyle has been stated for one of the western scientists as the following: "for the strict Sufis, the internal life is a kind of final human destruction, which burns in front of the divine unity sunlight, which is out of the other's achievement. "Of course, this analysis is in the field of Pantheism, which is clearer in the next centuries Sufis' opinions (Arberry, A. J. (1992).

2.2. The Reason of Propagation and Acceptability of the Mystical Morality

Studying the roots of mysticism, Sufism, and its formation, in the historical process, it is necessary to study the other reasons of its acceptability and expansion, briefly.

3.2. The Political-Social power of the Sufis, and the Attenuation of the Jurists

1.3.2. The Political-Social Power of the Sufis

In the fifth century, AH, the Sufis had some authorities in the political position, which was due to the credit and the value that they have found among people, and Emirs, and most of the governors tended to them. The story of how Sultan Mahmood and Shaykh Abul Hasan Kharqani faced each other and the issue that Shaykh did not accept the Sultan's gold⁹⁰ is one of the issues of mysticism and Sufi's

position during this era. Furthermore, Baba Tahir's advice to Tugrul Seljuk cannot be overlooked (Lewinsohn). Khwaja Nizam al-Mulk puts on a modest air in the presence of Abu Ali al-Farmadi, despite all his political power and authority (498), and sits down on the ground in his meeting and prefers his meeting and words to the others, even the jurists and scholars. The Khwaja's sincerity is so much that he starts crying when he hears the Shaykh's words, and changes completely. The lover Sufis and mystics, found so much credit that all the Emirs and ministers ask for intercession (Shah, Idries. 1971). Khwaja Abu Mansour Varqani (Tugrul's minister), asks Abu Saeed and Qashiri, to be present at his corpse, so that he becomes successful in the questioning of the Hereafter at the first night in the grave, and Ibrahim Danial, one of the cruel governor at that time, accepts all the conditions of Abu Saeed just for a manuscript from Shaykh. He wanted that manuscript to be buried with him, so that it helps him on the Doomsday. At this time, the mysticism live in prosperity and are busy in their convents with Sama' and prayer. They are respected by all the Mongols as well as less intolerant clergymen, and their community was welcomed by people, of course this attention, respect, and popularity caused some Mullahs to be jealous of them. When Ahmad Ghazali joins the Sufism, he has had some meetings, which are highly considered by the people, and these meetings and attention make the jurists angry and are destroyed by them; however, the people believed that the Sufis's sentences are related to the religious secrets and truths, and offered some gifts and vows to them. Abdul-Qadir Gilani's meetings (471-561), are so welcomed by people that Caliph Al-Mustanjid sometimes went to these meetings. The influence of these meetings was so much that cause many of the Baghdad Jews and Christians to convert to Islam.

4.2. The Attenuation of the Jurists

One of the reasons of the mystics and Sufis' acceptability during the Seljuk's era was the internal dispute of the jurists and scholars and involvement between their religions. They accused their opponents of heresy in a verbal and ideological conflict, and as the result, people turned away from them, and the society's belief became weak toward them. On the contrary, the Sufism and Mysticism were not strict in their beliefs, and they were very tolerant, and it was a good reason for people to welcome and respect them. Of course, the difference in understanding the religious opinions among the jurists and Sufis are considerable in the people's welcome, and tendencies. In the Sufis' beliefs, the direct divine understanding and recognition, without intellectual and verbal reasoning, and connection to God, do not

need any means, and they have not been excluded in the deeds and worships. Naturally, in this difference of thoughts, the Sufis found more chance. The disputed issues, between these two groups were mostly based on the religion and Sharia axis. The jurists accused the Sufis, of the division between Sharia, and doctrine, and the mystics, believed that they are interested only in the appearance of the religion and ignorant of the content and the core of it. And people who hated these jurists' behaviors tended to the Sufis. Ibn Arabi had communication with the Sufism and mysticism, in every city where he entered, and communicated with most of the scholars and jurists. He wrote some letters to Imam Fakhr Razi, and invited him to achieve the divine sciences from the training and following the formal sciences. The considerable point is the Abu Nasr Siraj. He believes that since in the juridical issues, the mysticism does not achieve the positions of the jurists, they refereed them (Burckhardt, Titus.1963).

5.2. The Equality of Mysticism with "Morality" and Knowledge in Moral Ways

In some of the Sufis' works and books, the mysticism has been described as noble and generous morality. Muhammad ibn 'Ali al-Qassab, the Junayd's master was asked: what is mysticism? He replied: "Sufism consists of noble behavior (AKHLAQ KARIMA) that is made manifest at a noble time on the part of a noble person in the presence of a noble people" and when the Shaikh is asked, why all the followers of sciences and schools are attributed to something, but the Sufis are not?! He replies: "because, it's not possible to describe them with any kind of science, or school, but they are the mine of all the sciences, and desirable moods and "noble behavior" and they are always with God (Shah, Idries. 1971). the elders of these people emphasize that, Tariqat, is a practical fact, and no name is attributed to it. The Sufism shaikhs have talked a lot about the application of the words of morality, virtue, and its closeness with mysticism, and have given many results on this issue. Abu Ali Gharmisni, believes that mysticism is equal to "noble behavior." Abu al-Hossein Noori, has gone further and has named the moral characteristics one by one, and has regarded mysticism as one of them. Junayd, one of the scholars of mysticism, have named eight moral characteristics, and believes that they are the foundations of mysticism. These noble behaviors are regarded as the foundations of the practical morality of the Sufism. Hajvery states one of the Imam Bagher's (PBUH) Hadithes, in which he has defined the mysticism as the good morality. The Hajvery's statement is as the following: "mysticism is good behavior, better behavior, makes one more Sufi (Nasr, S.H., 1996). In order to explain that what

points have been regarded by him, some minor notes should be stated. Abu Hamid al-Ghazali narrates one of the Khafif Shirazi's narration (267-371), and then explains the moral ways of Sufis, and believes that following his noble behavior is one of the most significant thing in Sufism Tariqat, which means purifying the heart from the worldly viciousness, and avoiding the human characteristics, and the self-obedience and conjoining with the divine and spiritual angels. The morality that is stated by the Sufi, and obligate himself to observe and execute it, is the divine morality, which is seen and heard in the tradition of the Prophet (PBUH), and are aware of its results and blessings. Therefore, it can be stated that: "the mystical morality is the same human and divine morality and values which are followed by the revival of the good and acceptable characteristics, and ejecting the mean ones.

6.2. The Mystical Morality and the Moral Needs of the Modern Societies

Among the mentioned notes, the following issues are compatible with the moral needs of the modern society:

- A. The mystical morality is against cruelty, and owns some stages at the time of the act, which is able to create the moral and value currents and help the society against oppression and inequality. Regarding the fact that the modern societies are seeking equality, and its accomplishments under the title of human rights, one can have a new approach to this kind of morality.
- B. The mystical morality has some thoughts for the managers of the society. This Tariqat can rare and train the individuals who are working on both morality and individual mysticism, and be effective and successful in the society of healthy people.
- C. The scholars and elders of this kind of morality, take the advantage of all the ways, and do not pay attention to only one religion and one way. In their beliefs, "the way to achieve God is as many as the number of people."¹⁰ Although they have created from the religions' thought, they do not have the bias and rigidity of the religious jurists and scholars; therefore, people are mostly tended to them.
- D. Based on the Sufis and mystics' thought, the morality is equal to mysticism and Sufism, and has roots in their foundations. The scholars and elders of this thought, emphasize this point that morality is inseparable from the Sufism and mysticism. The Muslim mystics believe that they are the moral followers of the Muhammad, the prophet (PBUH). Contrary to the issue that some of the orient lists have named him, the prophet of war, sword, and violence, is the

prophet of morality and kindness. Recently, the Muslim researchers have studied this point carefully, that the prophet not only has applied the sword and power, but also the spread of his religion has been indebted to his morality, and his righteous behavior. This is the most specification and the reason for his prophetic mission. As he stated: "I have appointed to prophecy to complete the generosity of morality."

3. Conclusion

One of the most significant needs of the modern societies is "morality and the moral society." The humanity retrospection in avoiding the morality and the human and divine values, and what exists among the people and some of the researchers of the modern world under the title of religion and morality, is the expression of religion and "juridical sentences and the clergymen's behaviors." As the writer believes, through study and more accuracy in the details of morality and updating the religions and their methods, one can substitute them as the purest religious thought, to the juridical and formal false imaginations, and of course the mystical morality should be introduced regarding its scholars and elders' behaviors. And not the superficial, emotional, and one-sided interpretations of some ignorant people! In this way, one can modify the accusation of violence from religion to the mystical morality, regarding the aim and depth of its mission, because in this morality, the lover and the mystic think only about his own God, and does not interfere and pay attention to the individual behavior of people, he is not willing to punish others, and to enter their private policy. The mystic and Sufi, remembers the Almighty God, in his privacy and add to his knowledge in this way. He acts upon the Prophet's (PBUH) words that "convey happy news and do not intimidate people... when you are talking about their God, don't say something that scares them." therefore, the mystical morality can be suggested as one of the best moral and spiritual needs to the mankind

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The Perfecting of Product Distribution Management; Supply Chain Demand Approach

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Abstract: The distribution process includes, beside the transport of the products, the operations of purchasing, of consignment, of concession, of depositing and storage and a lot of other commercial operations. The aim of this paper is introduce a model for supply chain demand. Also, this paper investigated the role and the status of the transport system in the distribution management.

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1. Introduction

The concept of distribution concern, above all, the itinerary covered by the goods from the moment in which they are furnished by the producers to the moment in which the end customers receive-buy them; this itinerary includes, besides the producers and the consumers, the commercial intermediates (who, sometimes, play an important economic role). The distribution process includes, beside the transport of the products, the operations of purchasing, of consignment, of concession, of depositing and storage and a lot of other commercial operations. The objectives of the distribution politics can have both a strategic importance (for example, the image of the distribution channel) and an operative importance (for example, the increase in a short time of the turnover). These objectives include in their structure:

- The objectives of the economics-oriented distribution politics;
- The objectives of the supply-oriented distribution politics;
- The objectives of the psychology-oriented distribution politics.

Due to the place it occupies in the economic processes, the distribution performs an important economic and social role.

The main functions of the distribution process are:

- the change of ownership over the product through the purchasing agreement;
- the moving of the product, meaning the transport, storage, conditioning, handling and wrapping of the product;
- The choice and the usage of the distribution channels;
- the establishment of the itinerary (route) that will be followed by the product on the market.

The distribution management can be defined as the complex process of planning, organization, coordination and control of all the flows of materials and products, with the information flows related to

them, including the collecting and refund of the waste materials and defective products. The physical distribution can be defined, according to Peter Drucker, as being “another way of naming the entire business process”, or according to Philip Kotler being the “planning, manufacturing and control of the materials and end products from their origin to the place in which they are used, to satisfy the customers and to obtain a profit”. Sufficient literature exists about various aspects and facets of GrSCM. Comprehensive reviews on green design (Zhang *et al.* 1997), repairable inventory (Guide *et al.* 1997c, 1999a), production planning and control for remanufacturing (Bras and McIntosh 1999; Guide 2000; Guide *et al.* 1997b,c), issues in green manufacturing and product recovery (Guide *et al.* 1996; Gungor and Gupta 1999), reverse logistics (RL) (Carter and Ellram 1998; Fleischmann *et al.* 1997) and logistics network design (Fleischmann *et al.* 2000, 2001; Jayaraman *et al.* 2003) have been published. In addition, Bloemhof-Ruwaard *et al.* (1995) deal with interactions between operational research and environmental management, and Roy and Whelan (1992) discuss recycling through value-chain collaboration. Min *et al.* (1998) and Lippmann (1999) discuss combined location-routing problems and elements for success in GrSCM, while Dowlatshahi (2000) develops a theory of RL. Sufficient literature also exists in the related areas of green purchasing (Zhu and Geng 2001), industrial ecology and industrial ecosystems (Bey 2001; Boustead 1979; Cairncross 1992; Frosch and Gallopoulos 1989; Graedel 2002; Hui *et al.* 2001; Kaiser *et al.* 2001; Klassen 2001; Min and Galle 2001; Nasr 1997; Owen 1993; Sarkis 1998, 1999, 2001; Sarkis and Cordeiro 2001; van Hoek 1999; Zhang *et al.* 1997; Zhu and Sarkis 2004). The aim of this paper is introduce a model for supply chain demand. Also, this paper investigated the role and the status of the transport system in the distribution management.

1. A Model for Supply Chain Demand

The concept of management of the distribution line implies the responsibility of integrating the organizational unities into an sales channel of the products, starting from the upstream (from the producer), to downstream, attracting into this system, depending of the context, even the end costumer; this complex action implies the efficient coordination of the entire informational flow, of the material and financial resources, in order to ensure an optimal service for the clients and this way to enhance on the whole the competitiveness of the distribution chain, (the distribution chain being considered as a unity). If a company produces end products out of various components acquired from the suppliers, and then these products are sold to the clients, the situation represents a supply chain. In the paper it was mentioned the place of the supply chain management in the context of the advanced planning of the product distribution. The objective that governs all the efforts in a SCM is that of increasing the competitiveness, a characteristic that, through that system, is extrapolated to the entire distribution chain. The elements that are specific to the supply chain are, in general, the following: the client; the planning; the acquirement of the material resources necessary for the manufacturing; the stocks from the distribution channel; the production; the transport. A supply chain management presents three levels of activity: strategy-oriented, tactics-oriented and operation-oriented. The specific components are: the planning, the source, the production, the delivery, and the refunds. The utility of a punctual and precise supply chain stands in its ability to distribute products, as much products as the market demands. This is, in fact, the practice of the Japanese system “Just in Time”, which allows the companies to reduce the stock of products they possess for a better efficiency. The supply chain management structure (SCM) has many levels, according to its main objective, the actions presented to be performed and the factors involved into the system. The fundamentals of SCM are integration and coordination: the integration involves choosing the partners, network organizing and inter-organizational collaboration – the distribution chain management. The activity’s coordination along the distribution chain can be an excellent one through the usage of the greatest developments in the communication and information technology. It involves three dimensions: the technology, information and communication usage; the process’ orientation, the advanced planning. The supply chain management is interpreted as a greatly efficient and effective modern system – these characteristics being proved by the results of its implementation by some successful companies.

SCM’s valorization necessitates, besides desire and interest, important informational, material, technical and financial resources. The advantages it generates justify in a significant way the effort involved into the implementation of SCM system. The management of the stocks which constitute inside the distribution channel, at the level of the distribution centers, of the storages and at the selling places raises a problem. The most important aspects of the stock management are related to the types of stocks which must be formed, the reasons they are constituted, the advantages generated by their existence, related to the effort implied by obtaining them. Considering the main features of stocks’ creation and possession, it was specified in the paper, besides the objective necessity that led to their creation, the managers’ orientation towards the optimization of the stocking processes, of the stocks’ level and of the elements associated to them. In order to do that, several variants of the Wilson model were presented, variants that lead to obtaining some positive results, optimization of the current stocks, of quantity of the order and supplying, of the level of replenishment of the stocks, of the costs involved in the storage process. On this line it was approached the question of the safety stock, for which it was recommended the IMPACT method. The running of the storage processes in conditions of increased efficiency and effectiveness leads to the enhancement of the competitiveness and performance in the product distribution and in serving the customers.

ANFIS is an *adaptive network*. An adaptive network is network of nodes and directional links. Associated with the network is a learning rule - for example back propagation. It’s called adaptive because some, or all, of the nodes have parameters which affect the output of the node. These networks are learning a relationship between inputs and outputs. Adaptive networks cover a number of different approaches but for our purposes we will investigate in some detail the method proposed by Jang known as ANFIS. The ANFIS architecture is shown below. The circular nodes represent nodes that are fixed whereas the square nodes are nodes that have parameters to be learnt.

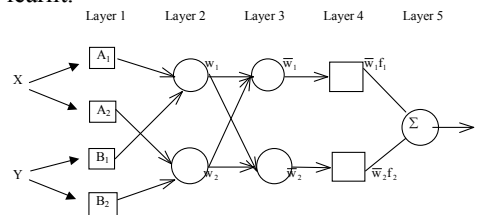


Figure1. Architecture of the ANFIS structure
An ANFIS architecture for a two rule Sugeno system
A Two Rule Sugeno ANFIS has rules of the form:

If x is A_1 and y is B_1 THEN $f_1 = p_1x + q_1y + r_1$
 If x is A_2 and y is B_2 THEN $f_2 = p_2x + q_2y + r_2$

For the training of the network, there is a forward pass and a backward pass. We now look at each layer in turn for the forward pass. The forward pass propagates the input vector through the network layer by layer. In the backward pass, the error is sent back through the network in a similar manner to backpropagation. An ANFIS system is a kind of adaptive network in which each node performs a particular function of the incoming signals, with parameters updated according to given training data and a gradient-descent learning procedure. This hybrid architecture has been applied to the modeling and control of multiple-input single-output (MISO) systems [4]. The architecture of the ANFIS is constituted by several layers (fig. 2). If we consider for simplicity two inputs x and y and two outputs f_1 and f_2 for a first-order Sugeno fuzzy model, with A_i and B_j being the linguistic label associated with x and y respectively, every node in layer 1 represents a bell-shaped membership function or with variable membership parameters. Usually we choose the bell-shaped functions. Nodes of layer 2 output the firing strength defined as the product, where the set of nodes in this layer are grouped for each output j . A normalization process is computed in layer 3 giving the normalized \bar{w}_i , and the Sugeno-type consequent of each rule with variable parameters p_i, q_i and r_i is implemented in layer 4 yielding f_j as the output of the single summation node and finally the single node of layer 5 computes the overall output as a summation of all incoming signals. The learning procedure consists of two stages. In the forward pass training input data go forward the ANFIS architecture, and in the backward pass the error rates propagate backward, being the both the consequent and the membership parameters updated by gradient descent.

Layer 1

The output of each node is:

$$O_{1,i} = \mu_{A_i}(x) \quad \text{for } i = 1,2$$

$$O_{1,i} = \mu_{B_{i-2}}(y) \quad \text{for } i = 3,4$$

So, the $O_{1,i}(x)$ is essentially the membership grade for x and y .

The membership functions could be anything but for illustration purposes we will use the bell shaped function given by:

$$\mu_A(x) = \frac{1}{1 + \left| \frac{x - c_i}{a_i} \right|^{2b_i}}$$

Where a_i, b_i, c_i are parameters to be learnt. These are the premise parameters.

Layer 2

Every node in this layer is fixed. This is where the t-norm is used to 'AND' the membership grades - for example the product:

$$O_{2,i} = w_i = \mu_{A_i}(x)\mu_{B_i}(y), \quad i = 1,2$$

Layer 3

Layer 3 contains fixed nodes which calculate the ratio of the firing strengths of the rules:

$$O_{3,i} = \bar{w}_i = \frac{w_i}{w_1 + w_2}$$

Layer 4

The nodes in this layer are adaptive and perform the consequent of the rules:

$$O_{4,i} = \bar{w}_i f_i = \bar{w}_i (p_i x + q_i y + r_i)$$

The parameters in this layer (p_i, q_i, r_i) are to be determined and are referred to as the consequent parameters.

Layer 5

There is a single node here that computes the overall output:

$$O_{5,i} = \sum_i \bar{w}_i f_i = \frac{\sum_i w_i f_i}{\sum_i w_i}$$

This then is how, typically, the input vector is fed through the network layer by layer. We now consider how the ANFIS learns the premise and consequent parameters for the membership functions and the rules.

1. The Role and the Status of the Transport System in the Distribution Management

The transports represent the costliest logistic activity, representing over 40 percent of the distribution costs of the majority of the companies; only in the United States these costs exceed 400 million dollars per year. The global transport costs exceed 2000 billion USD per year (Michigan State University). The transport expenses are raised proportionally to the other distribution costs and very fast; this is caused by some factors, as: the oil price, the lack of labor force, the increasing in the number of small orders and their frequency, the expansion of the exterior commerce, etc.

Resulting from the increasing interdependence between the companies, between various geographical areas, between the national economies and even between continents, the matter of the transports becomes especially important. Any kind of distribution activity necessitates, in a certain amount, a transport system. Under the circumstances, we can assert that the transports represent one of the components of the distribution, ensuring the connection between production and consumption, concurrently, the transport system manifests itself as a factor that links the economic national circuit and the international one. "The transports represent the circular system of economy, playing a vital importance into the optimum development of the economic activities, in general, and of the other components of logistics, in particular, any kinds of deregulations or malfunction of this process generate perturbations in the domain of production or of consumption."

In consequence, in the third chapter of the paper there were distinguished the elements that were specific to some ways of transport. It was proven that the transports are characterized by several main particularities, which are:

- They are intermediary activities that ensures the product and materials' flow towards the storages, from the storages to the places in which they are used, to the distribution centres and to the end users ;
 - They use special technical systems;
 - They provide services and they don't create any material goods;
 - The transports' infrastructure necessitates a lot of space and this fact results into a special influence over the social and economic space , etc.
- In order to perform with efficiency and effectiveness the distribution activities, the transports must answer to some requirements, like: low costs, a great degree of flexibility, minimal pollution of the environment, the quantitative and qualitative integrity of the products; great mobility. All these requirements depend on the modes and means of transport, on the

transport's infrastructure, on the nature of the products, on the costs implied.

The development of the process of transport presupposes the following stages: the dispatching; the initial terminal transport; the initial transshipment; the actual transport; the final transshipment; the terminal transport, the good's arrival. Among the stages that are characteristic to the process of transport, the dispatching and the destination of the products are compulsive; these stages delimit this process from the spatial point of view. The other stages depend of the concrete conditions of the communication lines that compose the transport route, of the status of the goods of loading and discharge and of the types of means of transport.

Nowadays the global economy, the systems of production are becoming more and more integrated, interdependent and connected to the product flow. This flow represent an integral and functional network composed by production commerce and services unities which cover all the components of logistics, from the ensuring of the materials, the products' manufacture to their distribution on the market. The transport process takes care of the products' flow on their entire distribution route.

The distribution system must be characterized by a high flexibility, according to its component of transport, in such a degree that it can adapt, at any time, to the nature of the goods that are transported. This requirement materializes into a series of measures, some of them being mentioned:

- The practice of a competitive management;
- The detailed knowledge of the area it covers;
- The performing of the transport in due time;
- The exact knowledge of the nature of the products and of the quantities that must be transported;
- The usage of the most adequate mode of transport.

The choice of the most efficient mode of transport and of the most economical means of transport available to this mode of transport presents a special interest. The choice implies the knowledge of the modes of transport that can be used and the means of transport that are specific to these. In order to do so, in the third chapter were presented some issues characteristic cu different ways of transport, in order to be ensured the necessary documentation for the distribution managers to choose the ways of transport considered the most efficient and effective.

2. Conclusion

The distribution process must be managed in such a way that it must ensure, in the first place, a unitary product flow, which must determine the improvement of the firm's performances. One course of action,

oriented towards the shipment optimization, is represented by “the optimization of the volume of goods that must be distributed and transported”. To that effect the distribution managers must analyze the factors that contribute to the optimization of the product distribution chains from the supplying sources to the distribution sources and from them to the sales outlets or to the end costumers. Choosing the distribution chain (channel) represents the distribution management’s main objective; therefore, a fundamental analysis is necessary as a result of this action’s impact on the efficiency and effectiveness of the product distribution to the customers. The decision of choosing the distribution chain and of the way of transport is complex, due to the great numbers of potential options.

The distribution managers must be informed, must quantize and monitor the volume of ordered products, transported and handled integrally. This allows those factors to optimize the distribution activities through: treating the shipment as a unity; improvement of the relationship with the transporters; the efficient coordination of the receiving and shipping of products; investments in the infrastructure and modern equipment; the increase of the circulation speed of the stocks; the appeal to third parties for services with a great degree of specialization; the creation of heterogeneous companies, etc.

To create a rational system of itineraries (routes), it’s necessary to consider some requirements that are particular to the goods distribution, such as:

- determining the consequences of small stocks;
- designing urban sales outlets;
- determining the variation of the report between volume and weight, according to the nature of the product;
- Organizing and grouping the diversity of goods wrappings;
- mentioning the restrictions of circulations specific to various transport routes;
- identifying the program of storages, centers or shops, etc.

There are some other actions that can be taken to ensure the optimization of the product distribution, such as: the automation, robotizing and complex mechanization of the loading and unloading of the merchandises, the usage of efficient procedures and techniques of prevention and protection against the deterioration and qualitative depreciation of the wrappings and products; the massive usage of modern techniques of shipping, storage and handling, etc. In the context of the approach of the possibilities of optimizing the distribution management both considering its components and on the whole, the optimization of the distribution network plays an important role, due to its impact to clients. The

optimal solutions are unique for each type of distribution network, being the result of a procedure that is recommended by some specialists, which involves taking some steps; we mention some of them:

- Evaluating the performance of the existent distribution network;
- Designing the new network’s configuration and the data base’s implementation for its optimizing;
- The identification of alternatives for each route;
- The selection of the design needed for optimizing the distribution network and the design of the soft used in this optimizing;
- The implementation of the network model in the calculation technique chosen, etc.

In order to achieve the optimization of the distribution actions, it was suggested in the paper as a mathematic model to be used (the forth stage from above) the critical itinerary method (or the critical itinerary analysis –ADC in the specialized papers), along with the methods CPM or PERT, for which it was presented concretely the theoretical methodology in their implementation. The indicators through which it can be expressed the efficiency of the shortage of the performing of the distribution management’s constituent activities were also mentioned in the context.

To draw a conclusion, we consider that the usage of CPM and PERT models in the distribution management, as tools of rendering efficient the activities in this field of activity is beneficial both for the product distribution system and for the whole economic activity particular to the members of a distribution channel.

Another contribution of our own, which we consider to be very important for enhancing the efficiency of the distribution systems, is related to the optimization of the emplacement of the objectives particular to these, as the storages and distribution centers or another sales outlet – an action that must sensitize the management at the superior level of the organizations. To that effect there were presented three economic-mathematic models, with concrete exemplifications under the guise of case studies. Before presenting the case study’s solving, there were stated the criteria that must be considered in choosing the emplacement of de investment objectives, in this case the distribution objectives: economic criteria, functional-technological, social, restrictive-strategic criteria, natural factors (for which there were specified the elements of characterization and justification). The optimization models are included in the economic criteria that take precedence over the others. In the end of chapter six it was discussed the inverse distribution system, as representing an objective necessity for the modern

distribution management. Specialists in the domain approached the distribution process in their attempt of designing a total distribution system, starting with the producer and with the product flow from the producer to the end consumer. Nowadays the specialists' preoccupations are related to designing an efficient inverse distribution system. The inverse distribution process, from the point of view of withdrawing a product from the distribution chain and even withdrawing it from its user, must be considered as being an integral part of the distribution strategy. This includes:

- The rational design of the products' physical distribution chains;
- The implementation of an effective informational system, which allows the operative knowledge, in due time, of the products that must be withdrawn from the distribution chain;
- The periodic revision of the systems and procedure of orders' process;
- the revision of the management systems and of the shipping and traffic, paying a special attention to the identification of the shipping data, the orders' book, the products' destination, the means of transport used, etc.

Having the same goal, the clients' localization and their direct notification represent essential factors in the product's safe withdrawal.

The distribution activities involved into the flow of the products to be returned are integrated in the process and interdependent. The main objectives of the distribution system are: the cost's minimization and the elimination of the service' malfunction. If these objectives can be fulfilled, in each concrete circumstance, then this action, more and more frequent on the market, will be easy to perform.

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A case study on grade 8 municipals of Fars Province¹

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Abstract: The present study aims to review the impact of internal marketing on customer orientation in the grade 8 municipalities in Fars. Within the proposed research model, the effect of customer orientation as an exogenous variable on three variables of internal marketing, job satisfaction, and organizational commitment was studied and then Indirect effect of internal marketing on customer orientation and organizational commitment was surveyed. This study was a descriptive-survey research. Statistic population included employees of grade 8 municipalities in Fars Province forming a sample of 153. As the simultaneous effect of multiple independent and dependent variables was supposed to be measured, structural equations method (Confirmatory factor analysis and structural equations) using the Lisrel software was applied to analyze the data and test the hypotheses in the present study. The results of this study indicated that internal marketing affects customer orientation. The results also showed that there is a significant relationship between internal marketing with job satisfaction and organizational commitment, and hypotheses about the impact of job satisfaction on customer orientation and organizational commitment were confirmed. But the impact of organizational commitment on customer orientation was not confirmed. Finally, indirect impact of internal marketing on customer orientation and organizational commitment through job satisfaction was confirmed, but indirect impact of internal marketing on customer orientation through organizational commitment was not confirmed. In addition to direct effects of these variables, their indirect impact on each other was also measured.

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Keywords: Internal marketing; Job satisfaction; Organizational commitment; Customer orientation

1. Introduction

Organization is the characteristic of the era we live in. Each organization is consisted of pillars that are necessary for the organization. These pillars include structure, technology, goals, capital, and manpower. Although the existence of each of these factors is important in shaping the organization, manpower is undoubtedly the most important pillar of each organization. Many management experts believe that human is the constant pillar of each organization, so the organization should pay a special attention to this pillar. Employees are internal customers of organization and paying attention to internal customers is now known as internal marketing in the marketing literature. Organizations that pay more attention to their employees usually have more customer-oriented employees with a higher job satisfaction and organizational commitment. Hence, the present research studies the impact of internal marketing on customer orientation. The objective of this study is to investigate the factors affecting customer orientation in grade 8 municipalities in Fars. These factors include internal marketing as an exogenous variable and job satisfaction and organizational commitment that affect customer orientation both directly and indirectly. Reviewing the research literature, definitions of variables will be provided and then the

relationship between these variables will be discussed in the next section

1.1. Conceptual model of research:

To express the relationship between variables, conceptual model was used in this study. This model which is an adaptation of Liao research (2009) is shown in Figure 1.

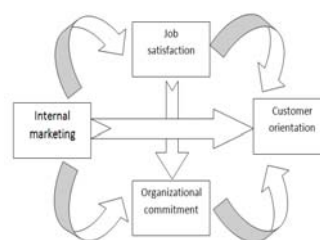


Fig 1: Conceptual model of research

2.1. Research background and hypotheses:

1.2.1. Internal marketing:

Internal marketing concept is rooted in the growth of service industries in the 1980s which was done in order to increase the quality of service sectors through surveying and monitoring the service delivery mechanism which is the staff. Internal marketing is based on the fundamental assumption that service providing in an effective and efficient

manner requires motivated and customer-oriented (Gronroos, 1981). This branch of marketing science is largely influenced by the quality management and marketing of services and emphasizes on importance and necessity of creating quality throughout the process of service providing. Internal marketing discusses the relationship between internal customers and suppliers of the organization in creating value for external customers. This can be manifested as a value chain and a tool to develop the quality of products and services and also interorganizational and intraorganizational relations (Ling, 2000). Next studies not only emphasized on the relationship between customer satisfaction and employee but also expanded the scope of internal marketing. In addition to the above relationship, it has been mentioned that employees are the internal customers of company and internal marketing was defined as considering the employees as internal customers and jobs were defined as internal products that provide the needs of internal customers in order to meet the goals of company. Internal marketing is the philosophy of treating employees like customers and design job activities so that they are consistent and compatible with human needs (Ahmed & Rafiq, 1995). Gronroos (1981) stated that the purpose of internal marketing is to get employees who are motivated and understand the customer. Finally, Liao defines the internal marketing as benefiting from a marketing method for managing all activities within the organization in order to create a more efficient internal environment and finally achieve the principle of customer orientation by employees. So, definitions and concepts of internal marketing in this study are known as processes that deal with entrustment of jobs, activities, views, strategies, etc to employees using internal marketing and state that understanding of internal marketing concept by employees is equal to employees' awareness of all activities undertaken by the organization in the field of internal marketing. Parasuraman & Berry (1991) believed that internal marketing is a process including employment, training, encouragement, and maintaining of competent employees through the provision of appropriate facilities that meet their needs.

1.1.2.1. Job satisfaction:

Job satisfaction is a complex concept that can have different meanings for different persons. Job satisfaction is often closely associated with the concept of motivation and is a pleasurable emotional state that a person obtains from doing a work. Job satisfaction is of a great importance, especially in service organizations, because job satisfaction is one of the reasons that motivate the staff to provide better services to customers (Hartline & Ferrell, 2001). Job satisfaction can be the result of the employees'

investigation of their job or considering various aspects of job such as payments, benefits, leadership style, and communications (Burke, 1999). Consequently, internal marketing is essential to employ, motivate, encourage, and satisfy these employees. So, the first hypothesis can be stated as follows: Internal marketing has an impact on job satisfaction

2.1.2.1. Organizational commitment:

Porter *et al* (1974) raised organizational commitment as a one-dimensional structure and defined it as the loyalty of a person to an organization and his/her contribution in that organization. Mowday *et al* (1979) also defined organizational commitment as loyalty and contribution of a person to an organization. Hogg (1996) stated that internal marketing means to manage human resources through attraction and marketing and finally the expectation of increasing loyalty of employees to the organization and could be a way to increase employees' commitment to the organization. Also, it has been stated that internal marketing means the commitment of employees to the organization and implementation of marketing plan. Correct and successful application of internal marketing certainly affects the performance of employees and can lead to organizational commitment (Pierce and Morgan, 1994). So, the second hypothesis can be stated as follows: Internal marketing has an impact on organizational commitment of employees.

3.1.2.1. Customer orientation:

The term *Customer orientation* has same meaning as considering the market, customer priority, and awareness of customer and can be used interchangeably. Narver & Slater (1990) stated that customer orientation means to direct and guide customer to understand the customer value chain in progressing and future transactions. Katle & Armstrong (1991) defined internal marketing as doing the act of customer orientation by the staff which is achieved by training and motivating frontline staff (line) and support staff (Staff) to do teamwork. So, the third hypothesis can be stated as follows: Internal marketing has an impact on customer orientation.

4.1.2.1. Forth hypothesis: Dose Job satisfaction has an impact on customer orientation?

Siguaw *et al* (1994) found that job satisfaction is not relevant to customer orientation. According to Hoffman & Ingram (1992), job satisfaction is preferred to customer orientation. A study by Kelley (1992) also showed there is a job satisfaction and customer orientation. Curkovic *et al* (2000) stated that employee's satisfaction is effective in customer oriented behaviors in the workplace. So, satisfied employees are more likely to have a better

mode and treat customers more considerately. Hence, keeping employees satisfied with their jobs creates customer oriented behaviors among employees (Gronroos, 1989). So, the fourth hypothesis can be stated as follows: Job satisfaction has an impact on customer orientation.

5.1.2.1. Fifth hypothesis: Dose Organizational commitment has an impact on internal marketing?

Without loyal employees, it is not possible for a company to have loyal customers (With a long-term relationship) (Reicheld, 1996). The main nature of customer orientation is exactly this: A long-term relationship with customers. Generally, committed employees work harder and more and are more willing to put more time to work, try more, and use their talents to the benefit of their organizations (Parasuraman, 1987). Consequently, a long-term relationship with customers can be achieved by committed workforce in a long term (Boshoff & Allen, 2000). So, the fifth hypothesis can be stated as follows: Organizational commitment has an impact on internal marketing.

6.1.2.1. Sixth hypothesis: Dose Job satisfaction has an impact on commitment of employees to their organization?

Many research have been done on the relationship between job satisfaction and organizational commitment indicating that employees who are more satisfied with their job and organizations are more eager to remain in the organization, are more efficient, offer higher quality services, are more committed to the results of organizational performance, and make the customers more satisfied (Wagner, 2006). Research about the jobs that dealing with providing services show there is a positive relationship between job satisfaction and the quality services provided by employees. Employees who are more satisfied with their jobs offer better services to customers (Malhotra & Mukherjee, 2006). When managers treat their employees well, employees will consequently treat customers well and probably increase their commitment to the organization when they feel organization's commitment to themselves (Fuller et al, 2003). Recent research also shows that job satisfaction of employees affects organizational commitment of employees and their willingness to stay in the organization. Hence, it can be stated that there is a direct relationship between job satisfaction and organizational commitment of employees (Caykoylu et al, 2007). It is likely that job satisfaction of employees affect their commitment to the quality of services. However, Bateman & Strasser (1984) stated that there may be an inverse relationship. On the other hand, Curry et al (1986)

stated that there is no relationship between these two concepts. So, the sixth hypothesis can be stated as follows: Job satisfaction has an impact on commitment of employees to their organization.

7.1.2.1. Hypothesis 7, Hypothesis 8, Hypothesis 9

Understanding the role of job satisfaction and organizational commitment of employees in an organization is essential to fully understand the relationship between the structures in this study. So, explaining that whether the levels of job satisfaction and organizational commitment mediates the exercise of effect of internal marketing on the principle of customer orientation or not can be of great importance. Additionally, job satisfaction may cause interruption in the relationship between customer orientation and internal marketing. This means that internal marketing may affect customer orientation through influencing job satisfaction and organizational commitment. In other words, employees who have a better understanding of the internal marketing will have a greater job satisfaction and organizational commitment. This will ultimately lead to behaviors that are more customer-oriented (Liao, 2009). In addition to direct effects of variables stated in the model and explained in the above hypothesis, indirect effects (the intermediate effect) of variables job satisfaction and organizational commitment as a mediator between internal marketing and customer orientation are expressed in hypotheses 7 and 8 and intermediate effect of job satisfaction among variables internal marketing and organizational commitment is also expressed in hypothesis 9. Hypothesis 7: Internal marketing has an impact on customer orientation considering job satisfaction. Hypothesis 8: Internal marketing has an impact on customer orientation considering organizational commitment. Hypothesis 9: Internal marketing has an impact on organizational commitment considering job satisfaction.

2. Material and Methods:

Based on library research, theoretical foundations of research were defined at first. Data were collected from the answers of the respondents to the questions of a questionnaire containing demographic questions (gender, age, education level, and work experience) and 25 specialized questions. This questionnaire was adapted from a study by Liao (2009) with some modifications. Likert scale from completely disagree (1) to completely agree (5) was used in this questionnaire. Lisrel software was used for confirmatory factor analysis and path analysis. In order to confirm the validity of questionnaire, questionnaire was sent to some of experts and their evaluation of each question and hypotheses were asked. Finally, its face validity was confirmed by applying the comments. Since the structural

equations method was used in this study, it was also necessary to use confirmatory factor analysis at first. To determine the reliability of the questionnaire, a sample of 30 employees was selected and then its reliability was accepted by calculating Cronbach alpha coefficients ($\alpha=0.849$). Since the objective of the present study was to identify the impact of internal marketing on customer orientation in the grade 8 municipalities in Fars, the employees of these municipalities formed the study population, because they directly provide services to customers and clients. There are a total of 310 employees in the grade 8 municipalities in Fars. The sample size was 153 persons in this study and sampling was done by stratified random sampling.

1.2. Data analysis:

Structural equations method is one of the strongest and most appropriate methods of analysis in the behavioral sciences and social sciences. Analysis of covariance structures or causal modeling or structural equations model is one of the main methods to analyze the structure of complex data. Conformity factor analysis tests the hypotheses. This analysis is part of the measurement model which deals with the observed relationships between variables and factors. Conformity factor analysis is a hypothesis test model, in which the researcher begins his/her analysis with a previous hypothesis. This model which is based on a strong theoretical and empirical foundation, determines that which variables are correlated with which factors. Conformity factor analysis was done in this study and then structural equations model was run to investigate and test hypotheses within the research proposed model. According to Hair criterion (2010), conformity factor analysis has an acceptable fitness for this research.

2.2. Model analysis:

According to the output of Lisrel software, the main presented model is as follows, in which the relationships between variables (the measurement model and structural model) are shown. (Explanation: Since there were three questions for the variable *job satisfaction* in the questionnaire, this variable was not classified like others and all three questions directly used in the model analysis. So, Js1, Js2, and Js3 denote question first, question second, and question third in terms of job satisfaction). According to the indices expressed in Table 1, it can be said that the model has an acceptable fitness. So, confirmation or rejection of hypotheses can be studied based on output model. In the analysis of structural equations model, each hypothesis is tested within a direction. Directions among the variables indicate the research hypotheses. After approval of the overall fitness of model, the value of the statistic *t* for each path indicates that the corresponding hypothesis is

confirmed or not. If the absolute value of statistic *t* is greater than 2.093, the hypothesis will be found significant or confirmed. Table 2 shows that 7 hypotheses are confirmed and 2 hypotheses are rejected.

Table 1: Fitness indices of analysis model path

Index	Appropriate criteria	Index value
(Chi-Square)	Chi-Squared(χ^2) --	94/2 (P = 0.0571)
Root mean square of remaining	RMR < 0/05	0/051
GFI (Goodness of Fit Index)	GFI > 0/9	0/91
Adjusted Goodness of Fit Index (AGFI)	AGFI > 0/9	0/87
RMSEA	RMSEA < 0/05	0/064
Normalized fitness index (NFI)	NFI > 0/9	0/91
Comparative fitness index (CFI)	CFI > 0/9	0/92
Increasing fitness index (IFI)	IFI > 0/9	0/93

Table 2: A Summary of hypotheses

Hypotheses	Hypotheses concerning	Fat Efficient	T-value	Confirmed rejected
H1	Internal marketing → Job satisfaction	0.65	4.93	Confirmed
H2	Internal marketing → Organizational commitment	0.32	3.1	Confirmed
H3	Internal marketing → Customer orientation	0.51	2.3	Confirmed
H4	Job satisfaction → Customer orientation	0.33	2.27	Confirmed
H5	Organizational commitment → Customer orientation	0.08	0.37	rejected
H6	Job satisfaction → Organizational commitment	0.67	6.45	Confirmed
H7	Internal marketing → job satisfaction → Customer orientation	0.214	---	Confirmed
H8	Internal marketing → Organizational commitment → Customer orientation	0.025	---	rejected
H9	Internal marketing → Job satisfaction → Organizational commitment	0.435	---	Confirmed

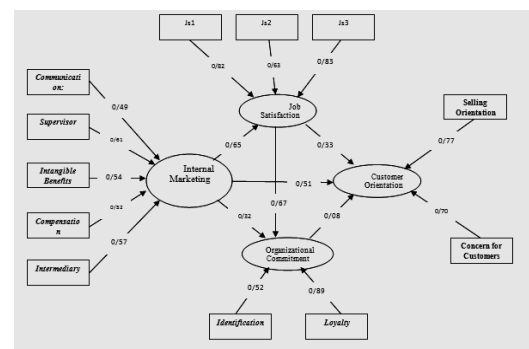


Fig 2: Results of model analysis

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9/20/2012

1- According to Interior Ministry regulations, Iran's municipalities are divided into 12 ranks, from the smallest municipality with 2 staff which ranks 1 to the biggest one which ranks 12. Three main criteria are considered for the ranking of municipalities including regular and net income of municipality, population, and position in terms of divisions. Grade 8 municipalities of Fars Province studied in this paper are the municipalities of Fasa, Firoozabad, Neyriz, Abadeh, and Lar.

Investors Behaviour and Information Asymmetry: an Experimental Research in Iran

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Abstract: Voluntary disclosure reduces information asymmetry between investors and stakeholders. In this study, to evaluate different decision-making styles, a cognitive and behavioural model is used. The field of this research are in the Processing "Brunswick Leans Model" is placed in behavioural accounting. This research uses a quasi-experimental method. The research is conducted in 2012 in Tehran Stock Exchange (TSE.). For purposes of this study, an Experimental group (176 respondents) and a control group (158 respondents) is divided into four new ones, which represent the four dominant styles of decision-making, namely directive, analytical, conceptual, and behavioural. As an addition, investors are divided according to their brains' dominant style of decision-making and cognitive complexity so that uncertainties about the tolerance level are classified. Evidence shows that those who have their left brain as more dominant are likely to use more items, on average, to process information. As an addition, Behavioural decision-making style uses lowest items to process information than other styles. Indeed, the results show that all styles in the Experimental group have less information asymmetry than the control group. These findings support the voluntary disclosure of information by companies to reduce the level of information asymmetry that the market offers.

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Keywords: Voluntary disclosure, decision styles, lens processing model, information Asymmetry.

1. Introduction

Information asymmetry occurs when one or more investors possess private information about a firm's value. Asymmetry creates an adverse selection problem in the market as informed investors' trade on the basis of their private information. These trading activities manifest themselves as unusually large imbalances in the observed order flow; therefore, the extent of information asymmetry among investors can be characterized as the probability that a particular buy or sell order comes from an investor with private information. In this section, a firm's choice of disclosure quality that potentially influences the level of information asymmetry is discussed. This study combines the foundations of information asymmetry, information overload theory and the decision style theory to address a current problem. The environment in which investors must make decisions is rich with complex information about numerous investment opportunities. Unstructured information environment, such as voluntary disclosure, can affect an investor's decision-making patterns. Many studies have

documented the negative effects, which are resulted from a decision maker's attempt to process more information than what is cognitively possible. Another study (Barber & Odean, 2008) finds that individual investors buy attention grabbing stocks. Those are the stocks that were in the news and experienced high abnormal trading volumes as well as extreme one-day returns. The researchers theorize that investors do not have the time to analyse all investment opportunities, therefore, they filter their search to the stocks that grab their attention. Consistent with this do-it-yourself trend, a recent study on investor decision-making reveals that accounting information is the most influential factor, followed by self-image/firm-image confidence, neutral information, advocate recommendation and personal financial needs (Al-Tamimi, 2006).

One of the ways for disclosure quality to affect information asymmetry is by altering the trading behaviour of uninformed investors. According to the Investor Recognition Hypothesis (Merton, 1987), such investors are more likely to invest and trade in firms that are well known or that

they judge favourably. If higher disclosure quality increases a firm's visibility and/or reduces the costs of processing the firm's specific public information, then, higher disclosure quality will induce more trading in the firm's stock by uninformed investors. Fishman and Hagerty (1989) make a similar argument.

While a higher intensity of uninformed trading reduces the probability of trading against a privately informed investor, *ceteris paribus*, prior research indicates that greater uninformed trading attracts more informed trading. Kyle (1985) demonstrates that the amount of informed trading varies proportionately with the expected amount of uninformed and liquidity-based trading. The net result is that the relative amount of informed trading remains unchanged even as the expected amount of uninformed trading changes. However, to the extent that informed traders are risk averse and capital constrained, it is expected that the relative amount of informed trading will fall as uninformed trading increases. Accordingly, higher disclosure quality will be associated with relatively less informed trading, which, in turn, will reduce information asymmetry. Prior empirical literature also suggests that disclosure quality will be negatively related to the frequency of private information events. Gelb and Zarowin (2002) as well as Lundholm and Myers (2002) find that current stock returns reflect more information about future earnings when disclosure quality is higher. These results imply that by "bringing the future forward," which means that more informative disclosures reduce the total set of information about future earnings that can be privately discovered about a firm. Since there is less information available to be discovered, in addition to the reduced search incentives discussed above, it is expected that the frequency of private information events will be declining in disclosure quality. The remainder of this paper is organized as follows. Section 2 contains a literature review while the research design is outlined in Section 3. Finally, the sample selection and descriptive statistics are provided in Section 4, followed by the empirical results in Section 5.

2. Literature Review

2.1. Information Asymmetry Studies

It is often argued that firms might find it advantageous to provide additional pieces of information (i.e., voluntary disclosure) to investors and analysts through annual reports. This statement is based on the notion that information asymmetry between firms and (potential) investors, due to a low level of disclosure, increases cost of capital by introducing 'adverse selection' between buyers and sellers of the firms' shares. The practice of 'adverse selection' tends to reduce liquidity in firms' shares

(Copeland & Galai, 1983; Glosten & Milgrom, 1985). In order to attract investors, firms with limited liquidity must issue shares with a (substantial) discount. This discount reduces funds firms receive from the issue, and, thus, increases the cost of capital. By disclosing more information, firms are likely to reduce information asymmetry and, hence, attracting extended interests (liquidity) in the firms' shares, which leads to lower cost of capital (Diamond & Verrecchia, 1991). Higher liquidity is regarded as an indication that a firm's shares has become a more popular investment object due to the higher level of information disclosed by firms (Leuz & Verrecchia, 2000). In this respect, it is desirable for a firm that its shares are liquid, so the firm is not constrained in its use of the stock market (Healy, Hutton & Palepu, 1999; Lang & Lundholm, 1993). Furthermore, empirical research indicates that increased liquidity results in lower information asymmetry and cost of capital (Botosan, 1997; Botosan & Plumlee, 2002; Diamond & Verrecchia, 1991; Leuz & Verrecchia, 2000).

Botosan and Plumlee (2002) create three disclosure indices based on information from the annual report, other publications and investor relations. They find that, which is contrary to expectations, the overall disclosure level is not associated with a lower cost of equity capital. However, the coefficient on the annual report score is significantly negative.

Sengupta (1998) measures the cost of debt over a three-year period, averaging the score for three consecutive years. He provides evidence that firms with high disclosure quality ratings from financial analysts enjoy lower costs of issuing debt. Using a sample of 173 new private debt issues, Mazumdar and Sengupta (2005) find that companies with consistently high ratings for voluntary disclosures have lower cost of debt. Healy et al. (1999) analyses whether firms benefit from expanded voluntary disclosure, by examining changes in capital market factors associated with increases in analysts' disclosure ratings for 97 firms. Their findings suggest that a higher disclosure rating is followed by increases in stock liquidity, stock returns, institutional ownership and analyst following.

Finally, Bailey, Karolyi and Salva (2005) evaluate the economic impact of the increased disclosure faced by non-U.S. firms when they list their shares on the U.S. markets. They find that there are increased volatility and volume reactions to earnings announcement after their U.S. listings. In addition, they find that individual firms' disclosure environment, rather than changes in its market liquidity, ownership or trading venue, explains their findings. In conclusion, relevant studies based on

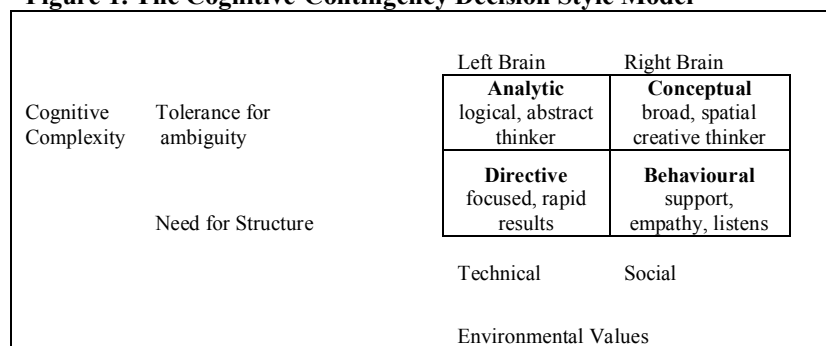
U.S. data, generally, indicate a negative association between the level of disclosure and estimates of the cost of capital. The studies on European data indicate that the level of disclosure is negatively associated with proxies for information asymmetry and cost of capital.

2.2. Decision Style and Lens Model and behavioural accounting Studies:

Rowe & Boulgarides (1983) defined a cognitive and behavioural model which indicates four decision styles, which are determined by classification into two dimensions: high cognitive complexity (thinking) or low cognitive complexity (action) and brain hemisphere dominance (either task or people

orientation). Cognitive complexity measures a person's capacity to cope with information. Cognitive complexity has also been equated to tolerance for ambiguity because these individuals are able to deal with information that is not sorted or structured. The other dimension in decision style according to this model is the brain dominance or the side of the brain with which people process the information. Brain dominance research helps towards the understanding of the dimension of decision-making style. The left side of the brain is the logical hemisphere. It focuses on the more technical aspects of the world. Conversely, the right side of the brain concentrates on the spatial, visual, or social aspects of our environment (Figure1).

Figure 1. The Cognitive-Contingency Decision Style Model



Rowe & Boulgarides (1983)

Vasarhelyi (1977) uses an instrument of his own design to classify subjects between analytic and heuristic. He defines cognitive style as how a person organizes information. He uses a panel of judges to review the subject's analysis of financial planning cases in a laboratory experiment. He finds that the participants in a group, which he calls analytics, use more information in their decision process and enjoy using the computer for planning more than the group, which he calls heuristics. However, both groups perform equally well.

Pratt (1980) criticizes the study by McGhee, Shields, and Birnberg (1978) because of its adverse findings. They point out several problems with the study, including the fact that the sample size is very small, which is only 24. Furthermore, they point out that the subjects have to make a large number of decisions in an unreasonably small amount of time. In addition, because the order of cue presentation is not randomized, the time pressure may have caused the first cues to be more heavily weighted than the latter cues (Payne, 2010).

Most of the early behavioural decision making research in accounting was conducted using lens model paradigm. Using the Brunswick (1952) lens model as an analytical framework, human

judges have been viewed as making decisions, judgments, or predictions based on a set of explicit cues or pieces of information. These judgments are made in an environment which is probabilistically related to a relevant environmental event or criterion (Libby and Lewis [1977]). Such studies examine subject's abilities to combine multiple cues into an overall judgment. For example, Ashton (1974) investigated the cue utilization, consistency over time, and consensus of auditors' judgment of hypothetical internal control systems. In this study 63 participating auditors were asked to judge the strength of an internal control in a payroll system based on six preanswered questions (cues) related to internal control evaluation. The experiment was conducted twice. The time interval between the experiment administrations ranged from forty-three to ninety-four days. Ashton concluded that the judgments of the sixty three auditors were found to exhibit a fairly high level of consensus and consistency over time. Ashton and Brown (1979) and Ashton and Karner (1980) replicated Ashton (1974) study.

That led the two authors to suggest that if the objective of the research is to study judgment in general for the purpose of facilitating and improving such judgments in practical situations, then using

students as surrogates is justifiable. However, if the objective of the research is the direct implementation of judgment policies, then it's desirable to use actual auditors as subjects. Other studies have used similar research design to investigate other issues. For example, Boatsman and Robertson (1974), Moriarity and Barron (1976, 1979), Hofstetd and Hughes (1977), and Firth (1980) examined materiality judgments of auditors. Joyce (1976) analysed auditor's allocations of time to categories of audit work related to accounts receivable. Krogstad et al. (1984) investigated materiality assessments for a proposed adjustment to the allowance for bad debt of a hypothetical company.

The introduction of lens model and policy capturing research in the mid 1970's has been a significant contribution to the auditing literature. This line of research has introduced new research techniques and methodologies to the literature and played a major role in the acceleration of the behavioural research in auditing. However, lens model and policy capturing studies have been criticized of focusing on the overall judgment while ignoring the mental processes that produce this judgment and the alternative information processing methods. Therefore, one major flaw of this line of research is that it views decision maker as a "black box". It assumes that the decision maker consider all available information in his judgment. However, the implication of different mental processes associated with different decision strategy can be an important factor that influence the decision outcome. For example Payne (1975) examines the hypothesis that people in response to complexity employ a simple non- compensatory decision strategy. Payne found that when subjects faced with two alternatives, they are more likely to employ search strategy consistent with compensatory decision process. However, when they are faced with six or eight alternatives, they are more likely to employ search strategy consistent with conjunctive or elimination by aspect decision process.

3. Research Design and Methodology

3.1. The Instrument

This experiment is organized as follows. Respondents are provided with 23 items of financial and non-financial reporting of Experimental Corporation (SAIPA Co.). Saipa co. is a big car manufacturer and is accepted in Tehran Stock Exchange (TSE). Information on Saipa Co. contains 16 items about voluntary discloser and 7 items about financial statements. After completing the demographic questions, respondents are presented with background information on Saipa Co., which represents a potential investment opportunity. Then,

they are allowed to choose from a menu of available information (balance sheets, statements of operations, statements of stockholders' equity, statements of cash flows, notes to the financial statements, analysts' estimates, the stock's current beta, historical stock prices and trading volumes and various financial ratios as well as other voluntary disclosure information. They are given the opportunity to view each piece of information as long as they like and return to a piece as many times as they like. They are, then, required to enter a hypothetical investment amount from \$X. The instructions explain that their alternative investment is a free risk option yielding and that they should assume as if they were investing in a normal economy and a normal market. After the investment is entered, respondents are asked to rank the information pieces that they viewed according to how much these information influence their investment decision. Finally, the respondents are asked to complete the 20 questions in the Decision Style Inventory (Rowe & Boulgarides, 1983), which determine their level of intensity for each of the four decision styles.

A pilot study is conducted among the faculty and staff at Islamic Azad University, Science and Research branch for the purpose of determining the reliability of the data. 43 people respond to the solicitation and go through the experiment. These respondents are asked to provide feedback on any problems that they encounter in the experiment and any problems they have in understanding the questions or instructions. All suggestions from this study are addressed.

The instrument chosen is Alan Rowe's DSI. Rowe and Associates have created an instrument for classifying humans according to their decision-making styles. They call the instrument as the Decision Style Inventory (DSI). The DSI was created based on the classifications in the Cognitive-Contingency Decision Style Model. This model refines the role/operative style shift of the Driver model to style dominance. The objective of the instrument, which the authors use in studying decision styles, is to examine the factors that contribute to a job's success and, in turn, job satisfaction. The DSI is chosen because it appears to capture the importance of complexity of the environment and the cognitive complexity of the decision-maker as stated in a study by Schroder, et al. (1967). The DSI instrument has been found to have well over 90% face validity when conducting follow-up interviews of respondents (Mann, 1982, as cited in Ideation & Starbird, LTD, 1990). Furthermore, Test-Retest reliability with using of Pearson-baron rate has been reported at 73% consists with other prior

researches (Rowe & Boulgarides, 1983, as cited in Ideation & Starbird, LTD, 1990).

3.2. Subjects and sample selection

The Subjects of experiment are professionals investors in Tehran Stock Exchange (TSE), who are investing and accounting professionals (security registered representatives, stock brokers, Iranian Certified Public Accountants (ICPA), Certified Financial Planners (CFP), Chartered Financial Analysts (CFA) as well as professors of accounting and finance in the Iran universities.

$$n \geq \frac{N Z_{\alpha/2}^2 \times P(1 - P)}{(N - 1)\epsilon^2 + Z_{\alpha}^2 \times P(1 - P)} = 150$$

According to kokran formula, at least 150 respondents should be selected for each experimental and control group, therefore, 595 Questioners are distributed among each member of the sample. Finally, 176 and 158 Questioners are collected from the experimental and control group respectively. Number of Questioners is summarized at Table 1:

Table1. Descriptive Statistic for Research Tool

Statistic for Questioners	Control group		Experimental group	
	percentage	number	percentage	number
Total sent	100	280	100	315
Total returned	66.43	186	67.62	213
Non-complete Questioners Out of 3.5 standard division	5.71	16	8.89	28
Useable Questioners	4.28	12	2.86	9
	56.43	158	55.87	176

3.3. Variables Measuring

Information Asymmetry Index: applied a fuzzy model

Information asymmetry of one decision-making style is an Average dispersion prices estimated by decision-makers (Piterson & plonberg, 2006).

$$AsymDisc_j = \sigma(Average(P_{is}))$$

Whereas:

P_{is} : Estimated Stock price by investors i with style s .

A fuzzy sets approach is used to estimate Information asymmetry index (Ahlers, David M., and Vithala R. Rao, 1977, 1976, and 1978). Therefore, each investor is asked on estimated three prices: high (H), mod (M), and low (L). so we will have:

for $L \leq Z \leq M$

for $M \leq Z \leq H$

All of them are defined for $H-L \geq 2$

$$Average = \frac{1}{3}(H + M + L)$$

$$Variances = \frac{1}{18}(L^2 + M^2 + H^2 - LH - MH - ML)$$

Decision Styles

In measuring a person’s decision style, DSI is used. The instrument determines one’s preferences when responding to a series of 20 statements. Each question of the DSI instrument has four possible answers. The answers are most like you, moderately like you, slightly like you, or least like you. The questions are weighted exponentially. The *most like you* answer is weighted 8, the *moderately like you* answer is weighted 4, the *slightly like you* answer is weighted 2, and finally the *least like you* answer is weighted 1. Each answer can only be used once. The responses are ordered by decision style. The first response is the directive, the second is the analytic, the third is the conceptual and, finally, the fourth is behavioural. The responses are put in columns and summed to obtain the level of dominance of each style. The total for each question is 15 (sum of 8, 4, 2, 1) and the total for the whole instrument is 300 (20 times 15). The maximum possible score for any one style is 160 (20 times 8) and the minimum is 20 (20 times 1) (Rowe & Boulgarides, 1983).

4. Hypothesis and Empirical Results

4.1. Descriptive statistic

Table 2 reports the most dominant decision styles of the investors. The most common decision style is directive style, which is 36.93% and 36.08% for Experimental and Control group respectively.

$$f(z) = \left\{ \begin{aligned} &= \left[\frac{2}{H-L} \left[\frac{Z-L}{M-L} \right] \right] \\ &= \left[\frac{2}{H-L} \left[\frac{H-Z}{H-M} \right] \right] \end{aligned} \right\}$$

Table2: Investors by Most Dominant Decision Style

Dominant Style	Control group		Experimental group	
	percentage	number	percentage	number
Directive	34.18	54	36.93	65
Analytic	36.08	57	32.95	58
Conceptual	14.55	23	18.18	32
Behavioural	15.19	24	11.94	21
Total	100	158	100	176

Each respondent’s analytic and directive cores are combined to determine the level of left brain dominance. Respondents with scores of over mean (=162) are classified as left brain dominant. Likewise, each respondent’s conceptual and behavioural scores are combined to determine the

amount of right brain dominance. Respondents with a score of over 138 are classified as right brain dominant. Two of the respondents' scores are from the Experimental group while seven of the respondents' scores are from the control group and the scores for both groups are even (162/138), which means that neither side is dominant. Table 3 summarizes these numbers.

Each respondent's analytic and conceptual scores are combined together while the directive and behavioural scores are combined with each other to determine the level of cognitive complexity. A combined analytic/conceptual score of over mean (=152) is classified as more cognitively complex while a combined directive/behavioural score of over 148 is classified as less cognitively complex. Five of the respondents' scores come from the Experimental group and one of the respondents' scores is from the control group and is even (152/148), which means that neither group has high or low complexity. Table 3 summarizes these numbers.

Table3: Investors by Most Dominant Combined Decision Style

Combined Dominant Style	Control group		Experimental group	
	percentage	number	percentage	number
Left brain dominant	49.67	75	47.70	83
Right brain dominant	50.33	76	52.30	91
More cognitively complex	49.04	77	52.05	89
Less cognitively complex	50.96	80	47.95	82

Hypothesis about Information Processed by Investors

The literature has shown that the more complex decision styles (Analytic and Conceptual) and Left Brain dominant styles (Analytic and Directive) are less likely to suffer from information overload than the less complex decision styles (Directive and Behavioural). Rowe and Mason (1987) find that the left brain dominant styles (Analytic and Directive) focus on the task in a decision environment. Therefore, they perform better in the area of finance than the right brain dominant styles (Conceptual and Behavioural) so these styles process more firm voluntary disclosure than others. This premise tested in an investing environment should answer the question as to how many information pieces an investor will view before making a decision. Therefore, it is hypothesized as follows:

H1: There is a significant relationship between investor's dominant styles and mean number of firm's voluntary disclosure items viewed.

Hypothesis H1 is subtracted to three sub-hypothesis H1a, H1b, and H1c:

H1a: Analytic and Directive (Left Brain) decision styles will have a higher mean number of firm's voluntary disclosure items viewed than Conceptual and Behavioural (Right Brain) styles.

H1b: Analytic and Conceptual (More Complex) decision styles will have a higher mean number of firm's voluntary disclosure items viewed than Directive and Behavioural (Less Complex) styles.

Hypothesis H1a is tested using two methods. First, it is tested by comparing the mean number of items viewed by each of the two groups.

$$\begin{cases} H_0 : \mu_{left} \leq \mu_{right} \\ H_1 : \mu_{left} > \mu_{right} \end{cases}$$

Before the mean compared measurer, the "Levin" test is done and Fisher'F statistic is reviewed.

$$\begin{cases} H_0 : \sigma_{left}^2 = \sigma_{right}^2 \\ H_1 : \sigma_{left}^2 \neq \sigma_{right}^2 \end{cases}$$

Hypotheses H1a and H1b are tested using two methods. First, it is tested by comparing the mean number of items viewed by each member of the two groups. The respondents are grouped according to their brain dominance as determined by their DSI scores. An independent sample t-test, with the number of items viewed as the test variable and brain dominance as the grouping variable (Left or Right Brain), is run. The results reveal that from the 23 (16 items for voluntary disclosure) items available, the left brain dominant styles actually view more items (mean = 14.53) than their right brain dominant counterparts (mean = 13.04) (Table4). Therefore, H1a is supported and it should be noted that the difference between the two means is statistically significant, which is at 0.05 (sig=0.992).

Also, for testing H1b, cognitive complexity as the grouping variable (more or less complex), is run. The results reveal that from the 23 (16 items for voluntary disclosure) items available, the more complex styles actually do not view more items (mean = 13.77) than their less complex counterparts (mean = 13.76) (Table 4). Therefore, H1B is not

supported. However, it should be noted that the difference between the two means is not statistically significant, which is at 0.05 (sig=0.992).

Table 4: Amount of Voluntary Disclosure processed by different decision styles

Style	N	Mean	Std. Deviation	Std. Error Mean	Levene's Test F_Fisher	t	df	Sig. (2-tailed)
Left	83	14.5301	4.91225	.53919	.366	2.056	172	.041
Right	91	13.0440	4.62100	.48441				
More	89	13.7753	4.69708	.49789	.187	.010	169	.992
Less	82	13.7683	4.91734	.54303				

***, **, * Significant at 1%, 5%, 10% level respectively.

Additionally, a one-way ANOVA test, with number of items viewed as the dependent variable as well as decision style (directive, analytical,

conceptual, and behavioural) as the factor, is run. The results (Table 5) reveal no significant difference between the decision style groups (sig=0.251). This lack of variance in use of information among the four decision styles fails to support hypothesis H1.

Table 5: Analysis of Variance of Number of amount of Voluntary Disclosure processed by Decision Style

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	97.641	3	32.547	1.378	.251
Within Groups	4061.245	172	23.612		
Total	4158.886	175			

Table 6 shows the results of a LSD test, which compares each style to the other three. There are no significant differences between most of groups but we have a significant difference between behavioural styles and directive and analytical styles.

Table 6: Multiple Comparisons in amount of Voluntary Disclosure processed by different Decision Styles

(I) style	(J) style	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Directive	analytical	.33103	.87770	.707	-1.4014	2.0635
	conceptual	.43125	1.04935	.682	-1.6400	2.5025
	behavioural	2.44762**	1.21969	.046	.0401	4.8551
Analytical	directive	-.33103	.87770	.707	-2.0635	1.4014
	conceptual	.10022	1.07003	.925	-2.0119	2.2123
	behavioural	2.11658	1.23753	.089	-.3261	4.5593
Conceptual	directive	-.43125	1.04935	.682	-2.5025	1.6400
	analytical	-.10022	1.07003	.925	-2.2123	2.0119
	behavioural	2.01637	1.36464	.141	-.6772	4.7100
Behavioural	directive	-2.44762**	1.21969	.046	-4.8551	-.0401
	analytical	-2.11658*	1.23753	.089	-4.5593	.3261
	conceptual	-2.01637	1.36464	.141	-4.7100	.6772

***, **, * Significant at 1%, 5%, 10% level respectively.

Since the number of observations in behavioural style test is less than 30 cases, Therefore, Kruskal-Wallis test (test H) is used to test for significant mean differences. The results of this test are shown in Table 7.

Kruskal-Wallis test results also confirm the statistical findings of the one-way ANOVA test.

Because χ^2 and sig of this test are 3.970 and 0.265 respectively, the evidence to reject H0, which is based on the equal to average amount of information processed by the different styles, cannot be provided.

H1c: Behavioural styles will have a lowest mean number of firm's voluntary disclosure items viewed than other styles.

Table 7. H -test results about different styles of decision making in terms of information processing

Style	N	Mean Rank	Statistic	Amount
Directive	65	94.56	Chi-Square	3.970
Analytical	58	90.34	df	3
Conceptual	32	85.06	Asymp. Sig.	.265
Behavioral	21	69.88		
Total	176			

The Mann-Whitney Test is used to test H1c hypothesis. The results of this test can be seen in Table 8. U-test results indicate that at the 10% significance level of H0 can be rejected and the claim hypothesis is accepted. In other words, investors with behavioural style dominant use lower information than other styles in decision making.

Table 8. U - Test results about Behavioural and Other styles of decision making in terms of information processing

Style	N	Mean Rank	Sum of Ranks	Statistic	
Other style	155	91.02	14108.50	Mann-Whitney U	1.236E3
Behavioural	21	69.88	1467.50	Wilcoxon W	1.468E3
				Z	-1.790
Total	176			Asymp. Sig. (2-tailed)	.073*

***, **, * Significant at 1%, 5%, 10% level respectively

Information Asymmetry Hypothesis

Prior empirical literature also suggests that disclosure quality will be negatively related to the frequency of private information events. Gelb and Zarowin (2002) as well as Lundholm and Myers (2002) find that current stock returns reflect more information about future earnings when disclosure quality is higher. These results imply that by “bringing the future forward,” which means that more informative disclosures can reduce the total set of information about future earnings that can be privately discovered about a firm. Disclosure quality affects information asymmetry is by altering the trading behaviour of uninformed investors. According to the Investor Recognition Hypothesis (Merton, 1987), such investors are more likely to invest and trade in firms that are well known or that they judge favourably. If higher disclosure quality increases a firm’s visibility and/or reduces the costs

of processing firm specific public information, then, higher disclosure quality will induce more trading in the firm’s stock by

uninformed investors. Fishman and Hagerty (1989) make a similar argument. Therefore, the following hypothesis is put forth:

H2: Before a firm’s voluntary disclosure, there is no significant difference in terms of information asymmetry between different styles.

This hypothesis has two sub-hypotheses. To test these two hypotheses, there should be a sub-test of equality of variance tests ("Levin") between the experimental group and control group using Fisher's F statistic. It is noted that information asymmetry of one decision-making style is an Average dispersion prices estimated by decision makers. For example, information asymmetry theory is used to compare the style I and j group, which is designed as follows:

$$\begin{cases} H_0 : \sigma_{i,j}^2 \geq \sigma_{i,j}^2 \\ H_1 : \sigma_{i,j}^2 < \sigma_{i,j}^2 \end{cases}$$

H2a: before a firm’s voluntary disclosure, Analytic and Directive (Left Brain) decision styles will have a lower information asymmetry than Conceptual and Behavioural (Right Brain) styles.

H2b: before a firm’s voluntary disclosure, Analytic and Conceptual (More Complex) decision styles will have a lower information asymmetry than Directive and Behavioural (Less Complex) styles.

Test results of "Levine" test for different hypotheses are summarized in Table 9.

Table 9: different styles information asymmetry t-test and Descriptive Statistics before Voluntary Disclosure processed

Hypothesis	Style	N	Mean	Std. Deviation	Std. Error Mean	Levene's Test F_Fisher	Sig.
H2a	Left(Co.)	83	2.0253E3	226.07537	24.81500	.521	.471
	right(Co.)	91	2.0017E3	242.13810	25.38297		
H2b	more(Co.)	89	2.0417E3	227.52944	24.11807	1.083	.300
	less(Co.)	82	1.9730E3	243.01851	26.83690		

***, **, * Significant at 1%, 5%, 10% level respectively.

The results of Table 9 shows Sig "Levin" test for both hypotheses, which are 0.471 and 0.300 respectively. Because this figure is smaller than the 5% significance level, variance equality (H0) is not rejected. The Levine test results do not provide sufficient evidence to support the tests on H1. Furthermore, in 95% confidence level, the claim hypothesis is not accepted. Therefore, there is no

significant difference between different styles about information asymmetry.

H3: Voluntary disclosure by firms respect to decries information asymmetry between investors with different styles.

Information asymmetry (variance of estimated prices by investors) is used between the experimental and

control group. This hypothesis has four sub-hypotheses. To test these hypotheses, there should be a sub-test of equality of variance tests ("Levin") between the experimental group and control group using the Fisher's F statistic. It is noted that the information asymmetry of one decision-making style is an Average dispersion prices estimated by decision-makers. For example, information asymmetry theory is used to compare the style I and j group, which is designed as follows:

$$\begin{cases} H_0 : \sigma_{i,j}^2 \geq \sigma_{i,j}^2 \\ H_1 : \sigma_{i,j}^2 < \sigma_{i,j}^2 \end{cases}$$

H3a: After voluntary disclosure by firms' Analytic and Directive (Left Brain), decision styles will have a lower information asymmetry.

H3b: A voluntary disclosure by firms' Conceptual and Behavioural (Right Brain), decision styles will have a lower information asymmetry.

H3c: After voluntary disclosure by firms' Analytic and Conceptual (More Complex), decision styles will have a lower information asymmetry.

H3d: After voluntary disclosure by firms' Directive and Behavioural (Less Complex), decision styles will have a lower information asymmetry.

The results of "Levine" test for different hypotheses are summarized in Table 10.

Table 10: different styles information asymmetry t-test and Descriptive Statistics in after and before Voluntary Disclosure processed

Hypothesis	Style	N	Mean	Std. Deviation	Std. Error Mean	Levene's Test F_Fisher	Sig.
H3a	Left(Ex.)	83	2.0253E3	226.07537	24.81500	11.027	0.001***
	Left(Co.)	75	1.9534E3	357.25513	41.25227		
H3b	Right(Ex.)	91	2.0017E3	242.13810	25.38297	6.034	.015**
	Right(Co.)	76	1.9246E3	352.25747	40.40670		
H3c	More(Ex.)	89	2.0417E3	227.52944	24.11807	3.963	.048**
	More(Co.)	77	1.8864E3	260.75390	29.71566		
H3d	Less(Ex.)	82	1.9730E3	243.01851	26.83690	11.480	.001***
	Less(Co.)	80	1.9900E3	416.72922	46.59174		

***, **, * Significant at 1%, 5%, 10% level respectively.

The results of Table 10 show Sig "Levin" test for all of the above hypotheses are 0.001, 0.015, 0.048 and 0.001 respectively. Because these figures are smaller than the 5% significance level, variance equality (H0) is rejected. The Levine test results provide sufficient evidence to support the H1 tests. Furthermore, in 95% confidence level, the claim hypothesis is accepted. Therefore, there is a significant difference among the different styles on information asymmetry ex-anti voluntary disclosure by firms.

Discussion and conclusion:

Information asymmetry occurs when one or more investors possess private information about a firm's value. Asymmetry creates an adverse selection problem in the market as informed investors' trade on the basis of their private information. These trading activities manifest themselves as unusually large imbalances in the observed order flow; therefore, the extent of information asymmetry among investors

can be characterized as the probability that a particular buy or sell order comes from an investor with private information. In this section, how a firm's choice of disclosure quality potentially influences the level of information asymmetry is discussed.

Evidence shows that people with dominant left side of the brain use more items, on average, to process information. In addition, Behavioural decision-making style uses the lowest items to process information. Indeed, the results show that all styles in the Experimental group have less information asymmetry than the control group. These findings support the voluntary disclosure of information by companies to reduce the level of information asymmetry the market offers.

This finding is consistent with other decision-making style research findings. Vasarhelyi (1977) finds, in his study, that the analytics use more information than the heuristics, but donot outperform the heurists as expected. Driver and Mock (1975) find that, when the decision environment is less

complex and rapid processing is needed, less complex decision styles will outperform more complex styles. This result also seems to support the Al-Tamimi (2006) findings. He notes that, if cognitive complexity is a learnt characteristic, then, an individual's cognitive abilities should increase over time. As an addition, findings of this research about the relation between information asymmetry and voluntary disclosure are consistent with other related research findings, such as Schrand, & Verrecchia (2004) as well as Bailey, Karolyi, & Salva (2005), which state that voluntary disclosure has a negative relationship with information asymmetry.

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