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Helicobacter pylori infection and serum homocysteine in hemodialysis patient

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Abstract: Hyperhomocysteinemia is a factor that is found to be responsible for the development of atherosclerosis in the setting of chronic Helicobacter pylori (H. Pylori) infection. In the recent years, homocysteine (Hcy) has been demonstrated to be an important contributor to atherosclerosis. This study was undertaken to elucidate whether in patients with uremia on maintenance hemodialysis (HD), the infection of *H. pylori* affects the levels of Hcy. he patients were 39 HD ones with mean ages of 46±18 years. The time of hemodialysis were 30± (35) months (median: 18 months). The value of serum Hcy of all patients was 5 (±2) µmol/L (median: 4.5 µmol/L). The value of serum H. Pylori specific IgG antibody titers was 7.6 (±9.9) u/ml (median: 2 u/ml). In this study a positive correlation was found between serum homocysteine and *H. Pylori* infection. As elevation of serum Hcy is observed in the great majority (>85%) of patients undergoing maintenance dialysis, further research is needed to determine the importance of association between elevated serum homocysteine and *H. Pylori* infection. Furthermore, whether or not the treatment of *H. pylori* infection in HD patients can diminish serum homocysteine level should be elucidated.

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Key words: Hemodialysis, Homocysteine, Helicobacter pylori, Renal failure

Introduction:

Helicobacter pylori (*H. pylori*) is a bacterium that causes infection in human stomach, and often leads to gastritis or peptic ulcer (1-3). Various data indicate a possible correlation between *H. pylori* infection and coronary heart disease (4-9). The link between *H. pylori* infection and hyperhomocysteinemia is a way to determine that this organism may be involved to the development of coronary diseases (10-13). Investigators have shown strong association between hyperhomocysteinemia and inadequate vitamin intake or insufficient vitamin concentrations in plasma, particularly vitamin B6, vitamin B12 and folate levels (14, 15). Several studies have shown that H. pylori infection has negative effects on serum vitamin B12 and folate levels (16-18). Metabolism of homocysteine (Hcy) involves a complex interaction between folate and vitamin B12 (19,22). It has been well established that chronic Helicobacter pylori infection causes gastritis (3,9,10) and decreased absorption of both folic acid and vitamin B12 has been established in patients with this condition (19-22). This study was designed to examine whether in patients with uremia on maintenance HD, the infection of H. pylori affects the serum level of Hcy.

Materials and Methods:

This cross-sectional study was conducted on patients under routin hemodialysis. The etiologies of renal failure were diabetic nephropathy, hypertension, various glomerular diseases, autosomal dominant poly cystic kidney disease (ADPKD) and also urinary tract infections (23-35). According to the severity of secondary hyperparathyroidism, each patient was treated with oral active vitamin D3 (Rocaltrol), calcium carbonate, and Rena-Gel capsules at various doses. According to the severity of anemia, patients were treated with IV iron therapy Iron Source (venofer) at various doses after each dialysis session. All

patients were under treatment with 6 mg folic acid daily, oral vitamin B-complex tablet daily. Also, 2000 U IV Eprex (recombinant human erythropoietin (rHuEPO) was given to each patient after each dialysis session routinely (35-37). All study patients had various upper gastrointestinal complaints consisting of epigastric pain, epigastric burning, post prandial fullness, early satiety, bloating and belching. Exclusion criteria for patients were using of proton pump inhibitors and antibiotics or taking aluminum hydroxide jells or having any active or chronic infection before the study. After an overnight fast, blood samples were collected. Serum homocysteine (total) was measured by enzyme-linked immunosorbent assay (ELISA) method using DRG kits (DRG Diagnostics, Berlin,Germany). Serum total Homocysteine (Hcy) has a normal range of 25-125 µmol/L. Serum H.pylori specific IgG antibody titer (titer >10 U/mL was interpreted as positive according to the kit) was measured by ELISA method using Trinity Biotech Kits (USA). For the efficacy (adequacy) of hemodialysis the urea reduction rate (URR) was calculated from pre-and post blood urea nitrogen (BUN) data (38). Body mass index (BMI) was calculated using the standard formula (post dialyzed weight in kilograms/height in square meters; kg/m²) (39). Duration and amount of hemodialysis were calculated from patients' records. The duration of each hemodialysis session was four hours. For statistical analysis, the data are expressed as the Mean ± SD and madian values. For correlations we used partial correlation test. For comparison between groups, student's t-test was used. All statistical analyzes were performed using SPSS (version 11.5.00). Statistical significance was determined at a p-value lower than 0.05.

Results:

The study was conducted on 39 (female=15, male=24) maintenance HD patients. Of 39 patients, 12 were diabetic. Mean age of patients was 46 (±18) years. The duration the patients were on HD was 30± (35) months (median: 18 months). The value of serum Hcy of patients was 5 (±2) µmol/L (median: 4.5µmol/L). Mean±SD of hemoglobin and hematocrit levels of all patients were 9±2 g/dL (median: 9 g/dL), and 28±6% (median: 29%), respectively. The value of serum H. pylori IgG antibody titer was 7.6 (±9.9) U/mL (median: 2 U/mL). Serum H. pylori antibody titer in the female and male groups were 5.9 (±8) U/mL (median: 2 u/ml) and 8.7 (±10.9) U/mL (median: 2 U/mL), respectively. In this study no significant difference of serum homocysteine and H. pylori IgG antibody level between male and female group or diabetic and non-diabetic HD patients were found (p>0.05). In non- diabetic group, a significant positive correlation between serum Hcy and anti H. pylori antibody level (r= 0.77, p=0.016) was found. Also, in male group also a significant positive correlation between serum Hcy and anti H. pylori antibody (r= 0.56, p =0.028) (adjusted for age and duration and amount of dialysis) was seen. No significant correlation between serum Hcy and H. pylori - IgG antibody in all patients, female group or diabetic HD groups was seen (p>0.05).

Discussion:

Uremia represent is associated with hyperhomocysteinemia (40-42). Hcy is a sulphur amino acid drived from methionine during transmethylation, and is either salvaged to methionine by a folate and cobalamin dependent remethylation reaction or directed toward degradation by the vitamin B6-dependent enzyme cystathionine β-synthase (41-43). Various studies have shown that moderate hyperhomocysteinemia is an independent risk factor for premature atherosclerosis and cardiovascular disease (40-43). Mild-to-moderate elevations in serum homocysteine levels are observed in the great majority (>85%) of patients with end-stage renal disease who are undergoing maintenance dialysis (43-46). Deficiency of vitamin B12 raises the serum and tissue levels of Hcy (47,48). Atrophic corpus gastritis results in impaired secretion of intrinsic factor and may lead to malabsorption of vitamin B12 in the intestine (49,50). In a study conducted by Aguilera et al. on 1313 peritoneal dialysis patients showed that infection with H. pylori was associated with anorexia, inflammation, and malnutrition in their patients (48). Eradication of H. pylori significantly improves this syndrome (49, 50). In our previous studies association of H. pylori infection with serum albumin and other nutritional parameters were shown (1, 2). To test the hypothesis that, chronic gastritis induced by Helicobacter pylori causes malabsorption of vitamin B12 and folate and lead to an increase in circulating Hcy level, Tamura et al. conducted a study on 93 patients who underwent diagnostic coronary arteriography (51). Study patients were divided into two groups according to the presence or absence of H. pylori infection. The study suggests that H. pylori - induced chronic gastritis decreases plasma vitamin B12 and folic acid levels, thereby increasing Hcy levels (51). In the study carried out by Sipponen et al. a low serum level of vitamin B12 that was associated with atrophic corpus gastritis in a sample of 12.252 men (age 51-

65 years) from two cites in Finland was found (47). Of these men, 72% (128 of 179 tested) had elevated Helicobacter pylori antibody levels. They concluded that low serum levels of vitamin B12 related to atrophic corpus gastritis is relatively common (prevalence 2.5%) among elderly male patients in the general population (47). To find, whether serum vitamin B12 levels in non-vitamin B12 deficient healthy adults correlate with serological evidence of H. pylori infection, Shuval-Sudai et al. studied 133 adults with a history of H. pylori eradication. They found that the higher prevalence of H. pylori infection among participants with serum vitamin B12 level within the lower end of the normal range, suggests a causal relationship between H. pylori infection and vitamin B12 levels in healthy adults (52). Hence, there is an association between Helicobacter pylori infection, reduced cobalamin absorption and cobalamin status. Consequently, elevated homocysteine levels, could offer an explanation why H. pylori infection is associated with coronary heart disease (53-67). However, in a meta-analysis study, testing10.000 patients, revealed no meaningful correlations between H. pylori and vascular risk factors (68). It is possible that homocysteine can directly cause endothelial damage (69-75), affect platelet function and coagulation factors (69), and increase the oxidation of low-density lipoproteins (76). Indeed in the light of these findings, a number of studies have focused on H. pylori infection as a possible cause of hyperhomocysteinemia in the general population. However, in HD patients other factors are also responsible for high serum levels of homocysteine (41,77). As noted above, in the present study we found a significant positive correlation betwee serum homocysteine and H. pylori infection. It has been well established that chronic H. pylori infection causes atrophic gastritis (1-5), and decreased absorption of both vitamin B12 and folic acid has been documented in patients with this condition (1-5). Patients with chronic H. pylori infection exhibited decreased secretion of ascorbic acid by the gastric mucosa and elevated gastric pH (78,79). It has been demonstrated that low levels of ascorbic acid in gastric juice or high pH of gastric juice could cause less folate absorption from the diet (80,81). Even in dyspeptic H. pylori - positive patients who do not exhibit gastric mucosal atrophy, complete eradication of H. pylori is associated with a significant drop in serum Hcy (65). Taken together, hyperhomocysteinemia is a factor that is suggested to be responsible for the development of atherosclerosis in the setting of chronic H. pylori infection (80,81). Homocysteine has been shown to be an important contributor to atherosclerosis as mentioned. Since in HD patients we also have hypermomocysteinemia,more researches are needed to determine the importance of this association in HD patients and whether or not treatment of H. pylori infection in hemodialysis patients can diminish serum homocysteine level.

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Study and an investigatior of Ternpresture inversion and effective factors in pollution of Tehran with the use of climate statistical analysis and GIS

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Abstract: atmospheric sustainability resulting from temperature inversion is one of the most important reasons for escalation of potential air pollution in big cities in particular Tehran. Therefore inversion is one of the basic factors in studying the pollution of Tehran. Tehran being surrounded in an arch-shaped space of western and south eastern currents doesn't have an effective refining quality, and thus Tehran's weather is still and static and consequently this situation Leads to dangerous phenomena called temperature inversion. In this study, firstly the statistics of Tehran's inversion during months of fall and spring season were provided on a daily basis from 2006 to 2009 for a statistical period using meteorology organization's data. In order to classify the pressure, we used operative analysis. The results show that, the temperature inversion. Was ongoing in Tehran at the time the research was being done in all the seasons of the same year in which the most largest circumference of temperature inversion was seen in fall and winter and the most largest circumference was seen in November an January.Also , among the patterns related to the simeltanous mass. Above Iran's north east (above Aral lake) as well as the north west and east of turkey, the pattern related to high pressur zagros had the most intense stability compare to the rest of the other systems and normally out of these systems Siberia's high pressur stability has been greater compare to other systems and when it accompanies the high-pressure part of Iran it's intensity gets greater.
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Introduction:

- Tehran is one of the Major cities of the world, which is already suffering from pollution. In some days of the year the amount of pollutant elements increases to the extent that it makes living pretty much difficult to survive. Tehran's geographical position as well as it's topographical condition plays some rules in the intensity and frequency of this sustainability and inversion acquired by it.

However, inversion occurs in most of the time of the year in Tehran. It's intensity has a direct relation with the dominant sinotopical conditions. (Yonesian, 1378)

- The air pollution reaches to it's peak when the inversion remains in the air with low altitude and long time makes a static and stable barrier which makes mixing this layer with the upper ones impossible and with the increase of the thickness of the pollutants under it, The air pollution increases.

In this study we have attempted to investigate the inversion of Tehran case by case.

For this reason the data of the atmosphere above Tehran's station has been collected during 2006 to 2009 at zero green which and has been studied.
(Ensafi Moghaddam, 1372)

- Therefore, inversion is one of the basic factors in increasing the pollution of Tehran.

Tehran being surrounded in a ach-shape western and south eastern currents, dose not have any refining quality, and thus. Tehran's air in most of the time is static and motionless and as a result this situation will lead to a dangerous phenomena called air or tempretature inversion . (Soltani Nejad 1376).
In winter except for few days of the season, The other days are clean and sunny.
Likewise due to the night radiation and snow on the northern mountains, this kind of radiative inversions as well as movements are usual.
On the other hand, according to the Topographical and Thermodinamical qualities of atmosphere.
The inversion phenomena over Tehran in all seasons, occurring In sinoptical conditions happing in the region and Iran is very strong and

inversions resulting from this condition is sinoptical and durable.
In summer inversions adjacent to earth reaches to it's peak but they are not very impressive. (Mohseni 1366)
In spring and fall due to domination of instability the number of inversions is not a lot.
The inversion occurs more than 200 times in Tehran. (environmental engineering magazine 1371, page 14).
The least inversion height occurs in the end of fall and at the beginning of winter and the height of the inversion has a negative congruence with it's intensity.
Carbon mono oxide with the side and the speed of the wind and it's negative congruence and thickness has a direct relation with it's inversion intensity. (Deljoo 1379)
Nowadays, air pollution is one of the problems major cities and the inversion is one of the basic factors for intensifying this phenomena.
In addition to that, those sources of creating and spreading contamination are very effective in increasing the pollution. (Hall .j. v. and clean, my colleagues and I 1999, page 445)
These material can exist in the state of solid particles Liquid drops, gas or a Mixture of these stuff. (Lais La. 1996, page 287)
The protection of environment committee of the u.s considers the five polluting articles including Mono-oxide Nitrogen dioxide, sulphur dioxide and suspending particles with less than two microns as well as Hydrocarbons among atmospheric pollutants.
In 1987 the margin of ten microns has been determined to the airodinamic diameter of the suspending articles by this committee and particles smaller than this due to the power of penetrating in Aloels received the highest health benefits. (calcestine,1987,page 178)
Many people lose their lives due to inversion and increasing pollution each year.
This problem has been of greet concern for officials since the past.

- In 1388 Alijani studied the synoptical inversion patterns in Mashhad (City located in northern east of Iran) using operative analysis, and investigated different patterns as well as effective patterns in his analysis getting to the conclusion that most of the inversions occur in winter thus they have greatest power and durability. (Alijani 1381)
- The way of classifying the pressure patterns is the most suitable tool for identifying circulating dominant patterns in a specific time and place.

The purpose of this study is to identify possible diversity of having the same pressure patterns of the earth surface during 2006 to 2009, in which the patterns were identified and classified as well as possible time changing as well as identifying and organizing the models which was classified in several different patterns of the models on the basis formation point as follows:
In this study we have dealt with identifying the most effective types of inversion in Tehran as well as increasing the occurance and the percentage of inversion which has direct relation with increasing the pollution.

The methodology:
In this study, first of all the daily statistics of the inversion in Tehran during fall and winter for the statistical period was prepared from 2006 to 2009 using meteorology organization. This data was along with the statistical gaps. since the inversion's data cannot be reconstructed the (skew-T) plan of all the days was prepared (from which the inversion is identified) and it was compared as well as corresponded with the existing statistic, and for all the days statistical data reacted to pollution . Of Teheran's stations was prepared form the preservation of environment organization, to analyze the relationship between inversion and pollution.
Since the aim of this study is to identify the synoptic systems, the statistics of the pressure of the sea level at: 00 o clock of the days that had inversion was received from NCEP (an internet site) in a digital from near 20 to 50 north degree as well as 30 to 70 east degree and a matrix operation was done on them.

In the next round, due to frequency of the days of inversion which made the analysis of the map difficult, the daily pressure data was classified in order to categorize the pressure, the operative analysis was employed.
With the help of the operative analysis method, we can manage to classify the weather dominating a place for a specific period of time.
The operative analysis method is a way that has been mainly created for decreasing the number of variables.
The advantage of this method is that not only it decreases the number of variables but also it preserves the initial quantity of existing variance in the main data. (Alijani 1381)
Then with using the operative analysis.
The main confluence factors and the pressure data were decreased to a limited number of factors and finally according to the origin of creation and the existing maps and diagrams and existing of high pressure and low pressure on the earth's surface the effective air types in the inversion of Tehran was detected.

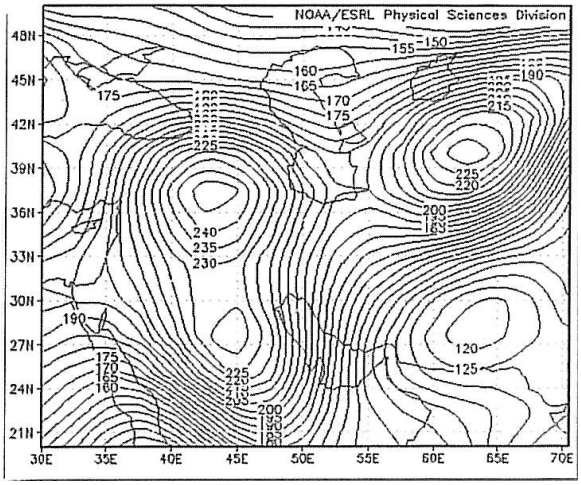
Studing the sinoptical patterns of inversion in Tehran Having done the study after acquiring the effective patterns on Tehran's inversion which will be shown in the following diagrams we will talk about them:
A: type pattern (January 2008):
The first graph shows the system arrangements on the ground earth's surface as you see in this pattern a high pressure center with the central pressure of 1022 HECTOPASCAL over 63 degrees east altitude and 41 degrees of north latitude has been formed.
The scope of this high pressure along the north eastern to south western almost covers central and southern Iran, and a high pressure cell in turkey's east 1025 along with the high pressure west soudi Arabia, with

88/10/13	CO	O3	NO2	SO2	PM-10
Bazar	86				
Aqdasieh	61	125	#6		36
golbarg					
Shahre rey		30	25	50	29
geophysics	73	29	32	51	44
Roz park	52	70	55	39	64
Punak	64	31	66	58	34
Masoudieh	30	29		60	28
Imam khomeini					
Sorkhe hesar	30	85	16	20	44
Tajrish	92		61	40	77
Pardisan					
Qolhak	82	16		23	132
Bahman					
Azadi	106		22	93	76
PSI	68	52	39	48	56

Chart: 1. The amount of pollution of Tehran's stations (3 january 2008)

The curve of 1023 has sent it's sparks up to Iran's central parts.

According to the maps available and studies this pattern mostly occur in winter, which has been less that the similar pattern of much pressurized soudi arabia where as the other two patterns play a basic rule in creating inversion of above Tehran.
In the following figure the amount of pollution related to the very day 3 Bahman, 1388 has been shown which according to graph no. I due to making comparative distance of the cold layer and more height of the stations above Tehran The amount of pollutants is much higher in the areas of these stations.



Graph: 1. The pattern of sea level pressure (3 january 2008)

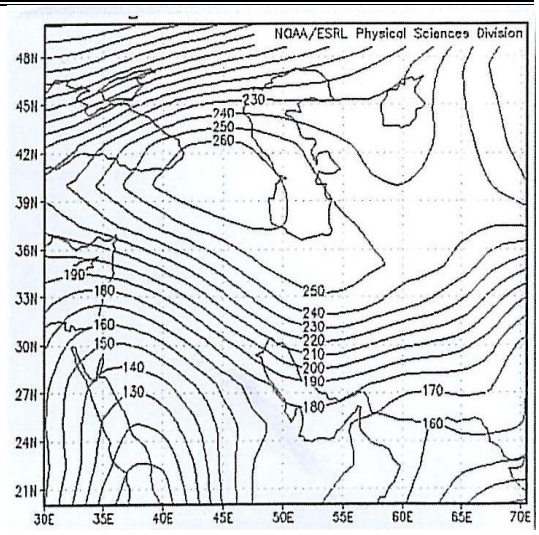
Type 2 pattern (11 january 2007)
The type 2 shows a winter pattern which is normally formed over the middle East in winter which is accompanied by the penetration of siberias cold weather into our country.

In this high pressure pattern sparks 1026 milibar has been formed over Northwest of our country.
In this pressure distirbuting high-pressure 1020 milibars have been stretched up to south of the country thus this sinoptical condition has caused the cold weather to be poured over Tehran and has caused weather sustainability over Tehran.

Out of these six categorized patterns this pattern is the most strongest of all and the air condition is much more sustainable. There fore the temperature inversions last longer and following that the weather pollution in the industrial centers and Tehran are much higher compare to other patterns.
For this reason the amount of pollution is much higher in these stations in particular when this pattern is dominant.

85/10/21	CO	O3	NO2	SO2	PM-10
Fatemi	69		5		34
Bazar	46		6		20
Aqdasieh	90	20	31	54	45
Mehr Abad	81	51	22		
Shahre – rey	55		27	41	38
Geophysics	44	13	51	60	28
Sorkhe – Hesar	13	19	7	17	
Tajrish	72		39	73	99
Pardisan	90	13	19	42	67
Qolhak	77	16	46	59	55
Bahman	70		88	27	60
Azadi	119	12	30	69	57
PSI	69	21	31	49	50

Chart: 2. The amount of pollution of Tehrans station (11 jan 2007)



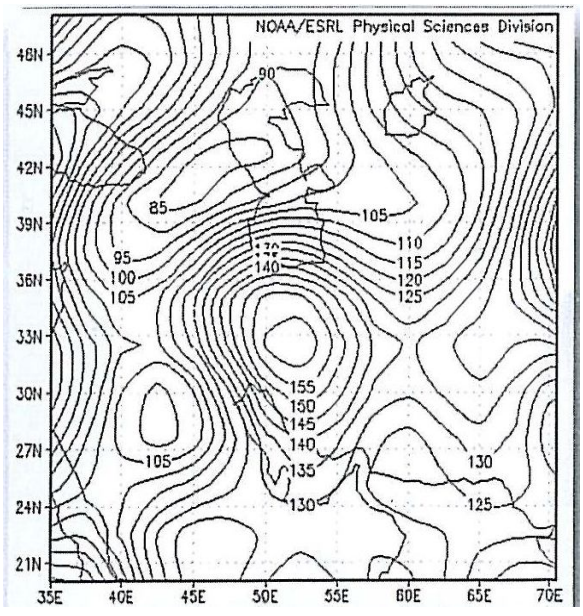
Graph: 2. The Pattern of sea level Pressure (11 jan 2007)

Pattern 3 (5 Nov 2006)

The Type 3 pattern normally is formed in fall. In this pattern the center of Iran is in the expension of high pressure pattern with the epicenter lf 1016 milibars, and the distance between Caspian sea's Central parts to the east of Turkey is in the stretch of low pressure system of 1008 milibars in which this state lets it move and it causes the spreading of Iran's Central pressure to the north of the country as well as the air sustainability and lack of ascending currents on the earth's surface Which has been demonstrated in figure 3 of the amount of pollution related to this pattern for 14 Aban 1385.

85/8/14	CO	O3	NO2	SO2	PM-10
Fatemi	124		17		43
Bazar			6		87
Aqdasieh	84		18		19
Mehr – Abad	66	57	21		
Shahr – rey	63	12	38	54	32
Sorkhe – Hesar	16		4		21
Tajrish					
Pardisan	97	19		13	23
Qolhak					
Bahman					
Azadi					
PSI	75	29	17	34	38

Chart: 3- The amount at pollution of Tehran's stations (5 Nov 2006)



Graph: 3- The level pattern of sea level Pressure (5 Nov 2006)

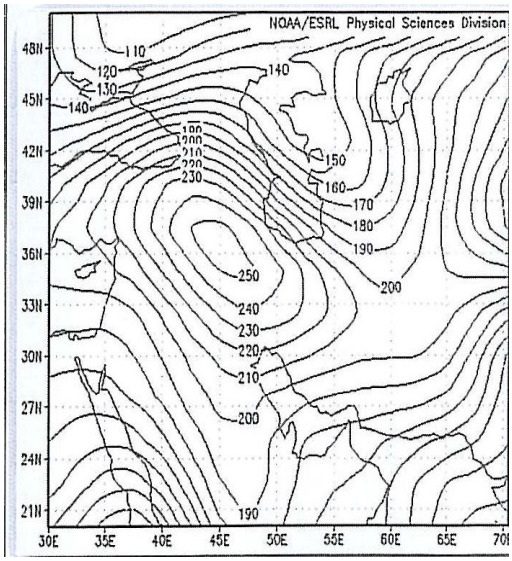
The type 4 pattern (26 Jun 2007)

In type 4 pattern, the high pressure one over Zagros is located at the epicenter 1025 and at the other point of middle – east and our country, sparks of the high pressure pattern with the curve of 1023 is dominant over Tehran and causes The short time air sustainability, especially at the beginning of the days and causes the pollution to be collected at the lowest surfaces this sort of pressure distribution occurs in late fall and early winter.

When this pattern is dominant over Tehran a very great suistainability is dominant over Tehran so that the amount of this mass is more than 7 days that has caused more concenteration of pollution in the lowest layer and increasing the amount of pollutants at most stations of Tehran so that the amount of carbon dioxide has exceeded the critic level at some stations.

85/11/06	CO	O3	NO2	SO2	PM-10
Fatemi	130		8		57
Bazar	96		13		
Aqdasieh	119	15	90	64	86
Mehr-Abad	113	54			
Shahr – rey	84	18	66	68	69
Geophysics	201	8	63		64
Sorkhe - Hesar	33	12	18	22	85
Tajrish	173		82	54	142
Pardisan	199	16	43	53	95
Qolhak	106	18	136	67	
Bahman	125		109	40	98
Azadi	261	8	60	81	115
PSI	137	19	63	56	90

Chart: 4- The amounts of pollution of Tehran's station (26 Jun 2007)



Graph: 4- The patterns of see level pressure (26 Jun 2007)

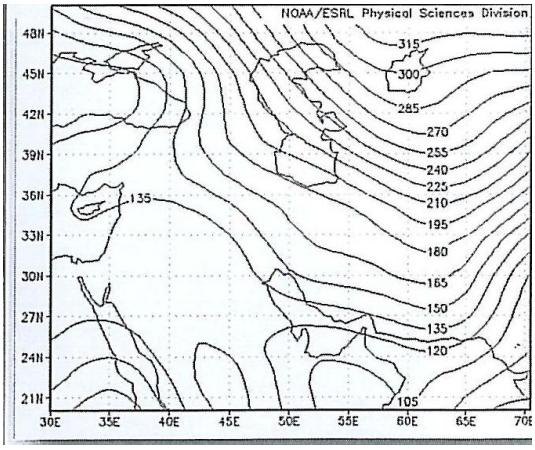
Type 5 pattern:

In this pattern of high pressure Siberia with 1035 millibars from Siberia which enters Iran from north east of Iran that always carries Siberian cold weather with penetrating the cold weather causes an almost intense air sustainability over Iran.

Sparks at this pressure with the pressure of 1018 milibars has been developed over Tehran and even has reached to Eastern parts of Iran which due to creating temperature inversion and lack of air ventilation in lowest layers, the weather of the region will be entirely sustainable and the pollution will relatively be high, which in graph 5, the mount of pollution at some stations for 18 Aban 1388 have been shown.

88/08/18	CO	O3	NO2	SO2	PM-10
The governer's office	165	10	38	51	68
Aqdasieh	84	38	37	57	46
Rose park	49	17	19	42	35
Punak	43	47	30	30	31
Geophysics		21	25	13	45
Shahre – rey	99	51	21	28	47
City hall district four	59	9	35	32	74
City hall district 11	52		25	33	87
City hall district 10					
City hall district 16				45	62
City hall district 19	81	30	22	40	67
Golbarg	38	7	15		51
Maweoudieh	30	42	20	23	43
Azadi	179	38	36	90	93
Imam Khomeini					
Bahman	54		65	27	71
Pardisan					
Tajrish	85		31	45	75
Sorkhe – Hesar	18	66	27	14	54
Qolhak	51	55		56	121
PSI	72	33	30	39	63

Chart: 5- the amount of pollutions at Tehran's Stations for (9 No. 2009)



Graph: 5- the pattern of sea level pressure (9 Nov 2009)

Type 6 pattern (10 Nov 2006)

The main controller and dominant system in this pattern in the map of the earth's surface is a high pressure which its origin has been formed on the altitude of 75 degree East and latitute 45 degrees north.

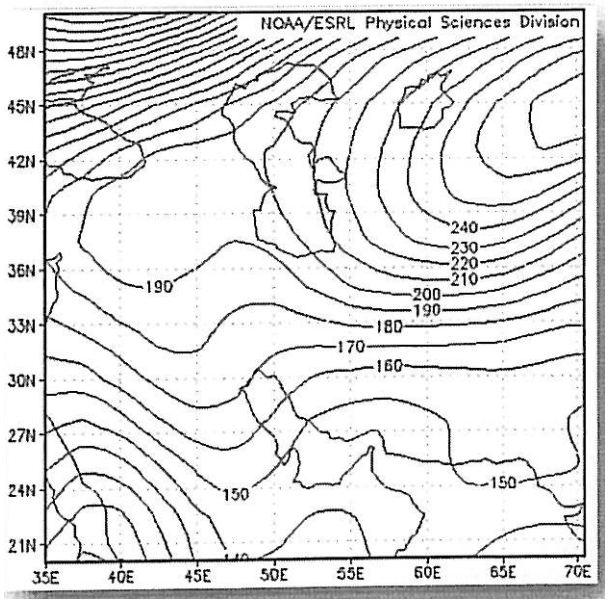
graph 6 shows the quality of the pattern of developing this system on the map of earth's surface.

In this pattern a high pressure curve has entered Iran from the north of Afganistan, and it's western spark has surrounded most parts of Iran in particular central Iran and Tehran with the curve of 1020 milibars.

Therefore entirely sustainable condition has been dominant over Tehran and due to the dynamic quality of dominant system in the region and dynamic decrease of air there is an increased inversion above Tehran so, that, due to more sustainability of this system, there has been more pollution approximately six days from Tehran stations, among which the amount of carbon mono – oxide has been more than the other polluting parameters, whose main reason is combustion failure and fossile fuels.

85/8/20	CO	O3	NO2	SO2	PM-10
Fatemi	96		16		24
Bazar	56		7		15
Aqdasieh	130		19		25
Mehr – Abad	112	58	20		
Sahre – rey	68	17	30	52	22
Sorkhe – Hesar	15	4			
Tajrish					
Bahman					
Azadi					
PSI	80	26	18	52	22

Chart: 6- The amount pollutions of stations of Tehran (10 Nov 2006)



Graph: 6- The pattern of the pressure of sea level for (10 Nov 2006)

Conclusions:

In this study we have employed the operative analysis method then arrangements of similar patterns has been classified at the same level and out of these similar patterns of one system for a specific day in which the amount of patterns for that day was prepared and then it was studied and analysed on the basis of dispersion of pressure for dominant types.
The results show that the temperature inversion during the course of study in Tehran has been settled in all seasons and due to qualification the inversion conditions, the temperature sustainability of the earth's surface has been settled and 80 percent of the days of four years was studied under the dominant inversion conditions, but the height of the layer of inversion varies according to changing the seasons, and the greatest circumference of the inversion has been in fall and winter according to the maps of s kew-t. and the greatest amount of circumferences has been in November and January. Also out of these pattern types 1,4 and 5 the patterns related to the simeltanuous mass above Iran north east over(Aral lake) and north - west and east of Turkey. The pattern related to high- pressure Siberia.
As well as high pressure Zagros has had the most increased sustainability compared to the other systems and normally out of these systems, Siberia's high - pressure sustainability has been higher compared to other systems and when it accompanies Iran's north - west high – pressure it becomes greater in intensity.
It became evident in studies done that usually most of the inversions occur in late fall and winter and winter inversions have more power and continuity.

Resources:

- Ensafi Moghaddam, Tahereh, 1372 – studying Tehran's pollution in connection with the sustainable and tempretature inversion.
Tarbiat Modarress masters dissertation.
- Deljoo, Amir Hushang B69- studying temperature inversion and unstability on Tehran's pollution. Azad university dessertation, science and research faculty.
- Sultani Nejad, Abdol – Azim 1376 echological effects of polluting gases from vehicles (based on Tehran's weather)
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Postmodern Truth in William Faulkner's "Absalom, Absalom!"

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Abstract: In this paper, the researcher has attempted to evaluate William Faulkner's salient novel; "Absalom, Absalom!" in the light of Postmodern approach towards Truth. One of the assumptions, shared amongst critics and writersof postmodern worldview is pluralityand temporality of truth. By examining this representative novel**,** it can be said that the Faulknerian text, sometimes denies that it possesses authority to guide readers toward any real truth and since the self- recognition has been resulted in truth as it is shown through the process of narrations in the novel, it would be said that multiplicity of selves or voices results in the plurality of truths that leads us to the postmodern view of truth. In fact, the narrator does not show himself as holding authority to bring out one absolute truth (meta narrative), but the narrator allows other voices to discover their own truths in a democratic condition.Hence, all of the tellers in the novel speak some of the truth, or some truth. Therefore, it is concluded that through the invocation of postmodern narratives, Faulkner's postmodern attitude towards "Truth" in his novel makes his aesthetic philosophy close to postmodern ideas of multiplicity of truth.

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Keywords: Postmodernism; Truth; Modernism; Multiplicity; Absalom, Absalom

Introduction

Modernists practically inventing fragmentation and ambiguity, still believed that if they accumulated all their fragments, they could reconcile ambiguities and finally arrive at complex yet whole truth. But this is not true of the postmodernists.

Postmodernists see human attempts to describe and establish truth not only as futile but even astwisting. Berten's (2005) *history of postmodernism* explains the issue precisely. Postmodernists, he says, believe that modernism's search for "timeless, representational truth" subjects experience to "unacceptable intellectualization and reductions". Postmodernists hold that transcendent truth is forever out of reach. Social and provisional truth can be attained.

Terry Eagleton (1983), describing the postmodern mind as "relativist and skeptical", agrees suspicious of all assured truths. Many critics, Fowler (2000), for instance, attribute this postmodern position to the influence ofpoststructuralists like Ferdinand de Sausser and Jacque Derrida, whose works "undermines traditional conceptions of truth".

Philip Weinstein (1995) describes one of the common results of seeing contingency as governing truth. He describes the growth of parody and a Nietzchean preference for play/construction rather than truth/correspondence. Postmodern writers, who consider all representation of the real to be no more than fictional, convinced that all of history, whether remembered or real is no more real than frankly fictional texts.

Postmodern Truth in *Absalom, Absalom!*

Many features of modernism and post modernism are seen in the works of William Faulkner. He demonstrates in his fiction many of the qualities typically attributed to literary modernism such as experimenting with narrative structures, temporal frameworks, narrative voices, and symbols and exploring inner consciousness as a major theme.Although Faulkner is the representative of Modernist movement in twentieth century, however his works can be evaluated in the light of

postmodernism as well. In this paper, it is attempted to reevaluate Faulkner's postmodern attitudes toward truth in his writing.

Postmodern critics interested in the impossibility of truth have turned to *Absalom,Absalom!*more than to the other fictions by William Faulkner. Some have seen the novel embracing this postmodern attitude. Gerhard Hoffman (2000), for example, has pointed to the narrative strategy of the novel, specifically, to its diction, as a postmodern rejection of truth. He describes a "pattern of uncertainty" and suggests that the multiple uses of "perhaps "and "maybe" point to the novel's grasp of the fictious state of truth. Similarly, Brian McHale (1987), sees a movement into postmodernism truth, especially in chapter 8 of *Absalom,Absalom!* , where he sees the novel abandoning modernist's question of authority and reality and allows the narrators to "fictionalize history" without restraint. Truth becomes what they make it. Fowler(1991) comes to a similar conclusion, arguing that Quentin Compson reaches a " postmodern awareness" when he finds in the Sutpen Saga not some kind of final meaning but the impossibility of all meanings, imagined in the dissolution he faces at his visit to Sutpen's Hundred.

Even, the source of truth in the novel remains murky. When Faulkner was speaking at the University of Virginia, he himself claimed to have a level of knowledge similar to the narrator's. Asked if Charles knew that Sutpen was his father, he replied with the same kind of qualifiers the novel has: *"I think he knew. I don't know whether he--his mother probably told him. I think he knew" (Gwynn, 79)*. Although the author, the creator of the fictive world who should have been able to answer all questions definitively, he chose instead to qualify his answer, with a familiar "probably". He did this because the nature of oral traditional knowledge in a postmodern novel is that. There are some truths we can not know. *He explained that Absalom, Absalom! is about the nature of truth: "I think that no one individual can look at truth. It blinds you. You look at it and you see one phase of it. Someone else looks at it and sees a slightly awry phase of it. But taken together the truth is what they saw though nobody saw the truth intact. So they are true as far as Miss Rosa and Quentin saw it. Quentin's father saw what he believed was truth that was all he saw. But the old man was himself a little too big for people no greater in stature than Quentin and Miss Rosa and Mr. Compson to see all at once. It would have taken perhaps a wiser or more tolerant or more sensitive or more thoughtful person to see him as he was."*(Ibid,273-4).In fact, Faulknerin *"Absalom, Absalom"* had made the plurality of the truth, its central theme, that is, the truth differs according to a person who sees it and interprets it. Therefore *Absalom,Absalom!*has some similar elements with the preceding multiple perspective novels such as "The Sound and The Fury " at a purely formal level; however, the scope of this novel proceeds further at the level of content or meaning. The main point is the selection or identification of a supposedly true theory among various perspectives about a phenomenon.

In *Absalom,Absalom*! we see the story told and retold.It has, in fact, five narrators: Rosa Coldfield, who was engaged to Sutpen; Mr. Compson, whose father was Sutpen's first Yoknapatawpha County friend , his son, Quentin; his Harvard roommate, Shreve Mc.Cannon; and a third-person narrator who sets the scenes and gives us Quentin's thoughts. These narrators sometimes quote other characters during their narrations. Quentin is the focal consciousness of the novel; every word we get from the other characters who speak in the novel's present is said in Quentin's presence. These four characters, and perhaps Thomas Sutpen, are the potential "thinking consciousnesses" of this novel, which is considered to be dialogical.

Quentin is clearly the focal consciousness of the work. Though all the information is not filtered through him, he is present with the reader at all times. However, no one is dominated by the others in the sense that he discovers the truth of the Sutpen legend, as some critics believe that Quentin does or that he has the truth all the time, as others hold the third person narrator to have.

Even if the narrator knows the final truth, he is not telling. Quentin and Shreve sit *"creating between them . . . people who perhaps had never existed at all anywhere"*.(AA, 243*). "Perhaps" they had never existed*: the tone of the third person narrator doesn't reveal whether he has the facts or not.

The characters may all speak for themselves; none of them may hold a privileged position in terms of knowing the truth of the Sutpen story.

In the first section of the chapter one, Rosa's story is centered on Sutpen. She establishes her authority as a witness to events:

'I saw what happened to Ellen, my sister. I saw her almost a recluse . . . I saw that manreturn–the evil's source and head which had outlasted all its

victims–who had created two children not only to destroy one another and his own line, but my line as well, yet I agreed to marry him.' (Ibid.12)

At the end of the first chapter we find that Rosa has realistically narrated an event she was not witness to, directly quoting dialogue and describing individuals, even though much of her authority is as a first-hand witness to events. In other words, chapter 1 ends with Miss Rosa's admission that she was not there for the scene she has just narrated.

The change in tellers is clearly signaled by Mr.Compson's narration in chapter 2, and he continues to tell for two more chapters. In each chapter he describes events in more and more detail and presents more and more speculations that he cannot know with any certainty.

Mr. Compson's"nobody knew what" in chapter 4 is functionally the same as the narrator's "none knew" in the first chapter. He and the narrator have the same perspective. The "perhapses" and "doubtnesses" that Mr. Compson uses are in regard to speculations about motivations; they are not about facts. In this chapter, he has the same kind of knowledge, the same kind of perspective, as the narrator.

It can be said that the novel's narrative technique implies a project, whose purpose is to make an analysis about the process of "attesting the truth" among various interpretations which are presenting a story about a past event. Depicting a truth-establishing process which appears through an accumulation of narratives, Faulkner shows us our own cognitive condition as history. Although this novelis told by four narrator-characters, however these stories have their own sufficient significance as long as they appear in the consciousness of Quentin Compson, who attends to all of these narratives when they happen.

In fact, in "*Absalom,Absalom*! in spite of Mr. Compson's effort to reorganize the materials at his hand, he cannot produce a seemingly valid interpretation.

". . . you re-read, tedious and intent, poring, making sure that you have forgotten nothing, made no miscalculation; you bring them together again and again nothing happens . . . " (AA,80).

On the other hand, preceding narratives to find out the truth are overlapped on Quentin's mind with a critical awareness of his own work. Through this process, commonalties and differences of plural narratives become clear at the same time. Although Quentin's word *"Maybe nothing ever happens once and is finished (Ibid,210)"* is that which immediately follows another statement of his own "*Yes, we are both Father*," we can suppose it to be Quentin's severe criticism, offered from within, of his father's discourse. For, here the famous "ripple" figure of Quentin's is forming a metaphorical expression of the continuity between past and present, or self and others, resulting in an antithesis to Compson's narrative which emphasizes the discontinuity of past and present. Here, merging with the antecedent narrative and criticizing it make two sides of one coin.

In addition, The narrative of Quentin and Shreve starts from imitating antecedent discourses with parody tones , examining mainly the truth and falsity of Compson's preceding narrative in its details, going further for building a more plausible hypothesis. However as we see in Shreve's comments like *"Let me play a while now (Ibid.224)"*, which can be taken as if he is merely playing a game,here, very important imaginative changes are made, for example, it was not Bon but Henry who was wounded on the battlefield. This finally enables a leap to an uncertain truth or an imaginative identification of the narrators with the narrated.

The most important thing is that we understand the two young men's narrative in the context of a mimic differentiation of the preceding stories, and this destruction by imitating the antecedents becomes a deconstruction of the father's story and gains an opportunity to attain some truths or some aspect of the truth.

The hypothesis of Bon's black blood which they reach at the very end, has no ground in the actual fact to be supposed as true; therefore, there is no way to judge whether the hypothesis is true or not.

It can be said that although the novel, dramatizing the process is led to the truth (or that which is supposedly true)but in fact, it is not clear that the truth may have been attained.The narrator's probable truth becomes the portrait of Sutpen as demon. However, the reason for Sutpen's rejection and killing of Charles Bon remains as mystery at the end of the novel as at the beginning despite the narrator's and Quentin's claim to have discovered the final truth in his visit to Sutpen's Hundred. In the novel, at the same time that readers are seduced by the claims of the story to be a supreme fiction, they are bombarded with reminders that this fiction is one of many possibilities and that no version can claim final authority and final truth.

In fact, the truth in this novel is not a historical one. "The '*truth*' at which the hero must and indeed ultimately does arrive through clarifying the events to himself, can essentially be for Dostoevsky only *the truth of the hero's own consciousness*" (Bakhtin*Problems* 55).

In addition, the primary question of the novel is not what the actual truth of Sutpen's life is, but what truth Quentin can take from the story to live with and how he can clarify the events for himself. Quentin, in fact, is the one upon whom the events that take place have their emotional impact. This is what stories do for people. Whether Quentin truly understands the events or not, his experience with the story helps him arrive at his own truth.

Considering "Truth" as a metanarrative (the grand ideologies that control the individual), Lyotard (1984) attacks it in his "*Postmodern Condition*", saying that the metanarratives are foundations and thus to be avoided. . He asserts the existence of micronarratives that in this sense can be considered as multiple truths. In addition, if truth is forever beyond reach, then humans shouldnot insist that a single truth must predominate in any sphere of thought and action. Rather, humans should be intellectually heterodox that means viewing all truths as equally valid and equally invalid.

This postmodern rejection of authority and hierarchy has led to what Jameson (1965) describes as a "narrative view of truth" and the vitality of small narrative units. Postmodernism prefers a "narrative view of truth because opposing the logical view necessitates establishing a new truth as universal. The "narrative view "on the other hand ,allows thought to take horizontal rather than vertical routes and to move toward open rather than close ending .At the same time , postmodernism prefers " local narrative" and rejects "master narratives".

This postmodernism traces its way into Faulkner's fiction and criticism.In fact, the Faulknerian text, sometimes denies that it owns authority to guide readers toward any real truth. The text rejects to become a master narrative controlling the local narratives created by multiple voices within it and by multiple readers of it. In other words, in Faulkner's text, narration becomes heterodox.In other words, it can be said that since the self-recognition has been resulted in truth as it is shown through the process of narrations in the novel,so we face that the truth itself is multiple.

Conclusion

To sum up, the narrative techniques in *Absalom, Absalom*! demonstrates Faulkner's anticipation of postmodern thought and style. It highlights how the writer confounds the notion of metanarrative by disrupting chronology and raising questions about the reliability of the narrators in each work. Faulkner uses dischronology, such as flashbacks to tell the story of Thomas Sutpen in order to get close to the postmodern concept. He provides key information through questionable narrators at strategic times to manipulate readers' thoughts and opinions about specific characters by using several narrators, none of whom witnessed all events, to tell the stories of each work.

This postmodernism traces its way into Faulkner's fiction and criticism.In fact, the Faulknerian text, sometimes denies that it possesses authority to guide readers toward any real truth.Hence, it can be concluded that since the self- recognition has been resulted in truth as it is shown through the process of narrations in the novel, it would be said that multiplicity of selves or voices results in the plurality of truths that leads us to the postmodern view of truth.

In other words, the narrator , here, does not show himself as holding authority before he dramatizes the climactic scenes of the novel to bring out one absolute truth (meta narrative), but the narrator allows other voices to discover their own truths in a democratic condition. In contrast to a monological narrator who provides certainty, Faulkner chooses instead to take us to the mystery of the human's spirit.Therefore, all of the tellers in the novel speak some of the truth, or some truth, and no voice should be privileged over any other because all of them arrive at the truths of their own consciousnesses.

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Fundamental Elements of Fraud Crime in Criminal Law of Iran and France

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Abstract: Fraud is among the crimes against properties and ownership and it is considered as one of the important subjects of criminal law in Iran and France. This Crime can be beriefly defined as achieving other's properties using fraudulent tools. The legal pillar of this crime in criminal law of Iran is the article 1 from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud approved by Expediency Discernment Council of the System on December 6, 1988 (15th of Azar, 1367). As to the criminal law of France, it is the 313-1 article of the French Criminal Law. There is particular evolution in French Criminal Law about the admission of loss as an independent element. Nevertheless the property consignment by the loser due to delusion is treated equal to a loss by French jurists; on the other hand, the usufruct of the fraud perpetrator is not required for the realization of fraud which can bring about the particular difference with the criminal law of Iran on financial and moral elements of fraud.

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Introduction

Fraud is among the crimes against properties and ownership. Although the main victims of fraud are individuals, society and government, are not safe from loss either, for fraud can shake the economic elements of the country and on the other hands, it can cause a feeling of distrust among the individuals of the society.

The other point which requires a particular attention to this crime is its high level of incidence. Instances such as the ease of fraud commitment compared to other crimes, and the tangibility of the achieved profit through this crime makes the criminals (who are usually provident and compare the pros and cons of the crime before its commitment) more prone to commit such a crime. The swindlers are usually smart and they deceive and abuse those of lower intelligence and such quality makes it more difficult to pursue and capture them.

Thus considering the significance of this crime, we decided to investigate its fundamental elements accurately and discuss its comparison with low of France as a European country in which legal basis and elements are close to ours, and indicate the similarities and differences between the criminal law of Iran and France.

Research method

This is a theoretical and desk research and different books, previous fundamental researches, and translations of the related contexts and books were applied for subject accordance. We tried to consider the opinions of jurists from both countries while comparing the topics.

Fraud (KolahBardari)

Kolahbardari (کلاهبرداری) is a Persian term which consists of two components: kolah or کلاه (hat) and bardari or برداری (taking off), its French equivalent is "Escroquerie" (Zeraat, 2006 (1385), 53), and its Arabic equivalent is "Alehtial" (الاحتیال) or "Alnasb" (النصب) (Ghafari, 1993 (1372), 54). In the Dictionary of Islamic law, kolahbardari is translated to "swindling; Fraud" and Kolahbardar (the perpetrator) is translated to "swindling" (Mirmohammad Sadeghi, 1994 (1373), 157).

As to Persian language, Kolahbardari is to achieve something from someone through a trick or deception (Amid, 1972, (1351), 838). The concept of fraud in French law dictionaries also refers to a criminal behavior through which some damage would be done to other's ownership. Although the victim himself consigns his properties to the perpetrator because of delusion, the important point is the property assignment is derived by circumventing maneuvers of the perpetrator (Cornu, 1992, 322).

As to the legal definition of fraud according to the article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud approved by Expediency Discernment Council of the System on December 6, 1988 (15th of Azar, 1367) it can be said that fraud is to achieve other's properties using circumvention tools.

1. Legal element

The legal element of fraud in Iran is the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud approved on December 6, 1988 (15th of Azar, 1367). The article one from this law forms the legal element of fraud and articles four and seven are respectively about the punishment for leading fraud, embezzlement and bribery networks and the suspension of governmental employees who have committed such crimes.

The article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud and its notes set that "anyone who deceives people through deception and circumvention, about the existence of unreal corporations, firms, factories or institutions or having unreal properties or authorities, or makes them hopeful for unreal affairs, or scares

them from unreal incidents and events, or adopts a false name or title and achieves money, properties, documents, draft, bill or clearance, etc through one of the mentioned or other circumvention tools, and takes other's properties in this way, is considered a swindler and besides giving back the original property to its owner, he would be sentenced to imprisonment for one to seven years and paying a fine equal to the taken properties. If the perpetrator has taken an unreal title, position or mission on behalf of governmental organizations and institutions, organs related to the government, governmental corporations or councils, municipalities, revolutionary institutions, and in general, Three (Legislature, Executive and Judicature) Forces, Armed Forces, and institutions responsible for public services, or the crime has been committed through public advertisement in mass mediums such as radio, television, newspaper, and journals, or through a public speech or issuance of printed or handwritten advertisement, or the perpetrator has been among the employees of government or governmental institutions and organizations, related organs to the government, municipalities or revolutionary institutions for public services, besides giving back the original property to its owner, he would be sentenced to imprisonment for two to ten years, a lifetime dismissal from service, and a fine equal to the taken property.

Note 1: if there were lesser sakes and qualities in all of the mentioned cases in this article, considering the criteria for mitigation of punishment, the court can reduce the perpetrator's punishment to the minimum level of punishment determined in this article (imprisonment) and lifetime dismissal from governmental services but it can't suspend the punishment implementation.

Note 2: depending on the case, the punishment for beginning a fraud would be the minimum punishment for that particular case and if the act is a crime itself, the beginner would be sentenced to the punishment of that crime as well. In addition to the mentioned punishments, governmental employees who are in position of general manager and higher or equal level of positions would be sentenced to a lifetime dismissal from governmental services and those in lower positions his dismissal would be from six months to three years."

Even in French law, after the revision of the French penal code in 1992, article 313-1 the sentence of fraud is described as following: "fraud is a behavior which ends in deception of a natural or legal person whether through using a false name or title or abusing a real position, or applying circumventive maneuvers to determine the mentioned person to deliver sums of money, securities, or any kind of property, make them provide a service, or talking them into doing any action which brings commitment for him, or termination of obligations which can be harmful for him or a third person." Fraud can cause five years of imprisonment and a fine of €375000.

As it was observed, the extensions of the fraud subject has been generalized in the foresaid law and it includes providing services, or doing any action which brings commitment or being committed to any action, and termination of obligation as well. As to the criminal result, besides the damage done to the victim, a third person's damage is also known as a cause of crime realization.

According to the article 313-2 of the discussed law, the penalty is increased to seven years of imprisonment and a fine of €750000 when the fraud is committed:

1) by a person who is a governmental employee or holds a public service mission, in the exercise of mission or as a result of that;
2) by a person untruly assuming the title of a person who is a governmental employee or holds a mission of public service;
3) by a person making a public appeal, proceeds to issue securities or collect money for humanistic or social supports;
4) to damage a person whose particular vulnerability, due to age, sickness, infirmity, physical or psychological disability or pregnancy, is apparent or known to the perpetrator;
5) in an organized network.

Although the recent criminal law uses the same definition of the old one, some slight changes have been applied. Admission of public services as a fraud subject besides the properties is among these changes (Pelletier, 2003, 541).

2. Financial element

The financial element of fraud consists of several components which are required to be realized altogether for the occurrence of the crime and considering the achieving a criminal result which is necessary for realization of the crime, fraud is a conditional crime and for its realization, in addition to the criminal behavior, a criminal result should be realized, and there should also be a causal relationship between them.

A. Criminal behavior

The criminal behavior in fraud is a positive financial action. The use of delusion and swindle a clear sample of which is a circumventive maneuver and taking other's properties through such activities are the main bases of the financial element of fraud, both of which represent a positive financial action (Habibzade, 2010 (1389), 86); and omission (failure to act) or silence can't cause the fraud to be realized. The silence itself, even if it is based on particular causes, cannot be considered as an exterior action, financial pretense and a positive financial action, that's why the third branch of the Supreme Court of Iran indicates in a part of its verdict 2496 on July 22, 1958 (31th of Tir, 1337): "if an employee takes the subvention for his married daughter, his action wouldn't be considered as fraud." Because in fact, the mentioned employee had avoided informing the responsible authority about his daughter's marriage which would exclude him from taking her subvention and it is clear that this avoidance or silence is nothing but omission, thus it doesn't realize fraud (Salari Shahrebabaki, 2007 (1386), 51).

Even in French law, the financial element of fraud can't be based on omission. This approach has always existed in old and modern French Criminal Law. Yet the perpetrator's omission can be included in another criminal topic (Larguier, 2008, 197). Besides, according to French Law, lying itself can't realize the financial element of fraud and a simple lie can't be included in fraud topic even if it ends in consignment of the property by a victim (Pradel, 2001, 864) and juridical verdicts in France have emphasized on this approach.[4]

B. The subject of crime

What is achieved by the swindler through a fraud should be taxable and financially and economically valuable or, it should have some rights or benefits and be supported by the government. Unlike theft the subjects of which are always movable properties, the subject of fraud can also include immovable properties. According to French Law, Property (Bien) refers to any material which can be owned (Cornu, 1992, 100).

As to the article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud, money, properties, documents, etc are all allegorical and considering the term "etc" which can be widely interpreted, it can be stated that the subject of the mentioned crime includes both movable and immovable properties. Thus the limitation of fraud subject about being taxable is among the differences of this crime with theft.

As to the French Criminal Law, according to the legislator's specification, the considered property in fraud should be movable. But in criminal law of Iran, any material including those which are naturally or pertinently movable and those which are naturally or pertinently immovable can be a subject of crime. If someone takes a piece of land, building or any movable properties from his owner using circumventive tools and make them owned by himself or buy them in a lower price than they really cost, through circumventive maneuvers, the action would be considered a fraud if other conditions have been realized as well (Habibzade, 2006 (1385), 128).

Just immovable properties are excluded from the subjects of fraud in French Law. Yet there is no difference of view about swindling objective rights of immovable properties such as money or the funds of such properties. Any subject that is financially considerable, such as bonds, purchase agreement, loan receipt, and whatever considered movable by civil law can be a subject of fraud. Furthermore, unlike the old criminal law, the recent criminal law (article 405), receiving services in a circumventive way is also considered as fraud. Thus the subject of fraud has been extended (Gattegno, 2007, 259).

In the article one from the law of enhancement law, the examples of fraud are mentioned as money, properties, documents, drafts, bills or clearance. As to France, if a person exempts himself from paying what he should pay or pays less than what is required, through applying a circumventive tool, he has achieved a sort of clearance according to the French Court and considering the wide interpretation of the terms "bills and clearances, his action can be compatible with fraud. Wide comprehension of the term "clearance" enables the foresaid court to consider the abuse of electricity power as fraud when it is not in accordant with the criminal description of theft (Habibzade, 2010 (1389), 150-151).

Considering the use of the term "etc" in the article one from law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud by the legislator, blank signed document, declaration, letter of intent, and any documents which cause or removes a right or commitment, can be among the allegorical examples of the legislator.

Considering the indicated subjects, what seems right and admitted by most of jurists, the legislator and juridical procedure is that the subject of fraud can include both movable and immovable properties. For in the article one from law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud, the legislator generalizes the fraud subjects to movable and immovable properties by using the term "property" and there is no reason to make it specific to movable properties, on the contrary, the unconditional use of the term "property" indicates that it includes all properties, whether movable or immovable.

To confirm this, in the notion 7.8227, approved on March 1, 1995, (10^{th} of Esfand, 1373), Administration of Legal Affairs of Juridical System announced that generality and predication of property includes movable and immovable properties.

As to the matter that a virtual property can be a fraud subject or not, there are some differences between the viewpoints of law professors, but what seems right and admitted by most of them (same, 154) is that a virtual property can't be a subject of fraud.

What is achieved by the swindler through fraud should be a property owned by another person. About this, one of the law professors, states: "the ownership of the taken property including movable and immovable properties by another person as a condition for fraud. Thus if someone takes his own property out of someone else's hands, through using circumventive tools, lies, maneuvers and delusion, (even if the property have been legally held by that possessor) the convict hasn't committed fraud" (Mir Mohammad Sadeghi, 2006 (1385), 81).

Of course if one takes any properties from others through trick or wile, the French Supreme Court would consider it as fraud even if the swindler is rightful (Habibzade, 2006 (1385), 129).

As to atonement, it would be right if the perpetrator is rightful owner of the original property and if the original property exists and the possessor avoids giving it back, he can take it back through using deception and circumventive maneuvers. As to the religious atonement, it seems to be fraud and wrong, because here, the perpetrator doesn't have an objective right about the property and in fact, the taken property is not his but someone else's, besides, at the present age and under the dominance of law on society, one can't enforce the law himself and this might cause an anarchy and inconsistence within the society. Besides the willingness and consent of the possessor has been violated here and if all of the fraud conditions are realized, it would be an example of fraud.

There is a difference between viewpoints of jurists about the possibility of the fraud realization on shared ownership properties by the partners, and even the law has remains silent about this. Of course, from the viewpoint of the author, the fraud can be realized, for in the crimes against properties, the legislator of the Islamic Republic of Iran basically supports the individual ownership. Thus each partner can apply the shared properties equal to his own share which would be right if other partners are content and this content is not achieved through delusion and deception, though the partner con only possess his own share. As to French criminal law, just as stealing shared properties is placed under the criminal title of theft and there are no different viewpoint toward this, fraud follows this procedure as well, and swindling shared properties is considered fraud (Gattegno, 2007, 215). In fact, as a result of a great number of verdicts approved by criminal

branches of French Supreme Court, there is no difference of view toward this matter in French Law.
Another point which should be considered is that the existence of an owner is required for the ownership of property by others in fraud, so that the swindler can deceive him through using circumventive maneuvers and make him consign his properties. Thus, fraud can't be realized on properties which have no owner or those with unknown owners, also public properties which are owned by all members of society and not a particular owner.
As to French Criminal law, according to article 313-1 of Penal Code, it is specified that fraud is also possible about providing services or accepting actions, but in Iran, what can apparently be understood from the article one of the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud, is that the subject of crime should be materialistic which doesn't include services (Zeraat, 2006 (1385), 70).

C. the tool and its qualities

In some crimes such as fraud, the applied tool and its qualities affect the realization of crime. As to fraud, it seems that the Persian legislator has used this term intentionally following the French legislator, and seeks some purposes through this choice, though terms "action" or "act" haven't been used and the legislator has used the term "tool" instead.
Tools include material and tangible items such as document, statute, etc and an immaterial and estimative item like a lie or a contract (a mare contract which is not reflected in an objective and material affair) can't be called a tool. The article one recounts some items and assigns them as tools and considering the phrase "and through one of the mentioned tools" and the concept of tool itself, it can be said that the rule aims to reflect all of the counted items such as name forgery, or unreal authorities besides a tool (an objective and tangible one), otherwise they can't be called tools.
Juridical procedure of Iran also emphasizes on this matter, and the Supreme Court has approved a verdict about that. The verdict 307 approved by second branch of Supreme Court of Iran on December 24, 1941 (third of day, 1320) indicates: "According to article 238 from General Criminal Law, in its verdict, the court should declares how the convict have taken the money from the complainant in order to reveal the applied circumventive tool." Therefore, considering the definition of fraud, the circumvention and unreality of the tool, whether in its form or nature, is delimitated and it is among the most important bases which forms the fraud crime.
The circumvention of the fraud tool can be characterizes through conferring to traditions. I.e. it should potentially be able to divert the minds of ordinary people in such condition and deceive them; the whole society should cognize it as a circumventive action but not in a way that its unreality can be easily recognized.
Some of the law professors have issued another condition about this matter indicating that when in a particular condition, deceiver who is aware of the credulity of his addressee, applies a trick which can affect no ordinary human being but that particular addressee, and he obtains a property through that deception, he has clearly committed a fraud (Darvish, 2005 (1384), 138). They consider the action of the perpetrator who has used circumventive maneuvers (which are not typically deceptive even according to tradition) being aware of the credulity of the victim, a crime, and they have somehow accepted a typical criterion among the community, but for particular individuals like the one in the foresaid example, they admit personal criteria. However what seems accepted by most of the law experts and in accordance with the restrictive interpretation of criminal law is that the circumventive maneuvers and tools should be typically deceptive, i.e. they should be able to deceive an ordinary human being.
Thus, in his verdict for any case, the court judge should investigate and evaluate the perpetrator's action based on the tradition and habits of the society in order to reveal if the circumventive tool applied by the perpetrator is traditionally considered unreal and circumventive or not. If it is not merely unreal, the case is not included by fraud sentence.
According to the general principal, "the proof is on the complainant", the investigation form to prove the circumvention of the tool and the use of circumventive tool is on complainant and prosecutor's office and they should prove the use of circumventive tools by the fraud culprit through one of the mentioned methods in article 238 of the general public penal code.
The circumvention of the tool should be reasoned by sensible and tangible exterior histrionics. Besides, the use of circumventive tool should be the final and single cause to achieve other's property, providing that this property wouldn't be achieved or in other words that fraud wouldn't be realized without the application of that circumventive tool.
Meanwhile, the application of circumventive tools and maneuver should happen be prior to the achievement of property, and occurs before that. Therefore the twentieth branch of the Supreme Court of Iran emphasizes on the necessity of the priority of circumventive maneuvers to the delusion and in the verdict 670, approved on November 7, 1992 (8^{th} of Aban, 1371) comments: "the priority of circumventive tools to other's properties, is legally among the main conditions of fraud realization and its differences with other financial crimes."
The fact that circumventive tools are not delimitated and they should be distinguished by the judge, might be criticized since it causes a juridical anarchy or it is against the principal of legality of crimes and punishment. But, these criticisms are rejected, and the move of legislator to make these methods allegorical is admirable, for as a result of the improvement of technology and instruments, each day, there would be new maneuvers and methods and their delimitation prevents the persecution of professional swindlers, and the Persian legislator who has delimitated the circumventive maneuvers have been also criticized by jurists of his country. The article 336, of the criminal law of Egypt and the article 417 from the criminal law of Jordan, has also delimitated the circumventive maneuvers (Zeraat, 2006 (1385), 37).
In fact, considering the improvement of technology and mess mediums and development of computer, satellite and Internet, in order to prevent crimes, it is necessary to adjust the law in a way that firstly, it regards the principal of the legality of crimes and punishments and not to waste individual rights,

and secondly, professional swindlers can't use the legal vacuums for financial abuse because of the lack of law or inclusion of law or a law which include new examples. Thus it would be very useful not to delimitate the examples of circumventive tools in a law. The allegorical examples of circumventive tools indicated in the article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud are:

A) Deceiving people about the existence of corporations, firms, factories or unreal institutions.

B) Deceiving people about having unreal properties or authorities.

C) Making them hopeful about unreal affairs.

D) Scaring them from unreal incidents or events.

E) Adopting a false name or title.

Other circumventive tools (undefined circumventive tools) used in considered actions in fraud are usually circumventive maneuvers. Circumventive maneuvers are among the main elements of the financial element of fraud. In fact, the swindler deceives the individual and takes his properties through these circumventive maneuvers. Circumventive method or maneuver refers to a combination of exterior actions and conspiracies along with particular skills which can be called a subtle deception and includes expository moves aiming to materialize the deception and make the unreal affairs seem right and real (Habibzade, 26, 1377).

According to the French juridical procedure, maneuver means a combination of exterior actions and conspiracies along with particular skills which can be called a "subtle deception"; but in fact, circumventive maneuvers illustrate the basic concept of a deception which ends in fraud and other deceptive methods are also deduced from this concept (Alkhani, Yosof Alhakim, 1994 (1415), 366).

In its verdict approved on February 27, 1880, France Court of Appeal states: "the purpose of circumventive maneuver is to perform expository actions in order to make the trick and deception more tangible and reflect it in a materialistic form and make a right and real appearance for his stated unreal affairs (same, 367)." Although the term maneuver hasn't been used in the old or modern criminal law of France, according to the French law, jurists have required the realization of makeover for the realization of fraud (Pradel, 2001, 566).

In the Law of Iran, the criterion applied to distinguish circumvention of maneuvers or tools depends on tradition and juridical view which is indicated in several verdicts of Supreme Court and a set of theories by Administration of Legal Affairs of Judiciary System. Of course, according to the authors, a typical criterion shouldn't be considered in order to distinguish the circumvention of tools and maneuvers. For the individuals of a society are in different levels of education and awareness and there are differences between an old simple villager and a university professor, or a callow youth and an experienced police officer. Besides, swindlers are usually smart and intelligent and they go to individuals who can be easily deceived, and give their properties. In some cases, these individuals are very smart and they can deceive experienced people as well and if it wasn't like that, swindlers would easily be recognized, introduced to police and captured. The legislator intends to support all members of society in which there are credulous and simpleminded individuals who should be supported as well. They shouldn't remain legally unprotected just because they are credulous and they haven't watched their properties, or the applied maneuvers by the swindler haven't been typically circumventive. It seems that in fact, swindlers are being supported by law, not the fraud victims. Thus, they investigate the status of each victim and then smartly decide about the circumvention of their maneuver considering his personal and educational condition. In fact, a combination of two criteria can be in accordance with justice. Of course, the legislator hasn't pointed out any particular example of fraud in the French law.

D. victim's delusion

Discontent of the owner is required for the realization of all crimes against properties, the difference of fraud is that the victim consigns his properties with absolute content which seems to be real, but in fact, it has been resulted through delusion and deception of the victim and derived by the use of circumventive tools and maneuvers by the swindler. In fact, this condition (victim's delusion) is distinct from the condition which requires the circumvention of the applied tools by the swindle, for not only the applied tools by the swindler should be "traditionally" circumventive, but also the victim should be "actually" deceived and "contently" comprise hid property to the swindler and the requirement of victim's delusion and deception should be his unawareness of the circumvention of the applied tools by the swindler, otherwise, no delusion has taken place and fraud hasn't been realized.

Even the juridical procedure notifies this matter in verdict 73 approved by the second branch of Supreme Court of Iran on April 9, 1957 (first of Farvardin, 1336): "if several investigation discovery officers confer to the criminal to buy forged Dollars, although he offers them some, this is not beginning a fraud, for the unawareness of individual of the intention of perpetrator to use circumventive tools, is required for the beginning a fraud."

Considering the fact that from the beginning, the officers intend to achieve some forged Dollars which is realized, and they mainly go to the seller of forged Dollars with this purpose, and they have been aware that those Dollars are forged, no delusion has taken place and the officers hasn't been deceived, therefore, the owner of forged Dollars hasn't committed a fraud and if other conditions of the crimes subjected to the article 525 from Islamic Penal Law are realized, his charge can be investigated and punished under other criminal titles such as forgery and issuance of forged money.

On the other hand, regarding the existing rules and regulations, the necessity of victim's delusion and deception in fraud requires him to be only a natural or legal person, for animals and objects can't be subjected to deception and no one can actually deceive a car or a dog.

But the question raised here is that considering the necessity of the commitment of fraud against human beings and that the term "people" have been mentioned in law, is it also possible to commit fraud against government? About this matter, in theory 7.2350 approved on June25, 1994 (fourth of Tir, 1373), the Administration of Legal Affairs of Juridical System

indicates comments: "considering the definition of fraud in article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud, the adverb "other" which has been mentioned in that article, includes government and other individuals, so it can be said that there are examples of fraud against government performed by ordinary individuals, and the law mentions the term "people" because of its predominance, for the fraud is usually committed against people but it is not limited to non-governmental targets."

Therefore, it should be said that legal individuals and government can't be deceived but the governmental fraud is distinguished to be possible considering the mentioned consultative theory, because the representatives and their employees who are all human beings can be deceived and consign the governmental properties.

There are two theories issued about the criterion of circumvention of maneuvers and tools used by the fraud perpetrator: typical (objective) theory, and personal theory. According to authors, unlike distinguishing the circumvention of maneuvers, here we shouldn't apply a typical criterion to distinguish deception, for in this way, we exclude many members of society from the legal support, for swindlers are generally smart and they track simple minded people who can be easily deceived. It must be mentioned that there are differences between a simple old villager and a university professor, or between a simple worker and a police officer. Therefore, in order to support such individuals, the court shouldn't be limited in cases related to their delusion, so that it can investigate the personality and social and educational situation of the victim.

E. Criminal result

Fraud is among conditional crimes and the realization of result affects on the realization of crime itself. According to the legislator's specification in the article one from the law of enhancement of punishment for perpetrators of embezzlement, bribery and fraud, taking other's property is the required result for the fraud realization which places this crime among conditional crimes. On the other hand, it is not the swindler, who takes one's property, but the owner himself, who voluntarily consigns his property to the swindler; but this consignment, is caused by his deception, i.e. the owner's content is incorrect.

Anyhow, we should pay attention to the purpose of a criminal result in fraud, is to take (possess) other's property which often damages the victim, and even if in some cases, the damage hasn't been realized, and the victim hasn't undergone any loss, the possession of his property by the swindler can merely realize the crime of fraud. Therefore, the dispassion of victim from his own property is enough to realize fraud, whether he undergoes a loss or not. But it seems that if the swindler's possession is not realized, neither is fraud, even if there are some damages.

There is particular evolution in French Criminal Law about the admission of loss as an independent element. In1810, there was no mentioning of loss element among the legal elements as an independent condition, but in the recent Criminal Law, it has been clearly predicted by the legislator. Nevertheless, French jurists have considered the consignment of the property (by the victim because of delusion) equal to realization of the loss. On the other hands they haven't necessitated the swindler's profit for the realization of fraud (Pradel, 2001, 576) which can be a particular difference of financial and moral element of fraud between the criminal laws of France and Iran. That's why some of the verdicts approved by the penal branch of French Supreme Court emphasize that fraud can be proved by victim and it doesn't depend on the realization of any damages while the property was being consigned to the perpetrator because of a delusion derived by circumventive maneuvers.[5]

F. Causal relationship

The existence of a cause-and-effect relationship (causal relationship) between the use of circumventive tools and maneuver by the perpetrator, victim's delusion and deception, and the consignment of the property by him is required for the realization of fraud. In fact, here are two causal relationships, one between circumventive maneuvers and victim's delusion, another, between the victim's delusion and property consignment; if, for any reason, there is no causal relationship between these components, the fraud wouldn't be realized.

Twentieth branch of the Supreme Court of Iran emphasizes on the necessity of the priority of the use of circumventive maneuvers to the delusion and in verdict 670 approved on November 7, 1992 (8th of Aban, 1371), it comments: " the priority of circumventive tools to other's properties, is legally among the main conditions of fraud realization and its differences with other financial crimes."

Besides, the persistent penal vote 1374.28 approved by general council of Supreme Court of Iran on November 7, 1995 (8th of Aban, 1374) indicates: "… for the realization of fraud, the use of circumventive tools should be prior to achieving other's property …"

Of course, the existence of a causal relationship should be proved in the court, so that perpetrator's action can be considered as fraud, and, the proof of the causal relationship is on prosecutor's office. If the causal relationship is not proved, the fraud wouldn't be realized.

3. Moral element

Fraud is among the intentional crimes and a fraud derived by a fault or negligence is not imaginable. For the realization of fraud, besides a general malice (to use a circumventive tool), there should be also a particular malice (to take other's property); the swindler should be aware of the circumvention of the tool while the victim shouldn't.

A general malice in fraud is a voluntary and deliberate use of circumventive tools and maneuvers in order to deceive or tempt another person, so the mentioned crime would be realized if the person intentionally and deliberately applies some tools aiming to deceive others, while being aware of their circumvention (Shambayati, 1993 (1372), 377). Thus, the fraud perpetrator should be aware that what is he doing is a circumventive maneuver and he should also know that this circumventive maneuver can deceive or mislead the victim and make him consign his property, besides, he must know that the subject of circumventive maneuvers is a quack and

unfounded. As we have mentioned before, the perpetrator should also know that the property he is planning to take is owned by another person.

D.R Ardabili, one of the Iranian jurists indicates: "Besides the general malice to commit deceptive actions in fraud, the perpetrator should also have a particular intent to take other's property, otherwise, for example if one uses circumventive tools in order to entrap his rival in unreal transaction and then them makes him bankrupt, this action can't be considered a fraud (Ardabili, 2005 (1384), 242)."

Therefore, the particular malice in fraud is the intention to "take other's property". An important point about the "mental element" is that the proof of the existence of malice in perpetrator is on complainant and persecutor's office. Thus if they are not able to proof this malice, the perpetrator would be discharged from fraud conviction.

As to French Criminal Law, possession of other's property through circumventive maneuvers is the moral element of fraud. Yet the perpetrator can possibly have different motives which are not effective. Nevertheless, the proof of perpetrator's malice for different subjects is on the Judge (Larguier, 2008, 202). In the criminal law of Iran and France, the motivation of fraud can't justify or avoid the realization of the crime, even if it is acceptable, justifiable and benevolently. Thus, one who uses tricks and circumventive maneuvers to collect people's money and vows to be expended as charity to help poor people or directly distributed among needy ones, would be prosecuted as a swindler.

Conclusion

Fraud is among the crimes against properties and ownership and the most important factor which makes if different from other crimes against the properties (theft, betrayal of trust, overdraft, etc) is the apparent content of the victim in paying money or delivering his property to the swindler. In fact, the swindler acts in a way that the owner or possessor of property would be deceived and consigns his property to the swindler contently. Even in French Law the consignment of victim's property is presumable with a content derived by delusion. Realization of such condition requires a performance of circumventive maneuvers and histrionics by the criminal and swindlers takes other's properties through tricks, circumvention and delusion considering the available tools and facilities. Of course, all of the tools applied by the perpetrator are not necessarily circumventive, and what he usually needs to meet his goals and deceive his victim, is a combination of circumventive and none-circumventive tools. There is certainly no doubt that the use of circumventive tools should be prior to possession of property and it should be done in order to achieve this property. Fraud is among conditional crimes, which requires the realization of its result i.e. taking other's property.

In comparison of fraud in criminal laws of Iran and France, it was observed that there are a lot of similarities between the elements of this crime in these countries and the conditions are almost the same, except for some differences between the criminal law of Iran and France due to some items such as crime subject. For instance, the subject of fraud in French Criminal Law is an object, but in Criminal Law of Iran the subject is a property. As to French Law, the legislator considers the fraud of shared properties as a crime, but in Iran, the law has remained silent. Unlike the law of Iran, benefit can be a subject of fraud in French Law.

There is particular evolution in French Criminal Law about the admission of loss as an independent element. French jurists consider the consignment of the property (by the victim because of delusion) equal to a loss and on the other hand, they don't require the fraud perpetrator's benefit for the realization of fraud which can cause a particular difference with the financial and moral element of fraud in Criminal Law of Iran. That's why some of the verdicts of the criminal branch of French Supreme Court emphasize on the matter that fraud can be proved by the victim and it doesn't depend on the realization of any damages while the property was being consigned to the perpetrator because of a delusion derived by circumventive maneuvers.

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The Effect of Dignity Therapy on Hope Level in Patients with Chronic Renal Failure Undergoing Hemodialysis

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Abstract: Diseases such as chronic renal failure, lead to the hope level decrement by impairing the patient's health and limiting the conditions. Hope level increment can change the patient's view of the life and illness. Dignity therapy is a unique and short therapeutic approach, designed to decrease suffering, enhance the quality of life and bolster a sense of dignity for patients who are suffering from life-threatening or life-limiting illnesses. This study examines the impact of dignity therapy on hope level in patients with chronic renal failure undergoing hemodialysis.This is a two-group experimental research with pre test – post test design, which was studied on selected hospitals of Mashhad. Seventy four patients with chronic renal failure, undergoing hemodialysis were involved in the study after obtaining informed consent. They were randomly assigned in two groups; 36 patients of even days were chosen as the intervention group and 34 patients of the odd days assumed to be the control group. In the intervention group, dignity therapy has been done in two 45-60 minutes sessions. The patient's words have been tape recorded, written, edited, and finally the "generativity document" created and has been shared with the patient's intimates. Hope level of patients studied before and 1month after the intervention by the Herth's hope index questionnaire and the collected data has been analyzed by SPSS software (Version 11.5); in which, Wilcoxon and Mann-Whitney test were applied in the analysis.Although, there was no significant differences in mean score of hope before the intervention between the two groups (p=0.832), one month after dignity therapy the mean score of hope for intervention group (34.1±2.6) and control group (32.4±3.90) revealed a significant statistical differences (p=0.038). Also, comparing the mean score of hope in intervention group in the pre test (32.2±3.22), and post test (34.1±2.6), represented a significant statistical difference (p=0.000), while this change in control group was not significant (p=0.188).Dignity therapy increases the hope level in hemodialysis patients. Therefore, by planning and performing such interventions the hope level in chronic renal failure patients can be increased.

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INTRODUCTION

The chronic illnesses have considerable effects on the patients' lives and change their view of the life(1). One of these diseases is the chronic kidney disease (CKD), which needs dialysis(2). Today, the kidney diseases are of the major health problems in communities. In (CKD), the kidneys become unable to exert the products of metabolism and their regulating actions, therefore toxins remain in the body and the electrolyte and acid-base balance will become disrupted(3).

The CKD patients are faced with a debilitating and lifelong limiting condition. Moreover, they become dependent on multiple groups of caregivers to use a device, which controls their life and comfort (4).

Threatening situations and changes in the life, can affect the hope level in people(5), which limited physical activity, and physical defects will decrease the hope level (6).

Hope is an essential element in all of the life aspects and is necessary for a healthy life(5). Understanding the concept of the hope is important for the nurses and appears to be an important factor in the effectiveness of psychological interventions and coping with chronic illness (7). In various cultural and scientific views, hope has different definitions. Snyder says: hope is not a passive emotion that only emerges in the dark moments of the life, but it is a process of recognition, in which people specify their goals, create ways to achieve them and develop the motivation to implement these ways and continue this process. These three components of hope are known goals, pathways thinking, and agency thinking. (8)

Banson Ward (2006) in the review of studies about hope says high levels of hope are associated with physical and psychological health, self-worth, social network and positive thinking(9).

Snyder (2006) concluded in his research that there is a significant correlation between high levels of hope and positive emotions, and also between low levels of hope and negative emotions. Hence, low levels of hope predict depressive symptoms, that are independent of diagnosis symptoms and coping strategies(10).

Hope is an important factor in patient's care, which includes treatment, rehabilitation, and palliative care(11). According to this, hope level increment in patients with chronic renal failure can change their views of life and disease(12), and nurses by their presence, talking to the patient, giving information, polite and honest interacting, are able to affect the patients' hope level (13).

Since there is always the possibility of neglecting emotional and social requirements during the process of meeting the physical needs of patients, the best way to reduce these individuals' demands are interventions, in which not only the physical treatment, but also psychological and social therapies are considered (6). One of these interventions is dignity therapy, which is one of the palliative care types and is considered as a psychotherapy, which is unique, personal and short-term, in order to enhance the quality of life, increase the hope and life expectancy, and creating a sense of purpose and well-being for people who are suffering from life-threatening and life- liming diseases(14).

According to the importance of psychological conditions and hope in hemodialysis patients, and the fact that dignity therapy is known as a way of improving psychological conditions in patients who are suffering from life-threatening disease; and also the fact that none of the researches were done on effectiveness of this method on hope level among hemodialysis patients in Iran and other countries, we decided to focus on this topic. The results of this study not only support these patients, but also help other researchers in this context.

MATERIAL AND METHODS

This is a two-group experimental research with pre test – post test design which was studied on selected hospitals of Mashhad city. Subjects were the patients who were undergoing hemodialysis and had been referred to dialysis centers in Imam reza, Hefdah shahrivar and Hasheminejad hospitals of Mashhad in 2012. Inclusion criteria were willing to participate in the research and completing the informed consent form , be aware of their disease, willing to have at least 6 months hemodialysis treatment, being in the 18-70 years old range, having the ability to reading and writing (in order to answer the questionnaire), having physical ability without cognitive impairment (according to Mini Mental Status Examination Score) to attending in the interviews and responding to the questionnaire, not having drug abuse, not having major psychiatric disorders (such as Schizophrenia, Paranoid disorder and major depression), not using effective psychiatric drugs, not travelling more than 4 weeks and not immigrating from Mashhad to other cities during the next one month.

The study received approval from the ethics committee of University of Medical Sciences in Mashhad. After taking informed consent, patients were allocated randomly in to two groups based on the days of the week. According to this, patients who admitted in dialysis centers on even days were

considered in the dignity therapy group and patients who arrived in the odd days were considered in the control group. In the intervention group after performing pre-test (assessment of hope level), dignity protocol questionnaire was given to the patient in order to think, after 24 to 48 hours, dignity psychotherapy sessions were conducted in 45 to 60 minutes. Besides the session sound recording and after transcribing, editing and creating a document, in the third session manuscripts read to the patient and the necessary changes were made with the patient's tendency. After that, the final generativity document was given to one of the patient's intimates who was determined by patient. One month later, the post-test (assessment of hope level) has been done.

In the control group, patients who arrived in the odd days and desired to enter into the study were listed. Among these, equal number of patients with even days patients were selected randomly. Pre-test was done and post-tests were performed one month later. Sampling has been done in six months.

Data gathering tools for performing this study were checklist of selecting study samples, questionnaire of demographic characteristics of patients, Herth Hope index and Mini Mental Status Examination Score (MMSE).

Herth Hope index comprises 12 items and 3 dimensions (cognitive-temporal, affective-behavioral and affinitive-contextual) that each of them are checked by 4 questions. Each item is graded based on a score from 1 (disagree), 2 (I'm not sure) and 3 (agree). But, the questions 3 and 6 are scored inversely. The score of HHI is between 12 and 36, and higher total scores indicate higher levels of hope.

Herth hope index has been translated into Persian by Abdi et al., (2007) and its validity has been confirmed(15). The brief mental condition questionnaire (MMSE) was used in the study of Foroghan et al., (2006) and the reported criterion validity was 78%(16). Also, reliability of Herth hope index has been confirmed by test-retest in patients with cancer with correlation of 84% and in kidney transplant patients was reported 78%(6).

Data was analyzed by SPSS (Version 11.5). Kolmogrov smirnov and Shapiro Wilk tests were used to evaluate the normal distribution of variables. In addition, Wilcoxon and Mann-Whitney tests were used to examine the research objectives.

Results

The mean age of subjects in this study was 49.0±12.8 years (20-70 years). .The most of patient were married 44.6% and had primary education 81.1%. Duration of hemodialysis was 6.5 ± 7.4years (0.5-26 years). All participants were living in Mashhad, they were Muslims and 69.9% of them were males. Among the patients in the intervention group, there were 38.9% retired ones, and 34.2% of the patients in the control group were housewives. The most common causes of kidney disease and require dialysis were diabetes mellitus 43/2% and hypertension 28/4%. Among the participants, 20.3% experienced renal transplantation and 67.6% were candidates for kidney transplantation.

Chi-square and t-tests were used to discuss the homogeneity of the variables in two groups. The results revealed that there were no significant statistical relations between the groups and all of variables, and two groups were homogeneous. Because the distribution of hope scores was not normal, in order to compare the mean scores of hope in dignity therapy and control groups, Mann-Whitney test was used before and one month after the intervention. The results showed that in pre-intervention stage there was no significant difference between the hope scores of the dignity therapy group (32.2 ± 3. 2) and the control group (31.7± 4.0). This means that these two groups were homogeneous (P =0.8), However one month after the intervention, the differences between mean scores of hope in the dignity therapy group (34.1 ± 2.7) and the control group (32.4 ± 3.9) was statistically significant (P =0.038).

To compare the mean scores of hope before and after the intervention for each group (intergroup comparison), the Wilcoxon test was used. Results revealed that in dignity therapy group, the mean scores of hope before (32.2 ± 3. 2) and after intervention (34.1 ± 2.7) had significant differences (P< 0.000); Although the results of the Wilcoxon test illustrated in the control group the mean score of hope before the intervention (31.7 ± 4.0) and after it (32.4 ± 3.9), had not significant differences (P=0.188).(table 2)

Table 2: mean scores of hope in clients undergoing hemodialysis, before and after the intervention in dignity therapy and control groups.

Group				
Stage	Control	Dignity therapy	Total	**Test**
Test	Mean ± SD	Mean ± SD	Mean ± SD	Mann-Witney test
Before intervention	31.7±4.0	32.2±3.2	31.9±3.6	Z=0.12 P=0.832
One month later	32.4±3.9	34.1±2.2	33.3±3.4	Z=2.07 P=0.038
Wilcoxon test	Z=1.31 P=0.188	Z=3.391 P<0.000		

To compare the mean score of dimensions of hope, before and after the intervention, Wilcoxon test was used. Results for the mean scores of cognitive-temporal dimension demonstrated that in dignity therapy group, before (10.4 ± 1.7) and after (11.1 ± 1.4) intervention, there was a significant statistical difference (P= 0.002), while the difference was not significant in the control group (P= 0. 408). In affective-behavioral dimension, the differences between mean scores before (10.8 ± 1.5) and after the intervention (11.5 ± 1.0) was statistically significant (P= 0.012), however this difference was not significant in the control group (P= 0.110). The test results of affinitive-contextual dimension illustrated that in the intervention group, mean scores before the intervention (10.9 ± 1.1) and one month after intervention (11.4 ± 0.8) had differences significantly (P= 0.020), while in the control group this difference was not significant (P= 0.77).(table 3)

Table 3: the mean scores of dimensions of hope in clients undergoing hemodialysis, before and after the intervention in dignity therapy and control group.

Hope dimensions / **Group**		Mean ± SD After intervention	Mean ± SD before intervention	Wilcoxon test	
cognitive-temporal	intervention	11.1±1.4	1.7±10.4	P=0.002	Z=3.15
	control	10.3±1.8	1.9±10.0	P=0. 408	Z=0.82
affective-behavioral	intervention	1.0±11.5	1.5±10.8	P=0.012	Z=2.51
	control	1.4±11.1	1.4±10.8	P=0.110	Z=1.59
affiliative-contextual	intervention	0.8±11.4	1.1±10.9	P=0.022	Z=2.28
	control	1.2±10.9	1.2±10.8	P=0.776	Z=0.28

Discussion

Results of the study demonstrated that in dignity therapy group, before and one month after the intervention, the mean scores of hope had a significant change and the mean scores of hope increased about 2 points, while in the control group, this difference was not significant.

The chochinove et al,.(2005) performed a study about dignity therapy for patients who are suffering from cancer and mentioned that 68% of the patients reported that dignity therapy has increased their sense of having a purpose (17).

The results of the present study are consistent with Hall and colleagues (2011) results, in which dignity therapy has been done for patients who were suffering from advanced cancer. Their results showed that in both follow-up times (one and four weeks after dignity therapy), the intervention group reported a higher level of hope than the control group. Effect sizes were medium (partial η^2=0.20 and 0.15) and at one week follow up the difference was statistically significant (difference in adjusted means 2.55; 95% CI −4.73 to 0.36; P=0.02). (18).

However, in another study, in which Hall et al,. (2012) performed dignity therapy on older adults, the impact of this therapy on the hope level was not statistically significant before the intervention and 1 week (P=0.095) and 8 week after the intervention (P=0.20) .(19)

In general, hope is known as an essential element, which affects all aspects of the life(20). Hong and Raw (2007) consider family support, religion, acceptance and knowledge about the disease as the four factors, which help the patient's hope enhancement(20). Actually, dignity therapy by inviting patient to engage to a dynamic process causes variations in the routine life of the patient which has been created during the process of coping with chronic illnesses such as chronic renal failure. In addition, speaking about the past, recalling memories, expressing wishes and sharing them with others through the "generativity document", makes the patient's life active, encouraging and creates goals in his life.

Moreover, this study's results revealed that in dignity therapy group, mean scores of hope significantly increased after intervention in all dimensions of hope.

Also in the study, mean scores of hope for cognitive-temporal dimension had a significant difference before and after intervention. Individuals, who have high levels of hope in this dimension, have a positive view of their lives; they do not have fears about the future, and have plans for today, tomorrow and the other days. The therapist tries to review the patient's goals and wishes of the past and future with him and by telling them to the patient's family or intimates facilitate the way for the patient to achieve them(6).

Also, mean scores of hope before and after the intervention for affective-behavioral dimension in intervention group, had significant differences. This dimension implies on the patient's purposeful functionality. By increasing this level, the patient feels the sense of control and leading their lives. They are also able to remember their sweet and enjoyable moments. In fact, the therapist helps the patient as a source of hope and cooperates with the patient and his family or intimates by improving their patience and also paying attention to the patient(6).

The results also demonstrated that mean scores of hope for affinitive-contextual dimension in the intervention group had significant differences before and after the intervention. This dimension indicates the relationship between one and others and also the God as the superior power. The therapist tries to improve the relations between the patient and others by expressing the patient's feelings to his intimates(6).

Conclusion

According to the results of this study, it can be concluded that the dignity therapy increases the hope in hemodialysis patients. Therefore, it is recommended to apply this therapeutic method for hemodialysis patients in clinical environment.

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Evaluation and comparison of identity style scales and Mental Health in Indian and Iranian Adolescents Males.

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Abstract: From the early centuries, Adolescence is mentioned as a period of challenges and opportunities for understanding oneself within the social context. A well-known note from more than 100 years ago describing adolescence as "storm and stress), is still addressed by psychologists. Adolescence is typically divided into three periods: early adolescence (ages 13-14), middle adolescence (ages15-18) and late adolescence (age 19 to adoption of adult roles), this research has been studied as a case study on Indian and Iranian teenager boys which considers some of their characteristics such as anxiety, identity and mental health , which describe these three characteristic and give information about them. Available scheme is a survey on mental health, anxiety and identity observation and also it's attributes in Iranian and Indian teenager boys that this order has comparatively accomplished. A used tool had been Berzonsky's identity questioner and has been applied by using variance analysis and T test in comparison with effective significance and insignificance parameters toward people's identity. Identity style is characteristic of an individual who at identity formation passively accepts models, is conscientious and concentrated on the aim. The individual adapts his behavior to norms and expectations of others, so he is oriented conformal. Result indicates that this statistical society's culture, gender, depression, anxiety ,normative identity ,number of siblings and their residency and also positive correlation between diffuse identity and thought problem would have effect on them.
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Keywords: Identity style, Mental Health , Male Adolescents

Introduction

Mental health is more than the mere lack of mental disorders. The positive dimension of mental health is stressed in whose definition of health as contained in its constitution: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Concepts of mental health include subjective well-being, perceived self-efficacy, autonomy, competence, intergenerational dependence and recognition of the ability to realize one's intellectual and emotional potential. It has also been defined as a state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their communities. Mental health is about enhancing competencies of individuals and communities and enabling them to achieve their self-determined goals.

According to (Bacová, 1998) identity is a cognitive process in which an individual experiences the value of oneself identity formation through social environment. Although identity is not defined uniformly, several psychological approaches agree that development of personal identity is influenced by social and cultural environment, which surround personality. Identity structure is in this way formed in a dynamic process. Identity is the process of claiming membership in social world, standing for something, being known for whom one is. Once constructed, identity then forms the framework for adulthood. Identity is both process and product. It is an unfolding bridge linking individual and society, childhood and adulthood. To understand identity then, we must be able to think about its basis in the individual and its realization in adult purpose. Because identity forms the foundation of adult life, as a society we have a large stake in seeing that this takes place as optimally as possible. Many psychopathological disturbances observed among some adolescents are accompanied by disturbances in identity.

During adolescence the development to sense identity is crucial task (Erikson , 1959). Erikson's concept of identity has been as important a contribution to the social sciences in the second half of the 20th century as Freud's concept of the unconscious was to the first half of 20th century. With Eriksson's understandings of identity came in focus on the roles not only of one's biological and psychological foundations, but also of cultural

contributions to the ways in which one both shapes and is shaped by the surrounding milieu.

The field of identity research has expanded so much over the past three and a half decades that virtually every major textbook on adolescent development contains a significant section on identity development and a discussion of Erikson's writings. In addition, there are now at least four English – Language social science journals that include the word identity in their titles and focus upon the interplay between the individual and context in shaping the course of the human life cycle. What is identity and how does it change as well as remain the same over the course of one's life span? Research provides a synthesis of theory research and practical consequences of the identity – formation process during the years of adolescence and adult life and attempts answer these questions. Erikson's psychological approach to identity theory is an integration of historical, biological, psychological, and socio-cultural forces. Identity is a complex entity. Over the past 60 years, and understanding both of what identity means and how it evolves over the course of the life span have been the inspiration for many theoretical writing as well as numerous research investigations (Kroger, 2006).

For example, identity disturbances are evident in identity disorders and borderline personalities (American Psychiatric Association, 1987). While not explicitly writing of the identity crisis, Masterson's (1988) ideas on borderline adolescents are quite salient to identity disturbances found in this form of psychopathology. In summary, the presence of psychopathology in adolescence, particularly borderline and narcissistic disorders, is strongly implicated in identity formation. Borderline disturbances bear strong resemblance to identity diffusion in that some borderline adolescents simply drop out of the identity search and commitment process. Other borderline adolescents may be susceptible to making foreclosed commitments at the urging of strong authority figures. Narcissistic disorders also pose problems in identity formation of adolescents. It has been suggested that this group of adolescents is at risk for identity foreclosure. Self-exploration is too threatening to the narcissistic individual who rigidly defends the fragile sense of self.

In poor countries, mental illness tends to be grossly neglected by health systems. Diseases tend to get prioritized.. However, emotional distress and mental illness are embedded within and cannot be separated from language, and cultural, social and political context.. Those who are mentally ill are also subject to stigma, sometimes feared, and sometimes cared for in inhumane conditions. These crucial issues are not addressed directly but are highlighted in some of the case studies that accompany this chapter on the Global Health Watch website.

Mental health problems are wide-ranging and include depression, schizophrenia, anxiety, stress-related disorders and substance abuse. They may be mild and temporary or chronic and severely disabling and affect all ages. Mental health problems also include organic disorders such as dementia and mental retardation (but not epilepsy, which is sometimes wrongly seen as a mental disorder). Poor mental health can also result in poorer outcomes associated with other diseases such as cancer, HIV/AIDS, diabetes and cardiovascular disease (Prince, 2007).

The World Health Organization (2003) estimated that13 percent of the worldwide burden of disease is due to mental health problems, although 31 percent of countries do not have a specific public budget for mental health (Saxena, 2007). In addition, each year nearly a million people take their own lives. Rates are highest in Europe's Baltic States where around 40 people per 100,000 commit suicide annually. However, the incidence of suicide is widely under-reported because suicide is considered a sin in many religions, a taboo in many societies, and a crime in others.

Suicide is among the top three causes of death of young people aged 15-35 (WHO, 2002) and is one of the leading causes of death of young women in India and China. In spite of the burden of mental illness across the world, 40 per cent of countries have no mental health policies. Thirty-three countries with a combined population of 2 billion invest less than 1 per cent of their total health budget on mental health (WHO, 2005). More than two-thirds of the world's population (68 percent), the majority of whom are in Africa and South Asia, have access to only 0.004 psychiatrists per100,000 of the population, although these areas have an extensive network of traditional practitioners (WHO, 2005).

Material and Method

The issue of adolescent mental health can be seen from many overlapping angels. For the promotion of their positive mental health, it is, therefore, necessary to understand and empirically evaluate their ideation, ideals, value system and the significant person ideologies and social institute affecting them or appealing to them. The mental health of children foreshadows the mental health of future generation of adults. Child and adolescent mental health services are a small part of the responsibilities of health and local authorities but the implication of poor attention to children's and young people's mental health are not only their and their

families continual suffering, but also a continuing spiral of child abuse, juvenile crime, family breakdown and adult mental illness, aloof of which can lead to more child and adolescent mental health problem. The theme for mental health week for the year 2003 was "Emotional and behavioral problems of children and adolescents". 37% of the population in India in is under the age of 18 years (WHO, 2001). Identity represents the intersection of the individual and society. In framing identity, the individual simultaneously joins the self to society to the self. As a result, identity comes to serve not only as a guardian of the integration and continuity of self-experiences, but also as a mechanism for shared meaning –making that embeds the individual with those with whom life will be lived. Eriksson's (1950, 1968)rich exposition of this process made it possible not only to better understand the adolescent transition but also to break ground for the study of adult development. In adolescence, young people first confront the challenge of finding a place for themselves in the larger social world. As children move toward and into adulthood, society begins to take them more seriously as members. Identity is the process of claiming membership in social world, standing for something, being known for who one is. Once constructed, identity then forms the framework for adulthood. Identity is both process and product. It is an unfolding bridge linking individual and society, childhood and adulthood

The purpose of the present research was to study the, Identity style and Mental Health of Indian male adolescents. A total sample of 120 adolescents, 60 each from India and Iran, were randomly selected from the school of Delhi and Iran in the age range of 14-17 years. The tools used in the research were: Identity Style Inventory developed by Berzonsky (1997) Youth Self Report developed by Achenbach (1991). The analyses of the data was group means and SD's were calculated and t-test was applied to study the differences between groups on the dimension of Identity Style and Mental Health Pearson's product coefficient of correlation was also calculated to know the inter relation among the various dimensions of identity and mental health in the sample of Indian, Iranian, male adolescents.

Result

Inter correlation coefficients for male adolescents (Table.1) between various dimensions of identity style and mental health; and self- esteem and mental health indicate significant positive correlation between diffuse identity and thought problems. To elaborate further, more the adolescents avoid personal issues, procrastinate decisions until situational demands dictate their behavior and accommodate their identity in relation to the changing social demands, more thought problems are likely to be experienced. In other words, this identity style results in a fragmented and loosely integrated identity structure. Most characteristic of the diffuse/avoidant identity style is a low level of active information processing and problem-solving (Berzonsky,2001).

Table 1:Inter-correlation Coefficients amongst the various dimensions of Identity Style and Mental Health of Male adolescents (N=120)

Variables	Mental health (overall)	Anxious depressed	With-drawn depressed	Somatic problem	Social problem	Thought Problem	Attention Problem	Rule Breaking behavior	Aggressive behavior	Internalizing behavior	Externalizing behavior
Informational	0.02	0.06	0.42	0.03	0.01	0.05	0.06	0.10	0.00	0.04	0.14
Normative	0.02	0.05	0.04	0.07	0.02	0.05	0.10	0.09	0.04	0.12	0.02
Diffuse	0.00	0.13	0.18	0.06	0.07	**0.24****	.10	0.00	0.00	0.05	0.13
Commitment	0.01	0.01	0.14	0.1	0.10	0.06	0.07	0.12	0.05	0.06	0.01
Identity style (overall)	0.09	0.03	0.03	0.00	0.12	0.01	0.10	0.08	0.15	0.01	0.01

Inter- correlations amongst the various dimensions of identity style and mental health for the sample of male adolescents are shown in Table It indicates significant positive correlation of diffuse/avoidant identity style with the mental health dimension of thought problem $^{**}(p<0.01)$.

Table 2 indicates significant t- values between Indian male and Iranian male adolescents on four dimensions of mental health i.e. anxious depressed, withdrawn depressed, thought problem, and externalizing. That is, Indian male adolescents had significantly higher mean scores than Iranian male adolescents on the measure of diffuse (i.e. 48.62 > 40.90), commitment (i.e. 50.23 > 41.87), withdrawn depressed (i.e. 51.67 > 38.28), and externalizing (i.e. 49.93 > 42.80). However, Iranian male adolescents scored significantly higher mean scores as compared to Indian male adolescents on the dimensions of informational identity (i.e. 46.23 > 41.42), anxious depressed mental health (i.e. 51.13 > 40.45), and thought problem dimension of mental health (i.e. 51.40 > 30.12).

Table 2: Mean, SD and t- values on the measures Identity Style and Mental Health for Indian and Iranian Male adolescents (df=59)

Measures	Indian male Adolescents (N = 60)		Iranian male Adolescents (N = 60)		t-value
	Mean	SD	Mean	SD	
Identity					
Informational	41.42	12.01	46.23	11.33	2.26*
Normative	47.87	10.33	50.60	10.65	1.43
Diffuse	48.62	9.01	40.90	11.54	4.08*
Commitment	50.23	10.01	41.87	12.83	3.98**
Identity (Overall)	50.42	9.62	50.22	9.94	0.11
Mental Health					
Anxious Depressed	40.45	10.34	51.13	10.40	5.64*
Withdrawn Depressed	51.67	11.56	38.28	10.38	6.54*
Somatic Complaints	51.27	10.30	50.17	12.42	0.53
Social Problems	48.62	11.08	50.67	12.33	0.96
Thought Problem	30.12	10.94	51.40	10.42	5.79*
Attention Problem	49.20	10.53	49.33	10.02	0.57
Rule Breaking Behavior	49.92	9.57	52.25	9.36	1.35
Aggressive Behavior	50.12	11.25	50.25	10.83	0.06
Internalizing	50.15	10.54	51.23	10.37	0.57
Externalizing	49.93	9.58	42.80	7.55	4.53*
Mental Health (Overall)	49.58	9.72	49.98	10.28	0.22

* p <.05; ** p <.01

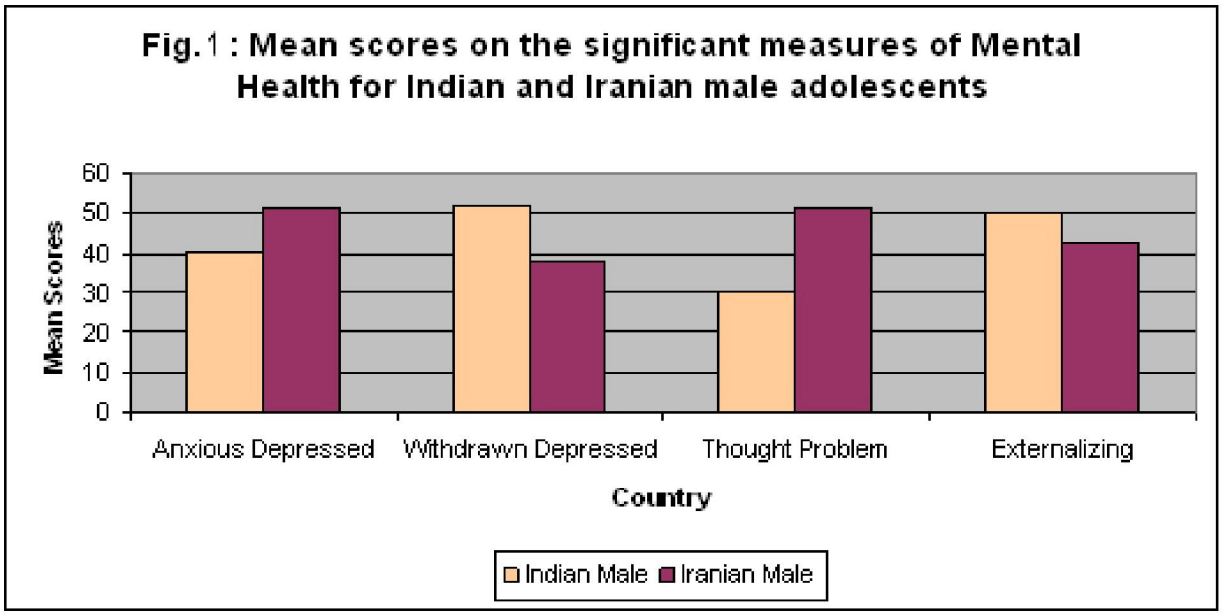

Figure 1: Mean score on the significant measures of Mental Health for Indian and Iranian male adolescents

The male adolescents from India and Iran exhibited significant differences on the dimensions of informational identity, anxious depressed, withdrawn depressed, thought problem, and externalization. Indian adolescents displayed significant higher mean scores than Iranian adolescents on identity style dimension of diffuse identity, and commitment identity; and mental health dimension of withdrawn depressed and externalization. That is, Indian adolescents generally avoid personal issues and

procrastinate decisions until situation demands so. They also adhere to a set of convocations, goals and values. They feel discomfort, distress and intensely crave for a substance when use of that substance is stopped.

Moreover, they generally exhibit more aggressive and rule breaking behaviors. Iranian adolescents showed more score on one dimension of identity style i.e. informational identity, and two dimensions of mental health i.e. anxious depressed and thought problem. That is, Iranian adolescents generally evaluate their worth, value, importance, or capabilities more than Indian adolescents. They seek out and evaluate information that is relevant for their identity before making committed decisions. However, they have a feeling of apprehension and fear characterized by physical, psychological and cognitive symptoms and have problem in concentrating or focusing thoughts over an issue or tasks in hand.

Discussion:

Depression in other age groups is linked with social isolation, alcohol and drug abuse and smoking (Hemenway, Solnick & Colditz 1993). Mood disorders can lead to an increased risk of accidents and injuries and poor physical and role function (Wells 1989).

Other factors such as learning through experience or observation also have an effect on health behavior. For example, it has been established that drug use before the age of 15 years is highly associated with the development of drug and alcohol abuse in adulthood (Jaffe 1995). Environmental influences, such as poverty or societal and cultural norms, also affect health behavior (WHO 2001).

A life-course approach helps in understanding social variations in health and mental health Exposure to experiences and environments accumulate throughout life, increasing the risk of adult morbidity and premature death if they are disadvantageous. Exposure to health-damaging environments during adulthood may accumulate on top of health disadvantage during childhood (Holland 2000). This approach takes into account the complex ways in which biological, economic, social and psychological factors interact in the development of health and disease. Such an approach reveals biological and social “critical periods” during which policies that will defend individuals against an accumulation of risk are particularly important. The policies of modern “welfare states” can be seen to contribute in many ways to present-day high standards of health overall in developed countries (Bartley, Blane & Montgomery 1997).

Mental health is fundamentally linked to physical health outcomes. Mental health status is a key consideration in changing the health status of a community. Health and behavior are influenced by factors at multiple levels, including biological, psychological and social. Interventions that involve only the individual, such as training in social skills or self-control, are unlikely to change long-term behavior unless family, work and broader social factors are aligned to support a change (Institute of Medicine 2001).

Health promotion is an approach to improving public health that requires broad participation. It may be understood as actions and advocacy to address the full range of potentially modifiable determinants of health, including actions that allow people to adopt and maintain healthy live and those that create living conditions and environments that support health (WHO 1998a). Mental health promotion is an integral part of health promotion theory and practice. The interventions can be applied at population, subpopulation and individual levels, and across settings and sectors within and beyond the health field (Walker, Moodie&Herrman, 2004)). The personal, social and environmental factors that determine mental health and mental illness may be clustered conceptually around three themes (Lehtinen, Riikonen & Lahtinen, 1997).

There are complex interactions between the determinants of health, behaviors and mental health at all stages of life. A body of evidence indicates that the social factors associated with mental ill-health are also associated with alcohol and drug use, crime and dropout from school. An absence of the determinants of health and the presence of noxious factors also appears to have a major role in other risk behaviors, such as unsafe sexual behavior, road trauma and physical inactivity. For example, a lack of meaningful employment may be associated with depression and alcohol and drug use. This may in turn result in road trauma, the consequences of which are physical disability and loss of employment (Walker, Moodie & Herrman 2004).

Kleinman (1999) describes the clustering of mental and social health problems in “broken communities” in shantytowns and slums and among vulnerable and marginal migrant populations: civil violence, domestic violence, suicide, substance abuse, depression and post-traumatic disorder cluster and coalesce. He calls for a research agenda and innovative policies and programmers “that can prevent the simply enormous burden that mental illness has on the health of societies resulting from the variety of forms of social violence in our era” (Kleinman 1999). The corollary is the need for the

development and evaluation of programmers that on the one hand control and reduce such clusters and on the other hand assist people and families to cope in these circumstances. In this context, Weisz (1993) and Ollendick (1996) found an association between cultures considered collectivistic and internalizing problems anxiety depressed, withdrawn depressed. (Escobar 2000) found that some evidence that a strong family orientation may be a protective factor against mental health problems. Berman, Weems and Petkus (2008) examined the expression, prevalence, and incremental validity of identity problem symptoms in adolescence. Identity problem symptoms predicted psychological symptom scores beyond identity status, and identity status accounted for substantially less variance in psychological symptom severity when controlling for identity problem symptoms. Additional research on the relationship between identity problems and psychological adjustment is needed and greater attention to the role of identity issues in clinical practice is warranted**.**

Aghaei and khan (2009) examined identity styles (informational, normative, diffuse- avoidant, commitment style) as a function of religion and gender on a sample of 120 (60 males & 60 females) with equal number of Hindu and Muslim students and showed that the identity construction is depended on gender and religion as normative identity style characteristic of conforming personalities, who acquire values: norms of authorities were dominantly. The informational and diffuse avoidant identity styles were least represented in these student. Gender also explained differences in commitment, indicating girls were high on identity commitment. The normative identity style positively influenced the identity commitment that means strength, stability of personality conviction about values, attitudes to itself and society as well.

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An Analysis of Relationship Between Human Capital and Economic Growth

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Abstract: Human capital in every sense is one of the fundamental factors of development. No country can achieve sustainable economic development without substantial investment in human capital. The relationship between economic growth and human capital has been long recognized. Many studies especially in Western economies have shown that human capital has a positive impact on economic growth. However, economic growth also has a strong effect on human capital outcomes, both through private expenditures and government programs. Thus, higher incomes facilitate the achievement of other crucial human development objectives; it also has an indirect effect on human development. In Malaysia, human capital investment is becoming an important aspect of the development agenda for which a large percentage of its expenditure is being allocated.

This study attempts to analyze the relationship between human capital and economic growth in Malaysia using an augmented aggregate production function growth model, we apply the bounds testing (ARDL) approach to cointegration which is more appropriate for estimation in small sample studies. Human capital is represented by life expectancy at birth and public expenditure on education, while economic growth is measured using real gross domestic product. The data used for the analysis are gathered from various government agencies and world reports and the coverage is from 1980 to 2009. The study reveals that the traditional inputs i.e capital and labour are statistically significant in both the long-run and the short-run, having positive effects on economic growth in Malaysia. Government expenditure on education is only significant at 12.6 per cent level, while life expectancy is significant at 16.1 per cent. In other words, economic growth in Malaysia is very much input-driven i.e. by adding more and more resources into the same production function. Such growth is hard work and by the law of diminishing returns, cannot be sustained indefinitely. A large budget allocated to education does not translate into improvement in the quality of workforce and production process, innovation and technological advancement. Empirical results in this paper suggest that Malaysian education system must produce more efficient workforce to increase the contribution of human capital to its economic growth. A large budget allocation to education sector must be utilized optimally through providing education that tailored to the nation's need. Further human capital investment in the labour market is also needed to produce skilled workers. This argument is further strengthened when we look at the objective for improving human capital which is not merely to achieve a high level of economic growth but also to fulfill social needs.

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1. Introduction

Human capital plays a key role in both neoclassical and endogenous growth models (Mankiw Romer and Weil 1992, Rebelo 1991, Sianesi and Van Reenen 2003). In the neoclassical growth model, output is determined by capital and labour. Model used in exogenous growth theory consists of a production function equation in which economic output was the result of the sum of two inputs: labor and capital (Mankiw, Phelps, & Romer, 1995). As capital and/or labor increased, then output increased by the same proportion as the inputs. Actual growth was exogenous to the model. Instead of looking at growth in the context of it being a part of the equation, theorists and economists excluded it, making it exogenous to the model. The neoclassical growth model of Solow (1956) focused on exogenous technological or population factors that determine output-input ratio. In this model the balanced path growth is achieved when the output and physical capital grow in tandem at the constant rate of labour force growth, i.e. growth in percapita output is always equal to the growth of the labour force, whereas technological progress is regarded as exogenously determined. This exogenous technology variable was meant to account for any discrepancies between what certain levels of capital and labor would indicate as the output and actual output, especially in cross-country comparisons. More importantly, it provided a vehicle for explaining the rate of growth over time. There is however a major weakness to Solow's model. By keeping technology outside of the equation, Solow's model could not explain "why" or "how", or from where/what

technological progress came from (Cortright, 2001). The model therefore lacks quite a bit of explanatory power.

The empirical results of this model indicate that physical capital and labour inputs cannot explain completely the growth of output (Schultz 1961, Denison 1962). The findings show that the growth rate of output exceeds the relevant input measures suggesting that investment in human capital is probably the major explanation factor for the difference (Lucas 1988; Romer 1989). The extended neoclassical growth model adopts an endogenous growth concept by introducing effective labour as factor of production, where human capital is embodied in this measure. This model suggests that endogenously accumulated human capital has a direct impact on the productivity of labour, while the exogenous growth model regards human capital as given and it is not determined within the system.

Hence, a good way of generating economic growth is through educational development. The basic importance of education is to enable individuals with knowledge and the ability to apply that knowledge. Education is therefore commonly regarded as the most direct avenue to rescue a substantial number of people out of poverty since there is likely to be more employment opportunities and higher wages for skilled workers. Furthermore, education can enable children's attitudes and assists them to grow up with social values that are more beneficial to the nation and themselves.

The theoretical basis of education on economic growth is rooted in the endogenous growth theory. Endogenous growth economists believe that improvements in productivity can be linked to a faster pace of innovation and extra investment in human capital. There is also a central role for knowledge as a determinant of economic growth. Endogenous growth theory predicts positive externalities and spillover effects from development of a high valued-added knowledge economy which is able to develop and maintain a competitive advantage in growth industries in the global economy.

In Malaysia, government' commitment to upgrade level of human capital especially education among the population is shown from its large expenditure allocated to this sector. For example, in 1980 the education and training development expenditure was 15.5% of the total government expenditure and was the highest in the category of social services expenditure. This percentage had increased to 18.8 per cent in 1990, 23.7 per cent in 2000 and 22.6 per cent in 2008. Public education expenditure as a proportion of GDP ranged from 4.4 to 6.1% during the periods. This figure is larger than that of other countries; for example Singapore allocated around 3.3 to 3.6 per cent, Hong Kong 3.8 to 4.2 per cent and in Taiwan education allocation were about 4.1 to 4.9 per cent. Cambodia and Myanmar were among the countries where the ratio of education expenditure to GDP is less than 2 percent (ESCAP 2009).

The composition of education also changes towards higher percentage enrolment at higher level of education. For example, in 1975 enrolment at the tertiary level was 17,603 students increased to 96,247 in 1995, but in 2008, it increased to 419,334. Enrolment at the primary level increased to 97.8 per cent in 2002 but decreased 94.2 per cent in 2007, (Malaysia 1996, 1998, 2008). In addition, education is regarded as an instrument for achieving national unity and for producing a productive and highly disciplined society (Rahmah, 1997).

As a result of changes in the educational structure, employment by level of education has also changed towards higher percentage of those with higher educational achievement. For example, employment with tertiary qualification increased from 275, 900 in 1981 to 1.13 million in 1998 and 2.12 million in 2007. On the contrary, employment with no formal education and with primary level of education decreased (see Figure1). This change is consistent with industrial development that is moving towards a more-capital intensive and higher technological adoption, which require more skilled workforce. The objective of the economy to move ahead towards knowledge-based economy also resulted in greater demand for more educated workers.

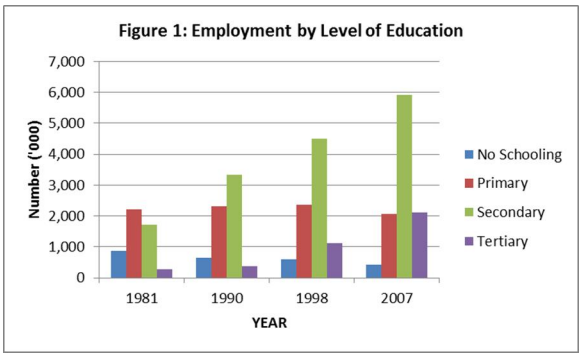

Table 1: Gross Domestic Product, Government Expenditure and University Enrolment

Year	Gross Domestic Product	Total Government Expenditure	Expenditure on Education			University Enrolment
	RM mill	RM mill	RM mill	% (Gov Exp)	% (GDP)	
1970	9 951	2 876	477	16.6	4.8	8 230
1975	22 332	7 013	1 370	19.5	6.1	17 603
1980	53 308	17 068	2 653	15.5	5.0	26 410
1985	77 470	26 822	3 437	12.8	4.4	43 258
1990	115 701	35 037	6 596	18.8	5.5	65 284
1995	218 703	49 093	10 459	21.3	4.8	96 247
2000	342 612	84 488	20 022	23.7	5.8	211 584
2008	738 677	196 346	44 420	22.6	6.0	419 334

Source: Ministry of Finance, Malaysia. (various issues), *Economic Report*. Kuala Lumpur: Government Publication.

Measuring the impact of human capital on output and economic growth is quite complex because both direct and indirect effects are involved. Measurement problems also arise from choosing the correct variables and defining them. Moreover, the goal of improving human capital is not only limited to achieving higher economic growth but it also contains objectives that are related to social and politics. Thus, failure to show its importance to increase output and economic growth does not mean that further investments in human capital should cease. Some countries emphasize social goals above that of the economic goals when investing in human capital. For example, investment in education is aimed to inculcate positive values among individuals which are crucial for long term development. In addition, human capital can be regarded as a basic need as it will improve the welfare of the society.

Human capital can be measured in several ways. Using education as a variable alone will require several possible measures such as years of schooling, number of enrolment, level of education of the labour force and public expenditure on education. A second type of human capital, health, in the form of life expectancy, has appeared significantly in many cross-country growth regressions (Bloom and Canning 2000, 2001). Life expectancy can effect economic growth in several ways. As people live longer, they can save more for old age (Lee et al. 1998). Life expectancy can also serve as proxy for the health status of the whole population, because declines in mortality rates are related to falls in morbidity.

From economist's view point, what is important is how far the rise in human capital can lead to an increase in output and thereby contribute to economic growth. To this question, human capital is introduced as a variable into the production function (Denison 1962, 1979; Hicks 1980; Otani and Villanueva 1990; Lau et al. 1993; Walter and Rubinson 1983).

1. The Theoretical Framework

The effect of human capital on economic growth is analyzed in the Cobb Douglas type production function and standard growth accounting framework. The standard aggregate production function (APF) model has been extensively used in econometric studies to estimate the impacts of human capital on growth in many countries. The APF assumes that, along with "conventional inputs" of labour and capital used in the neoclassical production function, "unconventional inputs" like human capital and trade may be included in the model to capture their contribution to economic growth. The general APF model to be estimated is
derived as:

$$Y_t = AK_t^{\alpha} L_t^{\beta} \qquad (1)$$

where Y_t denotes the aggregate production of the economy (real GDP per capita) at time *t* and A_t, K_t, and L_t are the total factor productivity (TFP), the capital stock and the stock of labour, respectively. The impact of human capital on economic growth possibly operates through TFP (A_t). Moreover, from the Bhagwati's hypothesis, any gains from human capital on TFP will surely be dependent on the volume of trade of a particular host country. Since we want to investigate the impacts of human capital on economic growth through changes in TFP, we assume therefore that TFP is a function a function of exogenous variables, such as level of human capital, government expenditure and foreign inputs. The argument is that an educated labour force performs a major role in the determination of productivity level instead of entering the production function as a factor. The expenditure on education is assumed to influence the level of human capital which is expected to cause improvements in total factor productivity. In addition, higher level of human capital speeds up the adoption of foreign technology that is expected to balance the knowledge gap between the developed and the developing countries (Nelson and Phelps, 1966; Lee; 1995; Benhabib and Spiegel, 1994; Loening, 2002). Thus:

$$A_t = C_t^{\lambda} H_t^{\delta} \quad (2)$$

Combining equations (2) with (1), we get:

$$Y_t = C_t^{\lambda} H_t^{\delta} K_t^{\alpha} L_t^{\beta}$$

From equation (3), an explicit estimable function is specified, after taking the natural logs both sides, as follows;

$$\ln Y_t = \beta_0 + \beta_1 \ln K_t + \beta_2 \ln L_t + \beta_3 \ln H_t + \beta_4 LIFE_t + \mu_t \quad (4)$$

Where,

Y = real gross domestic product (RM millions)

K = real physical capital stock (RM millions). The Malaysian data does not provide physical capital stock but data on capital formation (investment) is available. For the purpose of the analysis, capital stock is computed using the formula $K_t = \sum_{J=0} (I-d)^{t-j} (I_j / P_j)$ (Kydland and Prescott 1982).

L = quantity of labour ('000)

H = government expenditure on education (RM millions)

LIFE = life expectancy at birth

2.1 ARDL model specification

To empirically analyse the long-run relationships and dynamic interactions among the variables of interest, the model has been estimated by using the bounds testing (or autoregressive distributed lag (ARDL)) cointegration procedure, developed by Pesaran et al (2001). The bounds testing procedure is relatively more efficient in small or finite sample data sizes as is the case in this study (Narayan, 2004). The procedure will however crash in the presence of I(2) series.

To implement the bound test procedure, Equation (4) is modeled as a conditional ARDL-error correction model:

$$\Delta \ln Y_t = \alpha + \sum_{i=1}^{p} \theta_i \Delta \ln Y_{t-1} + \sum_{i=0}^{p} \beta_i \Delta \ln K_{t-1} + \sum_{i=0}^{p} \lambda_i \Delta \ln L_{t-1} + \sum_{i=0}^{p} \sigma_i \Delta \ln H_{t-1} + \sum \delta_i \Delta LIFE_t + \mu_2 \ln K_{t-1} + \mu_3 \ln L_{t-1} + \mu_4 \ln H_{t-1} + \mu_5 LIFE_{t-1} + \varepsilon_{1t} \quad (5)$$

The orders of lags in the ARDL model are selected by either the Akaike information criteria (AIC) or Schwarz Bayesian criterion (SBC), before the selected model is estimated by OLS. For annual data, Pesaran and Shin (1997) recommended choosing a maximum of two lags. From this, the lag length that minimizes SBC is selected. In addition, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta \ln Y_t = \alpha + \sum_{i=1}^{p} \theta_i \Delta \ln Y_{t-1} + \sum_{i=0}^{p} \beta_i \Delta \ln K_{t-1} + \sum_{i=0}^{p} \lambda_i \Delta \ln L_{t-1} + \sum_{i=0}^{p} \sigma_i \Delta \ln H_{t-1} + \psi ECT_{t-1} + \varepsilon_{2t} \quad (6)$$

where ECT_{t-1} is the one period lagged error correction term, defined as

$$ECT_{t-1} = \ln Y_t - \alpha - \sum_{i=1}^{p} \mu_1 \ln Y_{t-1} - \sum_{i=0}^{p} \mu_2 \ln K_{t-1} - \sum_{i=0}^{p} \mu_3 \ln L_{t-1} - \sum_{i=0}^{p} \mu_4 \ln H_{t-1} - \Sigma \mu_5 LIFE_{t-1} \quad (7)$$

Here θ, β, λ, and σ are the short-run dynamic coefficients of the model's convergence to long-run equilibrium, and ψ is the speed of adjustment.

2.2 Bounds testing procedure

The first step in the ARDL bounds testing approach is to estimate equation (5) by ordinary least squares (OLS) in order to test for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables, i.e., H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = 0$ against the alternative H_1: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq 0$. We denote the test which normalize on Y by F_Y(Y/K,L,H,LIFE). Two asymptotic critical values bounds provide a test for cointegration when the independent variables are I(d) (where $0 \leq d \leq 1$): a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors. If the F-statistic is above the upper critical value, the null hypothesis of no long-run relationship can be rejected irrespective of the orders of integration for the time series. Conversely, if the test statistic falls below the lower critical value the null hypothesis cannot be rejected. Finally, if the statistic falls between the lower and upper critical values, the result is inconclusive. The approximate critical values for the F-test were obtained from Pesaran et el (2001). In the second step, once cointegration is established the conditional ARDL (p_1

,q_1 , q_2, q_3, q_4, q_5) long-run model for Y_t can be estimated as:

$$\ln Y_t = \alpha + \sum_{i=1}^{p} \delta_1 \ln Y_{t-i} + \sum_{i=0}^{q_1} \delta_2 \ln K_{t-i} + \sum_{i=0}^{q_2} \delta_3 \ln L_{t-i} + \sum_{i=0}^{q_3} \delta_4 \ln H_{t-i} + \sum_{i=0}^{q_4} \delta_5 LIFE_{t-i} + \varepsilon_t \quad (8)$$

This involves selecting the orders of the ARDL (p, q_1 , q_2 ,q_3 ,q_4,q_5) model in the six variables using Akaike information criteria (AIC). In the third and final step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates.

3. Results and Discussion

3.1 Unit roots tests

Before we proceed with the ARDL bounds test, we test for the stationarity status of all variables to determine their order of integration. This is to ensure that the variables are not I(2) stationary so as to avoid spurious results. According to Ouattara (2004) in the presence of I(2) variables the computed F-statistics provided by Pesaran et al (2001) are not valid because the bounds test is based on the assumption that the variables are I(0) or I(1). Therefore, the implementation of unit root tests in the ARDL procedure might still be necessary in order to ensure that none of the variables is integrated of order 2 or beyond.

We applied the augmented Dickey – Fuller (ADF) and Phillips – Perron unit root test were conducted to examine whether each series of interest are stationary or not. The test regression included both a constant and trend for the levels and also for the first differences of the variables. The ADF and PP tests showed that all the series were non-stationary in level but stationary in the first difference (see Table 2a and 2b), that all variables are I(1).

Table 2a: τ ratios from ADF unit root tests

Variables	ADF tests including intercept and trend	
	Level*	First Difference**
GDP	-2.303645	-3.890704
K	-1.351059	-4.545250
L	-2.397156	-5.067466
H	2.545332	-3.944343
LIFE	-2.047078	-8.169328

Table 2b: Adj t-stat from Phillips-Perron unit root tests

Variables	PP tests including intercept and trend	
	Level*	First Difference**
GDP	-2.313427	-3.900965
K	-1.712561	-4.592819
L	-2.329836	-5.297553
H	9.082818	-3.946372
LIFE	-2.010571	-9.191768

3.2 Bounds tests for cointegration

In the first step of the ARDL analysis, we tested for the presence of long-run relationships in equation (4), using equation (5). We used a general-to-specific modelling approach guided by the short data span and AIC respectively to select a maximum lag order of 2 for the conditional ARDL-VECM. Following the procedure in Pesaran et al, we first estimated an OLS regression for the first differences part of equation (5) and then test for the joint significance of the parameters of the lagged level variables when added to the first regression.

Table 3 reports the results of the calculated F-statistics when each variable is considered as a dependent variable (normalized) in the ARDL-OLS regressions. The calculated F-statistics $F_{GDP}(GDP/K, L, H, LIFE)$ = 4.373 is higher than the upper bound critical value 4.01 at the 5% level. Also F_H(H/GDP, K, L, LIFE) = 4.791 is also higher than the upper-bound critical value 4.01 at the 5% level. Thus, the null hypotheses of no cointegration are rejected, implying long-run cointegration relationships amongst the variables when the regressions are normalized on both GDP_t and H_t variables. However, based on the growth theory, we used GDP_t as the dependent variable.

Once we established that a long-run cointegration relationship existed, equation (8) was estimated using the following ARDL (1, 2, 2, 2, 0) specification. The results obtained by normalizing on real GDP per capita, in the long run are reported in Table 4. The long run test statistics reveal that the capital and labour are the key determinants of the economic growth. It suggests that in the long run, an increase of one per cent in the capital is associated with an increase of 0.26 per cent in GDP. An increase of 1% in labour will increase GDP by 1.1%. The coefficient of expenditure on education is positive but quite low (i.e 0.08) and significant only at 12.6 per cent level, which implies that the impact from an increase in expenditure on education on GDP is very minimal and not quite significant.

Table 3: Results from bounds tests on Equation (5)

Dep Variable	F-stat	Prob	Outcome
GDP	4.373**	0.000012	Cointegrate
K	2.106	0.0001748	No Cointegrate
L	1.656	0.8361	No Cointegration
H	4.791**	0.6346	Cointegration
LIFE	2.598	0.1127	No Cointegration

Table 4: Estimated long run coefficients using the ARDL approach
Equation (8): ARDL(1,2,2,2,0) selected based on AIC

Dependent Variable: ln GDP_t

Regressor	Coefficient	t-stat	Prob
Constant	-1.8573	1.1279	-1.647[.119]
ln K	0.2625	0.0297	8.8518[.000]
ln L	1.0951	0.2453	4.4636[.000]
ln H	0.0804	0.0498	1.6157[.126]
LIFE	0.0133	0.0090	1.4696[.161]

Note: ***significant at 1% significance level
** significant at 5% significance level
*significant at 10% significance level

Diagnostic tests for serial correlation, normality, heteroscedasticity and functional form are considered, and results are presented in Table 5. These tests show that the long-run model passes all diagnostic tests in the first stage. The results indicate that the model passes the residual serial correlation test and the test for normality, proving that the error term is normally distributed. The functional form of the model is well specified and there is no existence of white heteroscedasticity in the model.

The results of the short-run dynamic coefficients associated with the long-run relationships obtained from ECM Equation (7) are given in Table 5. The changes in the relevant variables represent short-run elasticities, while the coefficient on the *ECT* term represents the speed of adjustment back to the long-run relationship among the variables. The results in Table 5 suggest that the immediate impact of changes on capital stock, labour and expenditure on education bear positive sign and are significant at the 1% level. On the contrary, life expectancy appears to have less significant impact on GDP in the short-run. Solow residuals or constant term has a negative sign and is statistically insignificant. The equilibrium correction coefficient, estimated -0.4256, is highly significant, has the correct sign, and implies a fairly moderate speed of adjustment to equilibrium after a shock. Approximately 43% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. The Adj R^2 is 0.968, suggesting that such an error correction model fits the data reasonably well. More importantly, the error correction coefficient has the expected negative sign and is highly significant. This helps reinforce the finding of a long-run relationship among the variables in the model. Finally, the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) plots from a recursive estimation of the model also indicate stability in the coefficients over the sample period (Figures 2,3).

4. Conclusion

This study examines the long-run and the short-run relationships between human capital variable (specifically expenditure on education and life expectancy) and economic growth in Malaysia.Using an augmented aggregate production function growth model, we applied the bounds testing approach to cointegration, which is more appropriate for estimating in small sample studies. The data span for the study is from 1980 to 2009.

The results indicate that the traditional inputs i.e capital and labour are statistically significant in both the long-run and the short-run, having positive effects on economic growth in Malaysia. However, human capital variables appear to have an insignificant impact on growth in the long-run, but significant in the short run. This implies that an increase in expenditure on education did not lead to economic growth in the long run. Hence, we can conclude that Malaysia's economic growth basically is an input-driven i.e. by adding more and more resources into the same production function. Such growth is hard work and by the law of diminishing returns, cannot be sustained indefinitely. According to growth accounting method, there are three elements that contribute to the production of goods and services: labour, capital and technology (also known as total factor productivity (TFP)). Labour and capital, known collectively as the "factor of production", refer to the workforce and the capital goods (buildings, machines, vehicles, etc) that use in producing products or providing services. Technology or TFP refers to all the methods employed by labour and capital to produce goods or services more quickly and more efficiently. No one denies that all three elements must be present to some degree if an economy is to grow. But to sustain the economic growth, country must focused on the contribution of technology relative to that of factor of production.

Table 5: Error correction for the model
Dependent Variable: $\Delta \ln GDP_t$

Regressor	Coefficient	Std Error	t-stat [Prob]
Constant	-0.7904	0.61661	-1.2819 [.215]
$\Delta \ln K$	0.2387	0.01617	14.7669 [.000]
$\Delta \ln K(-1)$	-0.0504	0.01678	-3.0059 [.007]
$\Delta \ln L$	0.4276	0.16895	2.5310 [.020]
$\Delta \ln L(-1)$	-0.3807	0.12641	-3.0119 [.007]
$\Delta \ln H$	0.0384	0.00965	3.9741 [.001]
$\Delta \ln H(-1)$	-0.0504	0.03003	-1.6770 [.110]
Δ LIFE	0.0057	0.00327	1.7289 [.100]
ECT(-1)	-0.4256	0.11883	-3.5817 [.002]
Diagnostics		Statistics	p-value
R^2		0.968	
S.E. of Regression		0.0095782	
Serial Correlation: $\chi^2(1)$		0.5756	0.448
Functional Form: $\chi^2(1)$		0.3894	0.533
Normality: $\chi^2(2)$		2.5437	0.280
Heteroscedasticity: $\chi^2(1)$		2.6048	0.107

Note: ***significant at 1% significance level
** significant at 5% significance level
*significant at 10% significance level

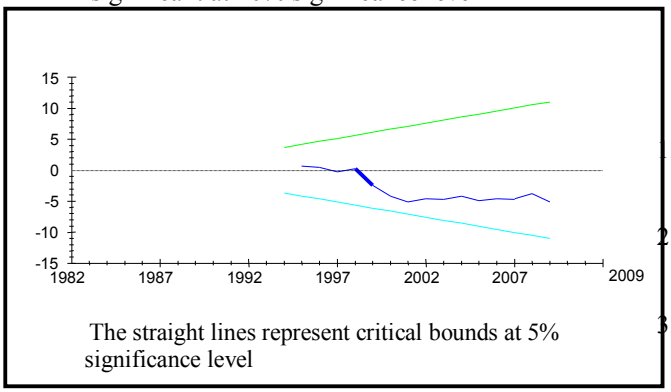

Figure 2. Plot of CUSUM of Recursive residuals

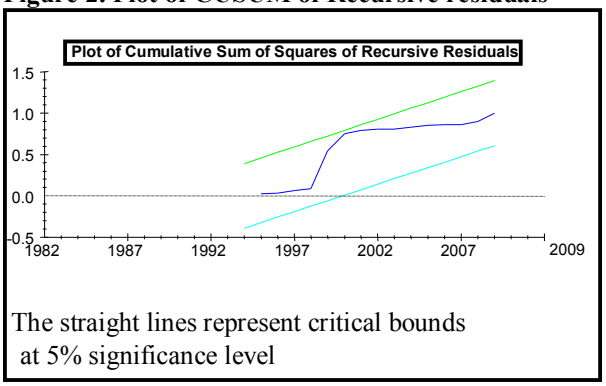

Figure 3. Plot of Cumulative Sum of Squares of Recursive Residuals

Empirical results in this paper suggest that some major review must take place on the Malaysian education system. Based on the empirical evidence, a large budget allocated to the education sector so far was unable to elevate worker to a higher level of knowledge. Education sector must produce more efficient workforce to increase the contribution of human capital to its economic growth. A large budget allocation to education sector must be utilized optimally through providing education that tailored to the nation's need. Further human capital investment in the labour market is also needed to produce skilled workers. Some studies in other countries also suggest that the level of effective human capital in the economy depends on total skills of the workforce and not just only based on formal education (Iyigun and Owen 1996). In this respect, the workforce must be trained to be skilled workers. The employers both in the public sector and the private organisations must be responsible equally in providing training facilities to their workers.

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1/26/2012

Prevalence of Breast Cancer in East-Azerbaijan of Iran

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Abstract: Cancer is a leading cause of death worldwide with about 7.6 million deaths in 2008. Breast cancer is the most frequent cancer among women and the most common cause of cancer death. This study is a mammographic screening study on 1000 women who came to a radiology center in Tabriz at 2010. The screening technique included physical examination of breasts by an experienced physician before taking mammograms and then mammography in two standard views.1000 women between ages 40-77 years old and without any clinical symptoms was evaluated. Malignant mass or nodule: 13 cases, Benign mass or nodule: 34 cases, Benign calcified nodule: 10 cases, Fatty breast: 6 cases and Ductal ectasia: 1 case. Association between malignancy signs in mammography and positive clinical findings doesn't have statistical significance (P=0.405) and association between benign signs in mammography and clinical findings doesn't also have statistical significance (P=0.692). varying in prevalence of breast cancer in different studies suggests that many factors more than those we think about them as same as: ages, family history, first pregnancy, menarche age, gravity, breast-feeding have rules in breast cancer prevalence and these should will be studying in anthers analytic studies to know about these factors and ways to decrease them and ultimately breast cancer mortality.
[Sajjad Ahmadi, Seyed Hesam Rahmani, Alireza Moghbel, Sepehr Taghizadeh, Hamidreza Morteza Beigi, Ali Zadimani, Seydeh Ramona Razavi, Homa Fatorachi. **Prevalence of Breast Cancer in East-Azerbaijan of Iran.** *Life Sci J* 2012;9(4):3743-3746] (ISSN:1097-8135). http://www.lifesciencesite.com. 555

Keywords: Cancer; Breast; Mammography; Screening

1. Introduction

Breast cancer is the most frequent cancer among women, and it is also the most common cause of cancer death in both developed and developing regions (Ferlay, 2010). Breast cancer is a major problem for global public health. Breast Cancer is the most common incident form of cancer in women around the world. The incidence is increasing while mortality is declining in many high-income countries. The last decade has seen a revolution in the understanding of breast cancer, with new classifications proposed that have significant prognostic value and provide guides to treatment options (Boyle, 2012). Breast cancer is also the most common cancer in Iranian women and vast majority of patients in Iran are diagnosed in advanced stages (Harirchi, 2011). Iranian breast cancer patients are younger than the patients in western countries (Ebrahimi, 2002). Cancer is the third leading cause of death in Iranian population (Yavari, 2008). Geographical variations in incidence and mortality rates of breast cancer suggest that the known risk factors for breast cancer may vary in different parts of the world and that environmental factors are of greater importance than genetic factors (Mc Pherson, 2000). Although breast cancer is an important health problem in Iran, Epidemiologic data isn't sufficient for this problem. For this reason, we conducted this mammographic screening study to determine the prevalence of breast cancer in East-Azerbaijan, a northwestern province of Iran.

2. Material and Methods

This is a mammographic screening study that performed in the Tabriz University of medical sciences at 2010. 1000 women who came to a radiology center in Tabriz (capital of East Azerbaijan province in Iran) were selected. The sample was

chosen among patients without any clinical symptoms who were referred for a general check-up or for initiating hormone replacement therapy or for follow-up after initiating hormone replacement therapy.

The screening technique included physical examination of breasts by an experienced physician before taking mammograms and then performing screening mammography in two standard views: craniocaudal (CC) and mediolateral-oblique (MLO) view.

A radiologist read the mammograms and any kind of abnormal findings were recorded. If there was any need, the patients were referred for further evaluation or to a surgeon for a biopsy. In the mammograms with abnormal findings the involved quadrant of breasts were recorded and association between the malignant and benign signs of mammograms and involved area of breast was evaluated. The association between the results of physical examination of breasts and results of mammograms was analyzed. In the sample the frequency of malignant and benign masses or nodules in different age groups was calculated.

Ethical considerations

This study was in perfect compliance with privacy protection, and all patients' information is completely confidential and their name and specifications have never been revealed.

3. Results

1000 women between ages 40-77 years old and without any clinical symptoms were evaluated. The frequency of age groups in the sample is shown table 1.

The results of the screening mammography in the sample were as follows:

Malignant mass or nodule: 13 cases, Benign mass or nodule: 34 cases, Benign calcified nodule: 10 cases, Fatty breast: 6 cases and Ductal ectasia: 1 case. Frequency of malignancy in different age groups was shown in Table 2.

Table 1. The frequency of age groups of samples

Age Range in year	Percentage
40-49	43.6%
50-59	41.8%
60-69	12.8%
>70	1.8%

In malignant cases 38.46% had negative clinical exam and 61.53% had palpable nodule or mass in the physical examination. Among the cases that had a benign nodule or mass in mammography 50% had a positive physical examination and 50% had a negative physical examination. Association between malignancy signs in mammography and positive clinical findings doesn't have statistical significance (P value=0.405) and association between benign signs in mammography and clinical findings doesn't also have statistical significance (P value=0.692).

In cases that had normal mammography 12.4% had signs of auxiliary lymphadenopathy, bloody secretions, glandular hyperplasia, pain in palpation or depressed nipple and pain in palpation of the breast is the most prevalent sign.

Table 2. Frequency of malignancy in different age groups

Age Range in year	Number of cases	Percentage
40-49	3	23%
50-59	8	61.5%
60-69	1	7.7%
>70	1	7.7%

Association between secretions and malignancy was evaluated. In cases that secretions were present 96.2% had normal mammography and 3.8% had benign nodule or mass without any statistical significance (P value = 0.975)

In the cases, which had signs of malignancy in mammography, the most involved anatomical location was the upper outer quadrant. (P value=0.018) In whom there were signs of a benign nodule or mass in mammography the most involved anatomical location was also the upper outer quadrant (P value=0.113).

4. Discussions

There is no way to breast cancer prevention though early diagnosis with screening mammography is the best intervention to reduce Brest cancer mortality. Recently, a review of six case-control studies confirmed a breast cancer mortality reduction ranging from 38% to 70% among screened women (Puliti and Zappa, 2012). In this study the breast cancer prevalence was 13 in 1000 patients and 5-20 with CI 95%.

Haikel and et al in 2012, reported 4.2 cases of breast cancer per 1000 examinations in a rural county in Brazil with screening mammography. The number of cancers detected was significantly higher in women aged 60 to 69 years than in those aged 50 to 59 years ($p < 0.001$) or 40 to 49 years ($p < 0.001$). No difference was observed between women aged 40 to 49 years and those aged 50 to 59 years ($p = 0.164$) (Haikel, 2012).

But we couldn't found any association between patient's age and menarche age with breast cancer.

Li and et al in 2012, reported suspicious breast cancer 0.2% among women aged 30 to 59 years old in China by clinical examination and mammography (Li, 2012).

Skovajsová and et al in 2012, reported 14914 breast cancer among 3056 907 women (0.48%) aged 45-69 that goes to mammographic screening between 2003-2010(Skovajsová, 2012).

In the cases, which had signs of malignancy in mammography and, whom there were signs of a benign nodule or mass in mammography the most involved anatomical location was the upper outer quadrant.

Elisabeth Bräutigam and et al in 2009, reported that Between 1089 patients presenting with a invasive carcinomas, 707 presented with tumors in the lateral quadrants, 294 with tumors in the medial quadrants, and 99 with tumors in the central quadrant (Bräutigam, 2009). There is no association between the ages of first pregnancy, breast secretions, and number of Childs, breast-feeding with breast cancer incidences.

Vera-Ramirez and et al: Diet has attracted considerable attention, as it is a modifiable risk factor and thus offers an opportunity to design preventive strategies. Nevertheless, only alcohol consumption has been unequivocally related to increased breast cancer risk. Despite the failure of observational studies in human populations to clearly define the nature of the relationship between specific nutrient exposures and breast cancer risk, in vivo and in vitro studies strongly suggest its existence. Moreover, studies at the molecular level have identified the putative action mechanism by which the nutritional constituents of specific foodstuffs may exert protective or enhancing effects with respect to breast cancer risk (Vera-Ramirez, 2010).

Kristbjornsdottir and Rafnsson reported that there are indications of an exposure-response relationship, as the risk of breast cancer was higher in residents of warm reference area in comparison with the cold area. Social status has been taken into account and data on reproductive factors and smoking habits show that these do not seem to explain the increased risk of breast cancer, however unknown confounding cannot be excluded (Kristbjornsdottir and Rafnsson, 2012).

The frequency of patients with Cancers increased with age in both sexes (Yavari, 2008).

Hajian-Tilaki and Kaveh-Ahangar in 2011 in Iran reported that having higher age at first pregnancy and abortion were associated with increased breast cancer risk (the adjusted OR = 4.1, 95% CI: 1.3-13.2 and 2.93, 95% CI: 1.64-5.24, respectively)(Hajian-Tilaki and Kaveh-Ahangar, 2011). By increasing parity, the risk had reduced significantly; among women with parity ≥ 5, the adjusted OR was 0.09 (95% CI 0.01-0.7) compared with nulliparous women, and also for each additional parity, the risk reduced by 50% (OR = 0.50, 95% CI: 0.34-0.71).

The duration of breast-feeding was inversely associated with breast cancer risk, while after additional adjustment for parity, no longer the protective effect of breast-feeding was observed. Nullparity, late age at first birth and abortion were the most important reproductive factors associated with breast cancer risk; therefore, it is recommended to women with these risk factors to perform breast cancer screening tests earlier (Hajian-Tilaki and Kaveh-Ahangar, 2011).

There is no difference between right and left breast in the rate of malignant or non-malignant mass. The most common finding in people with normal mammogram was pain in palpation without any mass (p=0.00). Positive or negative physical exam before mammography couldn't rule out presence of malignant or benign mass.

5. Conclusion

It seems prevalence of breast cancer in this study is more than another studying and another studies results also different together, also varying results about effective factors suggests that many factors more than those we think about them as same as: ages, family history, first pregnancy, menarche age, gravity, breast-feeding have rules in breast cancer incidences and prevalence. Despite the generally accepted idea that breast cancer risk factors are similar worldwide other factors as same as gene and diet and other environmental factors as same as diet, temperature… may alter their importance as causal factors, and results from studding on Caucasian patients may not be applicable in patients in Iran due to differences in tumor biology/profiles, metabolism of drugs and also health beliefs, though we should plan another analytic studies to know about these effective factors in Iranian people and ways to decrease them and ultimately breast cancer mortality..

Suggestions:

According to the results of this study and other studies, it is recommended to provide the possibility of self-examination studying with TV and odder media and gradually moving towards national mammography programs in Iran disseminated through the media with government support.

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Potential Therapeutic Effects of some Egyptian Plant Parts on Hepatic Toxicity Induced by Carbon Tetrachloride in Rats

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Abstract: This study was conduced to investigate the effect of some Egyptian herbs on impaired liver function of rats injected with Carbon Tetrachloride (CCl_4). Seventy mature albino rats, weighting 150-160g per each, were used and divided into 12 equal groups, one was kept as a control-ve group, while the other groups were injected subcutaneous (s/c) by CCl_4 in paraffin oil 50% v/v (2 ml/kg B.W.), twice a week for tow weeks. The tested herbs were given as a percent of 5% and10% from the Basel diet. Serum liver function (GOT, GPT, ALK) total protein, albumin, globulin, total bilirubin, indirect bilirubin, direct bilirubin, and histopathological changes of liver were examined. The results indicated that rats treated with CCl_4 recorded significantly increasing in the activity levels of all biomarker liver enzymes (SGOT, SGPT and SALP) and decreasing in serum total protein, albumin, globulin and bilirubin with significant values when compared with the control group after the experiment period, 2 weeks. Addition of tested plant parts such Henada *(Jasonia Montana)*, lemon balm leaves (*Melissa officinalis*), hawthorn leaves *(Crataegus azorolus),* rose of jericho *(Anastatica hierochuntica)* and corn cob silk *(zea mayz)* by 5 and 10% of the diet intake in the presence of CCl_4 induced significant improvements in all liver functions. Also, CCl_4 treated group had histopathological changes on liver through degeneration hyperemia, inflammatory reaction. The post-treatment of tested plant parts with CCl_4 leads to prevent some of the previous histopathological changes. It could be concluded that the tested plant parts were effective in protecting against CCl_4 -induced adverse liver functions and its histopathological changes. These results supported our hypothesis that the tested plant parts contain several compounds that are able to prevent or inhibit CCl_4 toxicity. Therefore, we recommended those tested plant parts by a moderate amount to be included in our daily diets and drinks.

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Key words: liver functions, bilirubin, albumin, histopathological changes.

1. Introduction

Liver is a vital organ present in all vertebrates. It has a wide range of functions, including detoxification, protein synthesis, and production of biochemical necessary for digestion (Voet and Voet,1990). This organ plays a major role in metabolism and has a number of functions in the body, including glycogen storage, decomposition of red blood cells, plasma protein synthesis, hormone production, and detoxification. It lies below the diaphragm in the abdominal-pelvic region of the abdomen. It produces bile, an alkaline compound which aids in digestion via the emulsification of lipids. The liver's highly specialized tissues regulate a wide variety of high-volume biochemical reactions, including the synthesis and breakdown of small and complex molecules, many of which are necessary for normal vital functions (Maton *et al.,* 1993).The liver is necessary for survival; there is currently no way to compensate for the absence of liver function long term, although liver dialysis can be used short time.

Nature has been a source of medicinal agents since the beginning of time. Herbal medicine is still the most common source for primary health care of about 65-80% of the world's population, mainly in developing countries, because of better cultural acceptability, and compatibility with the human body as well as fewer side effects. Different parts of these plants including Leaves, flowers, stems, roots, seeds, fruit and bark can all be constituents of herbal medicines (Shibamoto *et al.,* 2008). The medicinal values of these plants lie in their phytochemical components which produce definite physiological actions on the human body. The most important of these components are alkaloids, tannins, flavonoid and phenolic compounds (Shariff, 2001*).* Such components are extensively found at different levels in various medicinal plants and used in herbal medicine to treat diverse ailments such cough, malaria, wounds, toothache and rheumatism diseases (Exarchou *et al., 2002*).

Few decades ago, there has been renewed attention and interest in the use of traditional medicine globally (WHO, 2002). According to estimate of the world health organization, 80% of the world population is primarily reliant on traditional

methods of healing which use empirical knowledge based o the use of medicinal plants (Mueller and Mechler, 2005). Therefore, the present study aims to evaluate the therapeutic effect of some Egyptian plant parts on impaired liver function of rats injected with carbon tetrachloride (CCl_4). Also, histopathological effects of the these plant parts on liver will be in the scope of this investigation.

2. Materials and Methods

2.1 Materials:

Plants: Henada *(Jasonia Montana)* were obtained from Sant Catherine, Sinai while lemon balm leaves (*Melissa officinalis*), hawthorn leaves *(Crataegus azorolus),* rose of jericho *(Anastatica hierochuntica)* and corn cob silk *(zea mayz)* were obtained from local markets, Shebin El-kom City, Egypt. All plants parts were grinded using Electric grinder (Moulinex, France) to give a powder and kept in dusky Stoppard glass bottles until use.

Rats: Sixty adult male albino rats, weighing 150-160g per each were obtained from Medical Insects Research Institute, Dokki, Cairo.

Chemicals: All chemicals, solvents and buffers in analytical grade, carbon tetrachloride (CCl_4, 10% liquid solution) and vitamin and salt mixtures components used for rats feeding were purchased from Elgomhoria Company for Chemicals and Drug Trading, Cairo, Egypt. Casein was obtained from Morgan Chemical Co., Cairo, Egypt. Paraffin oil (10%) obtained from Eltampashawy Pharmacy, Shebin El-Kom City, Egypt.

2.2 Biological Experiments:

2.2.1 Basal Diet:

The basic diet prepared according to the following formula as mentioned by (AIN, 1993) as follow: protein (10%), corn oil (10%), vitamin mixture (1%), mineral mixture (4%), choline chloride(0.2%), methionine (0.3%), cellulose (5%), and the remained is corn starch (69.5%). The used vitamin mixture component was that recommended by (Campbell, 1963) while the salt mixture used was formulated according to (Hegsted, 1941).

2.2.2 Preparation of liver impaired rats:

Liver impaired was induced in normal healthy male albino rats by subcutaneous injection of CCl_4 (0.2 mg/kg body weight) for two weeks according to method described by Passmore and Eastwood, (1986).

2.2.3 Experimental design

All biological experiments were done at the biology lab, Nutrition and Food Science Dept., Faculty of Home Economics, Minoufiya University, Shebin El-Kom, Egypt. Rats (n=60 rats) were housed individually in wire cages in a room maintained at 25 ± 2 ^{0}C and kept under normal healthy conditions. All rats (60 rats) were fed on basal diet for one-week before starting the experiment for acclimatization. After one week period, the rats were divided into two main groups, the first group (Group 1, 5 rats) still fed on basal diet and the other main group (55 rats) was injected by CCl_4 for two weeks to induce liver impaired rats then classified into eleven sub groups as follow:

– Group (2): fed on standard diet only as a positive control
– Group (3): fed on standard diet containing 5% henada powder.
– Group (4): fed on standard diet containing 10% henada powder.
– Group (5): fed on standard diet containing 5% lemon palm powder.
– Group (6): fed on standard diet containing 10% lemon palm powder.
– Group (7): fed on standard diet containing 5% Jericho rose powder.
– Group (8): fed on standard diet containing 10% Jericho rose powder.
– Group (9): fed on standard diet containing 5% hawthorn powder.
– Group (10): fed on standard diet containing 10% hawthorn rose powder.
– Group (11): fed on standard diet containing 5% corn cob silk powder.
– Group (12): fed on standard diet containing 10% corn cob silk powder.

2.2.4 Blood sampling:

At the end of experiment period, 28 days, blood samples were collected after 12 hours fasting using the abdominal aorta and rats were scarified under ether anesthetized. Blood samples were received into clean dry centrifuge tubes and left to clot at room temperature, then centrifuged for 10 minutes at 3000 rpm to separate the serum according to Drury and Wallington, (1980). Serum was carefully aspirate, transferred into clean covet tubes and stored frozen at -20^{o}C until analysis.

2.2.5 Hematological analysis

Different tested parameters in serum were determination using specific methods as follow: glotamic oxaloacetic transaminas (GOT), glotamic pyruvic transaminas (GPT), alkaline phsphatase (ALP), total Bilirubin, direct Bilirubin and indirect bilirubin, albumin, globulin and total protein according to Yound, (1975), Tietz, (1976), Belfield and Goldberg, (1971), Doumas *et al.,* (1973), Chary and Sharma, (2004), Spencer and Price, (1977), Chary and Sharma, (2004) and Weissman *et al.,* (1950), respectively.

2.2.6 Histopathological examination

After rats were scarified under ether anesthetized, liver was removed, washed in slain

solution, dried by filter paper, weighted, and stored frozen in formalin solution 10% for histopathological testing according to method mentioned by Drury and Wallington, (1980).

2.3. Statistical analyses

Statistical analyses were made by using SPSS computer program (1998).

3. Results and Discussion

3.1 Serum GOT, GPT And ALP Activities (U\L) Of Rats Injected Ccl_4 And Consumed Some Plant Parts

Table (1) illustrate the mean value of serum (GOT) of rats' livers fed on various diets. It could be noticed that GOT of control (-) group was lower than control (+) group by the ratio of -40.8 %. Rats' livers fed on different tested diets revealed significant decreases in GOT activities compared with the rats injected with CCl_4. The percent of decrease as compared to control (+) group were - 42.14, - 46.17, - 41.18, - 43.48, and - 45.21; and -43.87, - 44.06, - 37.55, - 40.8 and - 45.21 % for *henada, lemon palm, Jericho rose, hawthorn and Corn cob silk by 5 and* 10%, respectively. Non significant differences were observed amongst rats groups fed on henada 10%, lemon palm 5 and 10%, hawthorn 5% and corn cob silk 5 and 10%. Considering (GOT) activity, *lemon palm 5%* group recorded the best treatment was observed for when compared to control (-) group. According to amelioration degree of GOT activity, the sequence of potency of that plant parts were lemon palm 5%> corn cob silk 5 > corn cob silk 10 > lemon palm 10%> Henada 10%> hawthorn 5%> henada 5%> Jericho rose 5%> hawthorn 10%> Jericho rose 10%. The same behaviour was observed for the mean value of serum (GPT) and (ALP) except the sequence of plant parts potency which were Jericho rose 5%> lemon palm 5%> hawthorn 5%> Henada 10%> lemon palm 10%> henada 5%> hawthorn 10%>> corn cob silk 10> Jericho rose 10% >corn cob silk 5 for GPT and hawthorn 10%> Jericho rose 5%> lemon palm 5%> Henada 5%> hawthorn 5%> henada 10%> Jericho rose 10% > lemon palm 10> corn cob silk 10> corn cob silk 5 for ALP. In similar study Shaban *et al.,* (2012) reported that the methanolic extract of Jericho rose (*A. hierochuntica*) was significantly decreased the activity levels of all some biomarker liver damage enzymes including GOT, GPT and ALP and restored them to normal values in all treated group of alloxan diabetic rats.

Aminotransferases are normally intracellular enzymes. Thus, the presence of elevated levels of aminotransferase in the plasma indicates damage to cells rich in these enzymes. For example, physical trauma or a disease process can cause cell lysis, resulting release of intracellular enzymes into the blood. Two aminotransferases were found in plasma are of particular diagnostic value GOT and GPT. These enzymes are elevated in nearly all liver diseases, but are particularly high in conditions that the causes extensive cell necrosis, such as severe viral hepatitis and prolongated circulatory collapse. Serial enzyme measurements are often useful in determining the course of liver damage. Also, aminotransferases may be elevated in nonhepatic disease, such as myocardial infraction and muscle disorders; however, these disorders can usually be distinguished clinically from liver disease (Champe and Harvey, 1994). Alkaline phosphatase (ALP) is an enzyme which catalyzes the hydrolysis of phosphate esters at an alkaline pH to give pi and the corresponding alcohol, phenol or sugar.

Table (1). Serum GOT, GPT and ALP activities (u\l) of rats injected CCl_4 and consumed some plant parts

Groups		GOT (U\L)		GPT (U\L)		ALP (U\L)	
		Mean±SD	% of change	Mean±SD	% of change	Mean±SD	% of change
Control (-)		$103^{bc} \pm 5$	- 40.80	$33.6^{de} \pm 1.4$	- 68.53	$165^{bcde} \pm 5$	- 21.55
Control (+)		$174^{a} \pm 5.29$	------	$106.8^{a} \pm 21.5$	------	$210.33^{a} \pm 1.52$	------
Henada	5%	100.66 ± 4.04	- 42.14	$47.2^{bc} \pm 1.3$	- 55.80	$160.66^{cde} \pm 6.02$	- 23.61
	10%	$97.66^{cd} \pm 2.51$	- 43.87	$43.2^{bcde} \pm 1.9$	- 59.55	$161.66^{bcde} \pm 2.08$	-23.13
Lemon palm	5%	$93.66^{cd} \pm 2.51$	- 46.17	$33.6^{de} \pm 1.4$	- 68.53	$160^{de} \pm 4.58$	-23.92
	10%	$97.33^{cd} \pm 3.05$	- 44.06	$45.2^{bcd} \pm 1.3$	- 57.67	$164^{bcde} \pm 4.58$	-22.02
Jericho rose	5%	$102.33^{bc} \pm 3.78$	- 41.18	$31.8^{e} \pm 1.6$	- 70.22	$159.66^{de} \pm 1.52$	-24.09
	10%	$108.66^{b} \pm 3.21$	- 37.55	$49.4^{bc} \pm 2.6$	- 53.74	$162^{bcde} \pm 3.60$	-22.97
Hawthorn	5%	$98.33^{cd} \pm 1.52$	- 43.48	$39^{cde} \pm 2.5$	- 63.48	$161.33^{bcde} \pm 2.51$	-23.29
	10%	$103.^{bc} \pm 4.35$	- 40.80	$48^{bc} \pm 3.8$	- 55.05	$157.33^{e} \pm 2.51$	-25.19
Corn cob silk	5%	$95.33^{cd} \pm 2.51$	- 45.21	$53.4^{b} \pm 2.1$	- 50.00	$170^{bc} \pm 2.00$	-19.17
	10%	$95.66^{cd} \pm 4.04$	- 45.02	$48.4^{bc} \pm 6.1$	- 54.68	$168^{bcd} \pm 2.00$	-20.12
Sig.		*		*		*	
L.S.D ($p \leq 0.05$)		6.153		8.02		5.732	

Means in the same row with different litters are significantly different., * Significant ($p \leq 0.05$)

The greatest concentration of ALP is found in bone, liver, intestine and the placenta. However, practically every body tissue contains at least a small amount of ALP. Because of this wide distribution limited information can be obtain from a total AP assay. Elevated serum and leukocytic ALP leaves in patients with Hodgkin`s and non-Hodgkin`s lymphoma were reported by several investigators. Also, Aiba *et al*., (1980), found that the elevated leukocyte AP in patients who have hairy cell leukemia was inversely correlated to absolute number of neutrophils in the peripheral blood, *i.e*. the patients who had high leukocyte ALP scores has low or normal peripheral blood neutrophil counts. Abnormal leukocyte ALP scores are characteristic of certain myloprolifrative and lymphoproliferative disorders. Gobbi *et al.,* (1982) found that among liver function tests that have been investigated in Hodgkin's disease, serum AP activity was elevated in 20 out of 133 patients while it was elevated in 10 out of 20 patients with initial bone disease.

Such as reviewed in Beattic *et al.,* (2005) plant parts including berries arc a rich source of such phytochemicals, in particular anthocyanins and flavonols. phenolic phytochemicals were extracted from blueberries, blackberries, strawberries, raspberries, cranberries, and Noble muscadine grapes by Wang *et al.,* (2000). Many studies reported that the effect of many plant parts like raspberry on decreasing the serum liver function enzymes activity could be attributed to their high level content of that phytochemicals. For examples, El-Nashar, (2007) found that different doses of cinnamon extract showed slight-decreased in serum GOT, GPT, ALP, total protein and globulin after 12 week of feeding when compared with control group while showed increased in serum total protein, globulin and total protein in liver homogenates with a significant on serum total protein and serum globulin after 12 week when compared with the control group. Dawson, (1998) reported that flavonoid is known to block the hepatocellular uptake of bile acids. It is reviewed in Beattic *et al.,* (2005) that flavonoids (found in berries) pretreatment improved the antioxidant capacity of the liver, diminished the bilirubin concentration compared with the groups without treatment. Also, flavonol glycosides reduced the elevated levels of the following serum enzymes, GOT, GPT and ALP. Finally, it reviewed in El-Nashar, (2007) that pre-treatment with flavonoids were not only able to suppress the elevation of GOT and GPT but also reduce the damage of hepatocytes *in vitro*. Also, they found that flavonoids have exhibited strong antioxidant activity against reactive oxygen species (ROS) *in vitro*. The hepatoprotective activity of flavonoids was possibly due to its antioxidant properties, acting as scavengers of reactive oxygen species (ROS).According to the present study, we strongly suggested that supplementation of the diet with berries has some hepatoprotective properties and therapeutic effects against hyperglycemia. In similar study, Mohammed, (2008) reported that oral administration of both the aerial parts extracts of Henada *(J. Montana)* at a concentration of 150 mg/kg b.w daily for 30 days leads to effectively normalize the impaired antioxidant status in Streptozotocin induced diabetes than the glibenclamide-treated groups. The extract exerted rapid protective effects against lipid peroxidation by scavenging of free radicals by reducing the risk of diabetic complications. The effect was more pronounced in ethanolic extract as compared to aqueous extract.

3.2 Serum Albumin, Globulin And Total Protein (G\Dl) Of Rats Injected Ccl_4 and Consumed Some Plant Parts

Data in Table (2) illustrate the mean value of serum albumin (ALB) of rats' livers fed on various diets. It could be noticed that ALB of control (-) group was lower than control (+) group by the ratio of -34.90 %. Rats' livers fed on different tested diets revealed significant increases in ALB activities compared with the rats injected with CCl4. The percent of increase as compared to control (+) group were 56.00, 56.00, 52.00, 39.20 and 58.00; and 50.00, 34.00, 43.20, 51.20 and 54.80 % for henada, lemon palm, Jericho rose, hawthorn and Corn cob silk by 5 and 10%, respectively. Non significant differences were observed amongst rats groups fed on henada 5%, henada 1%, lemon palm 5%, Jericho rose5%, hawthorn 10% and corn cob silk 5 and 10%. Considering (ALB) level, con cob silk 5% group recorded the best treatment was observed for when compared to control (-) group. According to enhancement on ALB level, the sequence of potency of that plant parts were corn cob silk 5 > henada 5%> lemon palm 5%> corn cob silk 10 > Jericho rose 5%> hawthorn 10%> Henada 10%> Jericho rose 10% >hawthorn 5%> lemon palm 10%. The same behaviour was observed for the mean value of serum globulin and total protein except the sequence of plant parts potency which were Jericho rose 10% > henada 5%> lemon palm 5%> Henada 10%> lemon palm 10%> hawthorn 10%> Jericho rose 5%> hawthorn 5%>> corn cob silk 5 > corn cob silk 10 for globulin and corn cob silk 5> corn cob silk 10> hawthorn 5%> Jericho rose 5%> hawthorn 10%> Henada 5%> lemon palm 5%> henada 10%> Jericho rose 10% > lemon palm 10 for total protein.

Table (2). Serum albumin (ALB), globulin (GLB) and total Protein (TP) (g\dl) of rats injected CCl_4 and consumed some plant parts

Groups		Albumin (g\dl)		Globulin (g\dl)		Total Protein (g\dl)	
		Mean±SD	% of change	Mean±SD	% of change	Mean±SD	% of change
Control (-)		3.84 ^{ab} ± 0.093	53.60	2.28^{f} ± 0.27	25.00	6.12 ^{d} ± 0.07	10.46
Control (+)		2.5 ^{e} ± 0.158	-------	3.04^{a} ± 0.04	-----	5.54 ^{e} ± 0.15	------
Henada	5%	3.90 ^{a} ± 0.74	56.00	2.39^{ef} ± 0.16	- 21.38	6.29 ^{d} ± 0.15	13.53
	10%	3.75 ^{abc} ± 0.106	50.00	2.47^{def} ± 0.16	- 18.75	6.22 ^{d} ± 0.12	12.27
Lemon palm	5%	3.90 ^{a} ± 0.061	56.00	2.37^{ef} ± 0. 1	- 22.03	6.27 ^{cd} ± 0.02	13.17
	10%	3.35 ^{d} ± 0.120	34.00	2.53^{def} ± 0.16	- 16.77	5.7 ^{e} ± 0.15	2.88
Jericho rose	5%	3.80 ^{abc} ± 0.081	52.00	2.72^{cd} ±0. 1	- 10.52	6.52 ^{bc} ± 0.15	17.68
	10%	3.58 ^{cd} ± 0.137	43.20	2.34^{ef} ±0.16	- 23.02	5.92 ^{e} ± 0.19	6.58
Hawthorn	5%	3.48 ^{d} ± 0.076	39.20	2.75^{bcd}±0.085	- 9.53	6.53 ^{bc} ± 0.15	17.87
	10%	3.78 ^{abc} ± 0.072	51.20	2.71^{cd} ± 0.12	- 10.85	6.49 ^{bc} ± 0.13	17.14
Corn cob silk	5%	3.95 ^{a} ± 0.058	58.00	2.98^{b} ± 0.094	- 4.93	6.84 ^{ab} ± 0.15	23.46
	10%	3.87 ^{ab} ± 0.186	54.80	2.91^{bc} ± 0.15	- 4.26	6.78 ^{a} ± 0.08	22.38
Sig.		*		*		*	
L.S.D (p≤0.05)		0.176		0.187		0.171	

Means in the same row with different litters are significantly different, * Significant ($p \leq 0.05$)

Albumin and globulin constitute most of the protein within the body and are measured in the total protein. Albumin is a protein that is formed within the liver. This makes up approximately 60% of the total protein. The major effect of albumin within the blood is to maintain colloidal osmotic pressure. Furthermore, albumin transports important blood constitutes such as drugs, hormones, and enzymes. Globulins are the key building block of antibodies (Champe and Harvey, 1994). Their role in maintaining osmotic pressure is far less than that of albumin. Globulins, to a lesser degree, also act as transport vehicles. Albumin is synthesized within the liver and is therefore a measure of hepatocyte function. When disease and their factors (CCl_4 in the present study) affect the liver cell, the hepatocyte loses its ability to synthesize albumin. The serum albumin level is greatly decreased (Pagana and Pagana, 1997). In some diseases, albumin is selectively diminished and globulins are normal or increased to maintain a normal total protein level. Another group of diseases similarly associated with low albumin, high globulin, and normal total protein levels is chronic liver diseases. In these diseases, the liver cannot produce albumin but globulin is adequately made in the reticuloendothelial system. Using of the all tested plant parts in the present study leads to repair the impaired hepatocyte induced by CCl_4 by different ratios which could be probably attributed to their content of some active ingredients i.e. phytochemicals. In similar study mentioned by Mohammed and Abdel-Gawad, (2009) showed that oral administration of ethanolic extract of the aerial parts of henada *(J. Montana)* at a concentration of 150 mg/kg b.w. daily to rats for 15 days leads to significant increase in hepatic total protein.

Serum albumin represents one of the most important metal binding proteins. It is a large protein secreted by the liver. Albumin transports a number of primarily hydrophobic compounds in the circulation, including free fatty acids and some drugs. The free (unestrified) fatty acids move through the cell membrane of the adipocyte and immediately bind to albumin in the plasma, which carries them to the tissues where the fatty acids diffuse into the cells and are oxidized for energy (Champe and Harvey, 1994). Serum albumin is a sacrificial antioxidant that can bind copper tightly and iron weakly to its surface serving as a target for their related free radical reactions. Thus it inhibits copper ion dependent lipid peroxidation (Gutteridge and Wilkins, 1983). The data of the present study are in agree with that observed by Mohammed and Abdel-Gawad, (2009) who showed that oral administration of ethanolic extract of the aerial parts of henada *(J. Montana)* at a concentration of 150 mg/kg b.w. daily to rats for 15 days leads to significant increase in hepatic total protein.

3.3 Serum Total Bilirubin, Direct Bilirubin and Indirect Bilirubin of Rats Injected Ccl_4 and Consumed Some Plant Parts

Data of the Bilirubin of rats injected CCl_4 and consumed some plant parts were tabulated in table (3). It could be noticed that total Bilirubin of control (-) group was lower than control (+) group by the ratio of -28.57 %. Rats' livers fed on different tested

diets revealed significant decreases in total Bilirubin levels compared with the rats injected with CCl_4. The percent of decrease as compared to control (+) group were -8.92, -16.07, -7.14, -17.85 and -16.07; and -12.5, -12.5, -16.07, -16.07 and -12.50 % for henada, lemon palm, Jericho rose, hawthorn and Corn cob silk by 5 and 10%, respectively. Non significant differences were observed amongst rats groups fed on Jericho rose10%, hawthorn 5 % and corn cob silk 10%. Considering total Bilirubin level, hawthorn 5 % group recorded the best treatment was observed for when compared to control (-) group. According to enhancement on total bilirubin level, the sequence of potency of that plant parts were hawthorn 5%> lemon palm 5%> Jericho rose 10% > hawthorn 10%> corn cob silk 5> Henada 10%> corn cob silk 10 > lemon plam 10%> henada 5%> Jericho rose 5%. The same behaviour was observed for the mean value of direct Bilirubin and indirect Bilirubin except the sequence of plant parts potency which were lemon palm 5%> Jericho rose 10% > corn cob silk 10> hawthorn 5%> henada 5%> hawthorn 10%> Henada 10%> lemon plam 10%> Jericho rose 5%> corn cob silk 5 for direct Bilirubin and Henada 5%> Jericho rose 5%> henada 10%> Jericho rose 10% > lemon plam 10> corn cob silk 10> hawthorn 5%> hawthorn 10%> lemon palm 5%> corn cob silk 5 for indirect Bilirubin.

Table (3). Serum total bilirubin, direct bilirubin and indirect bilirubin of rats injected CCl_4 and consumed some plant parts

Groups		Total Bilirubin (mg\dl)		Direct Bilirubin (mg\dl)		Indirect Bilirubin (mg\dl)	
		Mean±SD	% of change	Mean±SD	% of change	Mean±SD	% of change
Control (-)		0.40 ^{g}±0. 15	28.57-	0.12^{c} ±0.015	- 57.14	0.38^{bc}±0.015	35.71
Control (+)		0.56 ^{a}±0.02	-----	0.28^{a} ±0.015	-----	0.28^{e} ±0.02	-----
Henada	5%	0.51 ^{bc}±0. 15	- 8.92	0.12^{c} ±0.015	- 57.14	0.39^{b} ±0.015	39.28
	10%	0.49 ^{bcd}± 0. 15	- 12.50	0.13^{bc} ±0.015	- 53.57	0.36^{bcd}±0.015	28.50
Lemon palm	5%	0.47 ^{def}± 0.15	- 16.07	0.11^{c} ±0.017	- 60.71	0.33^{d} ±0.015	17.85
	10%	0.49 ^{cde}± 0. 15	- 12.50	0.14^{bc} ±0.011	- 50.00	0.35^{cd} ±0.015	25.00
Jericho rose	5%	0.52 ^{b} ± 0.15	- 7.14	0.14^{bc} ±0.032	- 50.00	0.38^{bc} ±0.015	35.71
	10%	0.47 f ±0.13	- 16.07	0.11^{c} ±0.013	- 60.71	0.36^{bcd}±0.011	28.50
Hawthorn	5%	0.46 ^{f}±0.15	- 17.85	0.12^{bc} ±0.011	- 57.14	0.34^{a} ±0.015	21.43
	10%	0.47^{def}±0.015	- 16.07	0.13^{bc} ±0.011	- 53.57	0.34^{cd} ±0.022	21.42
Corn cob silk	5%	0.47 ^{def}±0.15	- 16.07	0.14^{bc} ±0.013	- 50	0.33^{d} ±0.02	17.85
	10%	0.46 ^{f} ±0.15	- 12.50	0.11^{c} ± 0.01	60.71	0.35^{bcd}±0.023	25.00
Sig.		*		*		*	
L.S.D (p≤0.05)		0.022		0.020		0.020	

Means in the same row with different litters are significantly different, * Significant ($p \leq 0.05$)

Bilirubin is a breakdown product of hem (a part of haemoglobin in red blood cells). The liver is responsible for clearing the blood of bilirubin. It does this by the following mechanism: Bilirubin is taken up into hepatocytes, conjugated (modified to make it water-soluble), and secreted into the bile, which is excreted into the intestine (Nyblom *et al.,* 2004). The total serum Bilirubin level is the sum of the conjugated (direct) and unconjugated (indirect) bilirubin. Normally, the unconjugated bilirubin makes up 70% to 85% of the total bilirubin. If direct bilirubin is elevated, then the liver is conjugating bilirubin normally, but is not able to excrete it. Bile duct obstruction by gallstones, hepatitis or cancer should be suspected (Nyblom *et al .,* 2004). Active ingredients such phytochemicals content of the all tested plant parts in the present study may cause decreased levels of the total bilirubin induced by CCl_4. In similar study mentioned by Mohammed and Abdel-Gawad, (2009) showed that oral administration of ethanolic extract of the aerial parts of henada *(J. Montana)* at a concentration of 150 mg/kg b.w. daily to rats for 15 days showed a significant protection against-induced decrease in serum bilirubin levels.

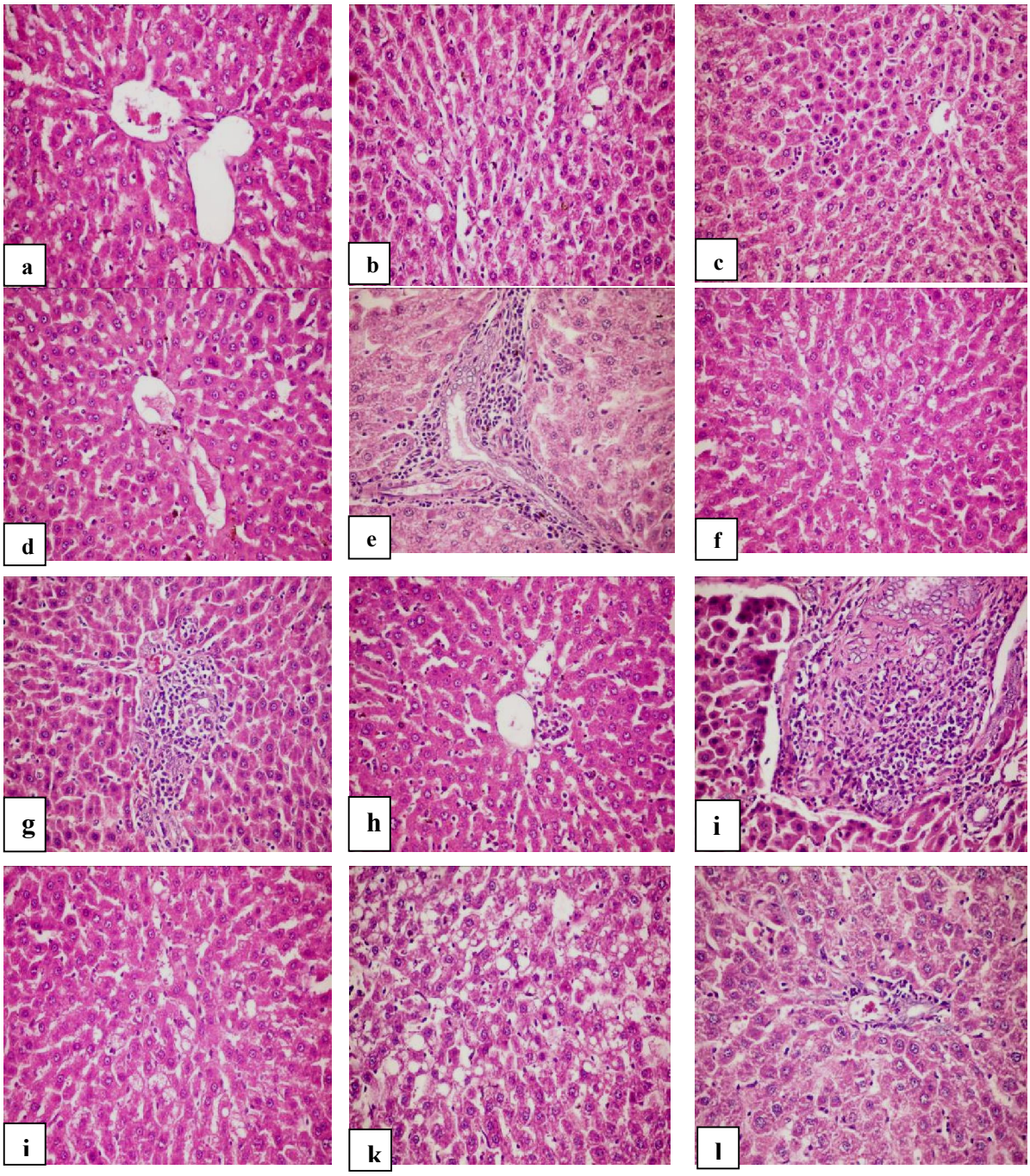

Fig. 1: The effect of tested plant parts on liver histopathological changes induced by CCl4 in rats. a, normal (control diet); b, c, fed the control diet and administrated CCl4 for 2 weeks; d, e, fed diet containing jasonia for 4 weeks after treated with CCl4; f,g,h, fed diet containing melissa for 4 weeks after treated with CCl4; i, j, fed diet containing crataegus azorolus for 4 weeks after treated with CCl4; and k, l, fed diet containing corn cob silk for 4 weeks after treated with CCl4. (H&E, X 40)

3.4 Histopathological Examination

Changes in histopathological parameters as the result of CCl_4 subjection has been studied by many authors. Several universities and academic centers have paid attention towards the methods could be used successively in reducing like of these

changes. One of the most effective methods commonly tested in the last decade is the using of origin-plant parts. Some of these parts exhibited significant roles in reducing the adverse effects of CCl_4 including the histopathological changes. In the present study the effect of phytochemical containing diet on rats treated with CCl_4 have been investigated. Liver of rats fed the normal diet showed the normal histological structure of the central veins and surrounding hepatocytes (Figure 1-a). Rats treated with CCl_4 for 2 weeks showed kupffer cells activation, cytoplasmic vacuolization of hepatocytes (Figure 1-b) and sinusoidal leucocytosis (Figure 1-c). Feeding on diet containing the tested plant parts for 4 weeks after treated with CCl_4 induced some improvement /amelioration on the histological structure of rat livers as follow: jasonia showed Kupffer cells activation (Figure 1-d) and portal infiltration with leucocytes (Figure 1-e), melissa showed kupffer cells activation (Figure 1-f), hierochuntica showed portal infiltration with leucocytes (Figure 1-g) and few leucocytes in hepatic sinusoids (Figure 1-h), *crataegus azorolus* showed portal infiltration with leucocytes and appearance of newly formed bile ductuoles (Figure 1-i) and cytoplasmic vacuolization of some hepatocytes (Figure 1-j), and corn silk showed cytoplasmic vacuolization of hepatocytes (Figure 1-k) and kupffer cells activation and apoptosis of hepatocytes (Figure 1-l). From such data it cold be reported that some of the tested plant parts act as a protector against CCl_4 toxicity mainly on liver. This finding agreed with that noticed by Wu *et al.,* (2006) and Elhassaneen *et al.,* (2009) who found that all histopathological changes in liver such as fatty infiltration, variation in mitotic figures and focal necrosis, which induced by dibutylnitrosamine were reversed by the administration of phytochemicals extract of cinnamon plant parts.

In conclusion, the tested plan parts in the present study were effective in protecting against CCl_4-induced histopathological changes. These results supported our hypothesis that tested plan parts contain several free and conjugated compounds that are able to prevent or inhibit CCl_4 toxicity. Therefore, we recommended the tested plant parts by a moderate amount to be included in our daily diets and drinks.

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On a Subclass of Analytic Functions Related with Janowski Functions

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Abstract. In this paper, we introduce a subclass of analytic functions by using the well-known Hadamard product along with Janowski functions. Some inclusion results, radius of univalence and other interesting properties of this class are discussed.

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1. Introduction

Let A be the class of analytic functions f

$$f(z)=z+\sum_{n=2}^{\infty}a_n z^n, \qquad (1.1)$$

defined in the open unit disk $E=\{z : |z|<1\}$. The class A is closed under the convolution or (Hadamard product)

$$(f*g)(z)=\sum_{n=2}^{\infty}a_n b_n z^{n+1},\ a_0=b_0=1,\ z\in E,$$

where

$$f(z)=\sum_{n=0}^{\infty}a_n z^{n+1} \text{ and } g(z)=\sum_{n=0}^{\infty}b_n z^{n+1}.$$

In particular, we consider the convolution with incomplete beta function $\phi(d,c,z)$, related to Gauss hypergeometric function [1] by

$$\phi(d,c,z)=z\,{}_2F_1(1,d,c,z)=\sum_{n=0}^{\infty}\frac{(d)_n}{(c)_n}z^{n+1}, \qquad (1.2)$$

$z\in E,\ c\neq 0,-1,-2,\ldots,$

where $(d)_n$ denotes the Pochhammer symbol given by

$$(d)_n=\begin{cases}1, & n=0,\ d\in \mathrm{C}\setminus\{0\},\\ a(a+1),\cdots(a+n-1), & n\in \mathrm{N}.\end{cases}$$

Note that $\phi(d,1,z)=\frac{z}{(1-z)^d}$ and $\phi(2,1,z)$ is the Koebe function, see [2].

Carlson and Shaffer [3] defined a convolution operator on A involving an incomplete beta function as

$$L(d,c)f=\phi(d,c,z)*f,\ f\in A,\ z\in E. \qquad (1.3)$$

It follows from (1.2) and (1.3) that,

$$z(L(d,c)f(z))'=dL(d+1,c)f(z)-(d-1)L(d,c)f(z). \qquad (1.4)$$

If $d=0,-1,-2,...,$ then $L(d,c)f$ is a polynomial. If $d\neq 0,-1,-2,...,$ then application of the root test shows that the infinite series for $L(d,c)f$ has the same radius of convergence as that for f because

$$\lim_{n\to\infty}\left|\frac{(d)_n}{(c)_n}\right|^{\frac{1}{n}}=1.$$

Hence $L(d,c)$ maps A into itself. $L(d,d)$ is the identity and if $d\neq 0,-1,-2,\cdots,$ then $L(d,c)$ has a continuous inverse $L(c,d)$ and is a one-to-one mapping of A onto itself. $L(d,c)$ provides a convenient representation of differentiation and integration. If $g(z)=zf'(z)$, then $g=L(2,1)f$ and $f=L(1,2)g$.

In [4], Janowski introduced the class $P[A,B]$, for A and B, $-1\le B<A\le 1$, if and only if for $z\in E$, a function p, analytic in E with $p(0)=1$ belongs to the class $P[A,B]$ if

$$p(z)=\frac{1+Aw(z)}{1+Bw(z)},$$

where $w(z)$ is an analytic function in E, with $w(0)=0$, and $|w(z)|<1$.

We note that $P[-1,1]=P$, the class of functions with positive real part consists of functions

p with $\operatorname{Re} p(z) > \alpha$. Also it can be clearly seen that $P[A,B] \subset P(\beta)$, $\beta = \frac{1-A}{1-B}$, therefore, we have

$$p(z) = (1-\beta)p_1(z) + \beta, \quad p_1 \in P. \tag{1.5}$$

Let $P_k[\alpha, A, B]$ denote the class of functions p that are analytic in E with $p(0) = 1$ and are represented by

$$p(z) = \left(\frac{k}{4} + \frac{1}{2}\right)p_1(z) - \left(\frac{k}{4} - \frac{1}{2}\right)p_2(z), \tag{1.6}$$

where $p_1, p_2 \in P[\alpha, A, B]$, $-1 \le B < A \le 1$, $0 \le \alpha < 1$, $k \ge 2$. It is clear that

$$P_k[\alpha, A, B] \subset P_k[A, B] \subset P_k(\beta),$$
$$\beta = \tfrac{1-A_1}{1-B_1}, \ A_1 = (1-\beta)A + \beta B$$

and $P_k[1,-1] = P_k$ [5]. For $k = 2$, the class $P_k[\alpha, A, B] = P_2[\alpha, A, B]$ was introduced by [6].

We will assume throughout our discussion, unless otherwise stated, that $d \ne 0, -1, -2, \cdots$, $c \ne 0, -1, -2, \cdots$, $-1 \le B < A \le 1$, $0 \le \alpha < 1$ and $z \in E$.

By using a linear operator $L(d,c)$, we define the following analytic classes.

Definition 1.1. Let $f \in A$, $z \in E$. Then $f \in C_{d,c}[\alpha, A, B]$, if and only if

$$\frac{(z(L(d,c)f(z))')'}{(L(d,c)f(z))'} \in P[\alpha, A, B]. \tag{1.7}$$

From (1.7), it is clear that

$f \in C_{d,c}[\alpha, A, B] \Leftrightarrow L(d,c)f \in C[\alpha, A, B] \subset C.$

Similarly, $f \in S^*_{d,c}[\alpha, A, B]$, if and only if,

$$L(d,c)f \in S^*[\alpha, A, B] \subset S^*.$$

Definition 1.2. Let $f \in A$. Then $f \in Q_k^{d,c}[\beta, \alpha, A, B]$, if and only if, for $\beta \ge 0$,

$$\left\{(1-\beta)\frac{z(L(d,c)f(z))'}{(L(d,c)g(z))} + \beta\frac{(z(L(d,c)f(z)')'}{(L(d,c)g(z))'}\right\} \in P_k[\alpha, A, B], \tag{1.8}$$

for some $g \in C_{d,c}[\alpha, A, B]$.

By varying the parameters c, d, α, β, A and B in the class $Q_k^{d,c}[\beta, \alpha, A, B]$, we get different subclasses of analytic and univalent functions studied earlier by various authors, see for example [7-12].

2. Preliminary Lemmas

Lemma 2.1 [13]. Let $0 < d \le c$ and $d \ge 2$ or $c + d \ge 3$. Then the function

$$\varphi(d,c)(z) = \sum_{n=0}^{\infty} \frac{(d)_n}{(c)_n} z^{n+1}, \ z \in E$$

is in the class C of convex univalent functions.

Lemma 2.2 [13]. Let $f \in C$ and $g \in S^*$. Then for every function F analytic in E with $F(0) = 1$, we have

$$\frac{(f * Fg)}{(f * g)}(E) \subset \overline{co}(F(E)),$$

where $\overline{co}(F(E))$ denotes the closed convex hull of $F(E)$.

Lemma 2.3 [14]. Let $u = u_1 + iu_2$, $v = v_1 + iv_2$ and let $\Psi(u,v)$ be a complex-valued function satisfying the following conditions:

1) $\Psi(u,v)$ is continuous in a domain $D \subset \mathbb{C}^2$,
2) $(1,0) \in D$ and $\operatorname{Re}(\Psi(1,0)) > 0$,
3) $\operatorname{Re}(\Psi(iu_2, v_1) \le 0$, whenever $(iu_2, v_1) \in D$ and $v_1 \le \frac{-1}{2}(1 + u_2^2)$.

If $p(z) = 1 + \sum_{m=1}^{\infty} c_m z^m$ is a function analytic in E, such that $(p(z), zp'(z)) \in D$, $z \in E$ and $\operatorname{Re}(\Psi(p(z), zp'(z)) > 0$ for $z \in E$, then $\operatorname{Re} p(z) > 0$ in E.

3. Main Results

In this section, some properties of the class $Q_k^{d,c}[\beta, \alpha, A, B]$ such as inclusion results, second coefficient bound, its invariant property under convolution with the convex function, covering theorem and radius problem will be discussed.

Theorem 3.1. If $0 < c \le d$, $d \ge \min[2, 3-c]$ and if $0 < a \le c$, $c \ge \min[1, 1-a]$, then

$$Q_k^{d,c}[\beta, \alpha, A, B] \subset Q_k^{d,a}[\beta, \alpha, A, B]$$
$$Q_k^{d,a}[\beta, \alpha, A, B] \subset Q_k^{c,d}[\beta, \alpha, A, B].$$

Proof. To prove the first inclusion, we proceed as follows:

(i) Let $f \in Q_k^{d,c}[\beta,\alpha,A,B]$. Now

$$(1-\beta)\frac{z(L(d,a)f(z))'}{L(d,a)g(z)}+\beta\frac{(z(L(d,a)f(z))')'}{(L(d,a)g(z))'}$$

$$=(1-\beta)\frac{z*[(\phi(d,c)*\phi(c,a)*f)]'}{(\phi(d,c)*\phi(c,a)*g)}$$

$$+\beta\left[\frac{[(z(\phi(d,c)*\phi(c,a)*f)']'}{\phi(d,a)*\phi(c,a)*g)'}\right]$$

$$=(1-\beta)\left[\frac{\phi(c,a)*\frac{N}{D}(\phi(d,c)*g)}{(\phi(c,a)*\phi(d,c)*g}\right]$$

$$+\beta\left[\frac{\phi(c,a)*\frac{N'}{D'}(\phi(d,c)*zg')}{\phi(c,a)*\phi(d,c)*g')}\right]. \quad (3.1)$$

Since, from Lemma 2.1, $\phi(c,a)$ is convex, therefore by using Lemma 2.3 to see that the right hand side of (3.1) is contained in the convex hull of the image of E under $[(1-\beta)\frac{N}{D}+\beta\frac{N'}{D'}]$ with

$N(z)=z(\phi(d,c)*f)',$

$D(z)=\phi(d,c)*g\in C[\alpha,A,B]\subset C\subset S^*.$

This implies $f\in Q_k^{d,a}[\beta,\alpha,A,B]$ for $z\in E$ and the proof of (i) is complete.

The proof of the second inclusion is similar to that of the first part.

Theorem 3.2. Let $f(z)=z+\sum_{n=2}^{\infty}a_nz^n\in Q_k^{d,c}[\beta,\alpha,A,B]$. Then

$$|a_2|\le\frac{(1-\alpha)(A-B)(c)(k+1+\beta)}{4d(1+\beta)}.$$

The equality, with $\alpha=0,\ A=1,\ B=-1,$ occurs for $f_0(z),$ given by

$$F_0(z)=L(d,c)f_0(z),\ G_0(z)=L(d,c)g_0(z)=\frac{z}{1-z},$$

$$p_0(z)=(1-\beta)\frac{zF_0'(z)}{G_0(z)}+\beta\frac{(zF_0'(z))'}{G_0'(z)},$$

$$=\left(\frac{k}{4}+\frac{1}{2}\right)\frac{1+z}{1-z}-\left(\frac{k}{4}-\frac{1}{2}\right)\frac{1-z}{1+z}.$$

Proof. Let $L(d,c)g(z)=z+\sum_{n=2}^{\infty}b_nz^n$ and $p(z)=1+\sum_{n=1}^{\infty}c_nz^n.$ Since $g\in C_{d,c}[\alpha,A,B]$ and $p\in P_k[\alpha,A,B],$ it easily follows from known results [4] that $|c_n|\le\frac{k}{2}(1-\alpha)(A-B),$ $n>1$ and

$$|b_2|\le\tfrac{(1-\alpha)(A-B)}{2}.$$

Now

$$(1-\beta)[z+\sum_{n=2}^{\infty}\frac{n(d)_{n-1}}{(c)_{n-1}}a_nz^n][1+\sum_{n=2}^{\infty}nb_nz^{n-1}]$$

$$+\beta[1+\sum_{n=2}^{\infty}\frac{n^2(d)_{n-1}}{(c)_{n-1}}a_nz^{n-1}][z+\sum_{n=2}^{\infty}b_nz^n]$$

$$=[1+\sum_{n=2}^{\infty}c_nz^n][z+\sum_{n=2}^{\infty}b_nz^n][1+\sum_{n=2}^{\infty}nb_nz^{n-1}].$$

Equating coefficient of z^2 on both sides, we have

$$\frac{[2(1-\beta)d+4\mu\beta]}{c}a_2=-2(1-\beta)b_2$$

$$-\beta b_2+3b_2+c_1,$$

or

$$\frac{2d(1+\beta)}{c}|a_2|\le(1+\beta)|b_2|+|c_1|.$$

Using the coefficient bounds of $|b_2|$ and $|c_1|$ as given earlier, we have

$$\frac{2d(1+\beta)}{c}|a_2|\le\frac{(1+\beta)(1-\alpha)(A-B)}{2}+\frac{k}{2}(1-\alpha)(A-B)$$

$$=\frac{1}{2}(1-\alpha)(A-B)[k+1+\beta].$$

That is

$$|a_2|\le\frac{(1-\alpha)(A-B)(c)(k+1+\beta)}{4d(1+\beta)}.$$

This completes the proof.

Special Case

We note that for $A=1,\ B=-1,\ \alpha=0,$ we have coefficient bound for the class $B_2^{\alpha}(a,c),$ see [15].

The next result shows that the class $Q_k^{d,c}[\beta,\alpha,A,B]$ is closed under convolution with convex functions in $E.$

Theorem 3.3. Let $f\in Q_k^{d,c}[\beta,\alpha,A,B]$ and let

Ψ be convex univalent in E. Then $(\Psi * f) \in Q_k^{d,c}[\beta,\alpha,A,B]$ in E.

Proof. We first show, that for $g \in C_{d,c}[\alpha,A,B]$, $(\Psi * g)$ also belongs to $C_{d,c}[\alpha,A,B]$, which implies that $L(d,c)g \in C[\alpha,A,B] \subset C$.

So

$$(\Psi * L(d,c)g) = L(d,c)(\Psi * g) \in C[\alpha,A,B].$$

Let

$$N(z) = z(L(d,c)f(z))',$$
$$D(z) = L(d,c)g(z), \quad D \in C$$

and therefore starlike in E. Since

$$\frac{z(L(d,c)(\Psi * f)'(z)}{L(d,c)(\Psi * g)(z)} = \frac{\Psi * \frac{N}{D}(L(d,c)g)(z)}{(\Psi * L(d,c)g)(z)},$$

and so it is in the convex hull of the image of E under $\frac{N}{D}$. Similarly,

$$\frac{(z(L(d,c)(\Psi * f)')'(z)}{(L(d,c)(\Psi * g))'(z)}$$

is in the convex hull of E under $\frac{N}{D}$. Since $P_k[\alpha,A,B]$ is a convex set, it follows that

$$\left\{(1-\beta)\frac{N}{D} + \beta\frac{N'}{D'}\right\} \in P_k[\alpha,A,B]$$

and consequently

$$(\Psi * f) \in Q_k^{d,c}[\beta,\alpha,A,B] \quad \text{for} \quad z \in E.$$

Remark 3.1. (i) It follows from Theorem 3.3 that the class $Q_k^{d,c}[\beta,\alpha,A,B]$ is invariant under the integral operators defined by $f_i(z),\ i = 1,2,3,4$

.

(i) $f_1(z) = (\phi_2 * f)(z) = \frac{2}{z}\int_0^z f(t)dt, \phi_1(z) = -\frac{2}{z}[z + \log(1-z)],$

(ii) $f_2(z) = (\phi_1 * f)(z) = \int_0^z \frac{f(t)}{t}dt,\ \phi_2(z) = -\log(1-z),$

(iii) $f_3(z) = (\phi_4 * f)(z) = \frac{1+c}{z^c}\int_0^z t^{c-1}f(t)dt, \phi_3(z) = \sum_{n=1}^{\infty}\frac{1+c}{n+c}z^n, (\mathrm{Re}\, c > -1)$

(iv) $f_4(z) = (\phi_3 * f)(z) = \int_0^z \frac{f(t)-f(tx)}{t-tx}dt, |x| \le 1, \phi_4(z) = \frac{1}{1-x}\log\frac{1-xz}{1-z}$

Since $\phi_i \in C$, the proof is immediate when we apply Theorem 3.3.

(ii) Let D_1, D_2 be the linear operators defined on the class A, as follows:

$$D_1(f) = zf', \ [2], \quad D_2(f) = \frac{(zf)'}{2}, \ [16].$$

Both of these operators can be written as $D_i(f) = h_i * f$, where

$$h_1(z) = \sum_{n=1}^{\infty} nz^n = \frac{z}{(1-z)^2},$$

and

$$h_2(z) = \sum_{n=1}^{\infty}\frac{(n+1)}{2}z^n = \frac{z - \frac{z^2}{2}}{(1-z)^2}.$$

We note that the radius of convexity of h_1 and h_2 are

$$r_c(h_1) = 2 - \sqrt{3} \text{ and } r_c(h_2) = \frac{1}{2}.$$

Thus, it follows from Theorem 3.3 that, if $f \in Q_k^{d,c}[\beta,\alpha,A,B]$, then

$$D_1(f) \in Q_k^{d,c}[\beta,\alpha,A,B]$$

for $|z| < 2 - \sqrt{3}$ and

$D_2(f) \in Q_k^{d,c}[\beta,\alpha,A,B]$ for $|z| < \frac{1}{2}$.

In the next result, we shall use the notation

$$Q_k^{d,c}[\beta,\alpha,1,-1] = Q_k^{d,c}(\beta,\alpha).$$

Theorem 3.4. For $\beta \ge 0$,

$$Q^{d,c}(\beta,\alpha) \subset Q_k^{d,c}(0,\alpha_1),$$

$$\alpha_1 = \frac{2\alpha + \beta\delta_1}{2 + \beta\delta_1}, \ \delta_1 = \frac{\mathrm{Re}\, h_0(z)}{|h_0(z)|}, \quad (3.2)$$

and

$$h_0(z) = \frac{z(L(d,c)g(z))'}{L(d,c)g(z)}, \ L(d,c)g(z) \in C.$$

Proof. The case $\beta = 0$ is trivial, so we suppose $\beta > 0$. Let $f \in Q_k^{d,c}(\beta,\alpha)$ and let

$$\frac{z(L(d,c)f(z))'}{L(d,c)g(z)} = h(z)$$
$$= \left(\frac{k}{4} + \frac{1}{2}\right)h_1(z) - \left(\frac{k}{4} - \frac{1}{2}\right)h_2(z), \quad (3.3)$$

for some $L(d,c)g \in C(\alpha) \subset C \subset S^*$.

Differentiate (3.3) logarithmically, we have

$$\frac{(z(L(d,c)f(z))')'}{(L(d,c)g(z))'} = h(z) + \frac{zh'(z)}{h_0(z)}$$

with $h_0 = \dfrac{z(L(d,c)g(z))'}{L(d,c)g(z)} \in P(\alpha).$

Since $f \in Q_k^{\lambda,\mu}(\beta,\alpha),$ we have

$$(1-\beta)h(z)+\beta\left(h(z)+\frac{zh'(z)}{h_0(z)}\right) = \left(h(z)+\frac{\beta z h'(z)}{h_0(z)}\right) \in P_k(\alpha),$$

and using convolution technique, see [17,18], it follows that, for $z \in E,\ i=1,2$

$$\left(h_i(z)+\frac{\beta z h_i'(z)}{h_0(z)}\right) \in P(\alpha).$$

Writing $h_i(z) = (1-\alpha_1)p_i(z)+\alpha_1,$ we have, from (3.4)

$$\left[(1-\alpha_1)p_i(z)+\alpha_1-\alpha+\beta(1-\alpha_1)\frac{zp_i'(z)}{h_0(z)}\right] \in P.$$

We now form the functional $\Psi(u,v),$ by choosing $u = p_i(z),\ v = zp_i'(z),$

$$\Psi(u,v) = (1-\alpha_1)u+(\alpha_1-\alpha)+\beta\frac{(1-\alpha_1)v}{h_0(z)}.$$

The first two conditions of Lemma 2.3 are clearly satisfied. We verify (iii) as follows:

$$\mathrm{Re}\,\Psi(iu_2,v_1) = (\alpha_1-\alpha)+\frac{\beta(1-\alpha_1)v_1\,\mathrm{Re}\,h_0(z)}{|h_0(z)|^2}$$

$$= (\alpha_1-\alpha)+\beta(1-\alpha_1)v_1\delta_1,\ \delta_1 = \frac{\mathrm{Re}\,h_0(z)}{|h_0(z)|^2}.$$

Now, for $v_1 \le \frac{-1}{2}(1+u_2^2),$ we have

$$\mathrm{Re}\,\Psi(iu_2,v_1) \le (\alpha_1-\alpha)-\frac{1}{2}\beta\delta_1(1-\alpha_1)(1+u_2^2),$$

$$= \frac{1}{2}\left[(2\alpha_1-2\alpha)-\beta\delta_1(1-\alpha_1)-\beta\delta_1(1-\alpha_1)u_2^2\right]$$

$$= \frac{1}{2}(L+Mu_2^2),$$

where

$$L = 2(2\alpha_1-2\alpha)-\beta\delta_1(1-\alpha_1),$$

$$M = \beta\delta_1(1-\alpha_1) < 0\ .$$

Therefore $\mathrm{Re}\,\Psi(iu_2,v_1) \le 0,$ if $L \le 0$ and this gives us α_1 as defined by (3.2) . Applying Lemma 2.7, we conclude that $\mathrm{Re}\,p_i(z) > 0$ in $E,\ i=1,2$ and so $h_i \in P(\alpha_1).$ Consequently $h \in P_k(\alpha_1).$ This completes the proof that $f \in Q_k^{\lambda,\mu}(0,\alpha_1).$

Theorem 3.5. For $0 \le \beta_2 < \beta_1,$

$$Q_k^{d,c}(\beta_1,\alpha) \subset Q_k^{d,c}(\beta_2,\alpha).$$

Proof. For $\beta_2 = 0,$ the proof is immediate from Theorem 3.5 Therefore we let $\beta_2 > 0$ and $f \in Q_k^{d,c}(\beta_1,\alpha).$ There exist two functions, $H_1, H_2 \in P_k(\alpha)$ such that, for $g \in C_{d,c}(\alpha),$

$$H_2(z) = \left\{(1-\beta_1)\frac{z(L(d,c)f(z))'}{L(d,c)g(z)}+\beta_1\frac{(z(L(d,c)f(z))')'}{(L(d,c)g(z))'}\right\},$$

$$H_1(z) = \frac{z(L(d,c)f(z))'}{L(d,c)g(z)} \in P_k(\alpha), \text{ by Theorem 3.4.}$$

We use the fact that $P_k(\alpha)$ is a convex set and

$$\left\{(1-\beta_2)\frac{z(L(d,c)f(z))'}{L(d,c)g(z)}+\beta_2\frac{(z(L(d,c)f(z))')'}{(L(d,c)g(z))'}\right\} = \frac{\beta_2}{\beta_1}H_1(z)+\left(1-\frac{\beta_2}{\beta_1}\right)H_2(z),$$

we obtain the required result that $f \in Q_k^{d,c}(\beta_2,\alpha).$

Remark 3.2. Since $\phi(d,c)(z)$ is convex for $0 < c \le d,\ c+d \ge 2$ by virtue of Lemma 2.1 and the class of close-to-convex functions is closed under convex convolution, we have

$$Q_2^{d,c}(\beta,\alpha) \subset Q_2^{d,c}(0,\alpha) \subset K(\alpha) \subset K \subset S.$$

We now derive a covering theorem.

Theorem 3.6. Let for $0 < c < d,\ d+c \ge 2,$ $f \in Q_2^{d,c}(\beta,\alpha).$ If B is the boundary of the image of E under $f,$ then every point of B is at distance at least

$$\left[\frac{2\mu(1+\beta)}{(1-\alpha)(1+\lambda)(3+\beta)+4\mu(1+\beta)}\right]$$

from the origin.

Proof. Let $c \ne 0,$ be any complex number such that $f(z) \ne c$ for $z \in E.$ Then, by

Remark 3.2, $f(z)=\dfrac{cf(z)}{c-f(z)}$ is univalent in E. Let f be given by (1.1) . Then

$$\frac{cf(z)}{c-f(z)}=z+(a_2+\frac{1}{c})z^2+\cdots,$$

and hence

$$\left|a_2+\frac{1}{c}\right|\le 2.$$

Now using triangular inequality and coefficient bound of $|a_2|$ for class $Q_k^{d,c}[\beta,\alpha,A,B]$ as proved in Theorem 3.2 in the above, we have

$$|c|\ge\frac{2d(1+\beta)}{(1-\alpha)(c)(3+\beta)+4c(1+\beta)}$$

which is the required result.

The following result deals with the converse case of Theorem 3.4.

Theorem 3.7. Let $f\in Q_k^{d,c}(0,\alpha)$ in E. Then $f\in Q_k^{d,c}(\beta,\alpha)$ for $|z|<r_\beta$, where

$$r_\beta=\frac{1}{1+2\beta},\qquad (3.5)$$

This result is sharp.

Proof. Since $f\in Q_k^{d,c}(0,\alpha)$, there exists a function $L(d,c)g(z)\in C\subset S^*(\frac{1}{2})$, such that

$$\frac{z(L(d,c)f(z))'}{L(d,c)g(z)}=(1-\alpha)h(z)+\alpha,\ h\in P_k.\quad (3.6)$$

Differentiating (3.6), we have

$$(z(L(d,c)f(z))')'=(L(d,c)g(z))(1-\alpha)h'(z)$$
$$+\{(1-\alpha)h(z)+\alpha\}(L(d,c)g(z))'$$

Since $Q_k^{d,c}(0,\alpha)$, we have

$$\frac{1}{1-\alpha}\left\{(1-\beta)\frac{z(L(d,c)f(z))'}{L(d,c)g(z)}+\beta\frac{(z(L(d,c)f(z)')'}{(L(d,c)g(z))'}-\alpha\right\}$$
$$=h(z)+\frac{\beta zh'(z)}{h_0(z)},$$

where $h_0(z)=\frac{z(L(d,c)g(z))'}{L(d,c)g(z)}\in P(\frac{1}{2})$.

Now using the same convolution technique, we have

$$\left(h(z)*\frac{\phi_\beta(z)}{z}\right)=\left\{h_1(z)+\frac{\beta zh_1'(z)}{h_0(z)}\right\}$$
$$=\left(\frac{k}{4}+\frac{1}{2}\right)\left[h_1(z)+\frac{\beta zh_1'(z)}{h_0(z)}\right]-\left(\frac{k}{4}-\frac{1}{2}\right)\left[h_2(z)+\frac{\beta zh_2'(z)}{h_0(z)}\right],$$

where $h_1,h_2\in P$.

From this it follows that

$$\left\{h_i(z)+\frac{\beta zh_i'(z)}{h_0(z)}\right\}\in P \text{ for } i=1,2.$$

Using well-known results [2] for the class P and $P(\frac{1}{2})$ that

$$\left|zh_i'(z)\right|\le\frac{2r\,\mathrm{Re}\,h_i(z)}{1-r^2},\ \mathrm{Re}\,h_i(z)\ge\frac{1-r}{1+r},$$
$$\mathrm{Re}\,h_0(z)>\frac{1}{1-r},$$

we have

$$\mathrm{Re}\left\{h_i(z)+\frac{\beta zh_i'(z)}{h_0(z)}\right\}\ge\mathrm{Re}\left\{h_i(z)-\left|\frac{\beta zh_i'(z)}{h_0(z)}\right|\right\},\quad (3.7)$$
$$\ge\mathrm{Re}\,h_i(z)\left\{1-\frac{2\beta r}{1-r}\right\}$$
$$=\mathrm{Re}\,h_i(z)\left\{\frac{1-(1+2\beta)r}{1-r}\right\}.\quad (3.8)$$

From (3.7), it is clear that

$$\mathrm{Re}\left\{h_i(z)+\frac{\beta zh_i'(z)}{h_0(z)}\right\}\ge 0,\ \text{for } r<r_\beta$$

and consequently it follows that

$$\left\{h(z)+\frac{\beta zh'(z)}{h_0(z)}\right\}\in P_k,\ \text{for } |z|<r_\beta.$$

Hence $f\in Q_k^{\lambda,\mu}(\beta,\alpha)$, where r_β is given (3.5).

We obtain the sharpness of this result by taking

$$h_i(z)=\frac{1+z}{1-z},\ h_0(z)=\frac{1}{1-z}.$$

This completes the proof.

Conclusion:

We introduce a subclass of analytic functions by using Hadamard product along with Janowski functions. Some inclusion results, radius of univalence and other interesting properties of this class are discussed.

In future work we intend to use formal approaches to prove theorem based on developed formal tools. The formal methods have many application in real life problems [19-32].

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Agility reaching in governmental organizations and their achievements

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Abstract: Changes will lead the organizations to the new challenges which the lack of attention to them will threaten the survival and success of manufacturing organizations increasingly. Because of this vital situation, most of the organizations have reviewed their business priorities and strategic perspectives and emphasized on the consistency with changes of business environment and the rapid response to the market and client needs through the new methods of cooperation. In order to respond to these challenges of business, the organization have chosen a new approach entitled the agility. Agile manufacturing has been defined as the ability to survive and thrive in a highly competitive environment with continuous and unpredictable changes by a quick and an effective response to the changes and also creating the products and services based on the customer demand. In this article, first the historical trends and circumstances, which have led to the emergence of agile manufacturing, have been studied and then the qualifications and abilities needed for the agility and also the agility providers in the organizations have been described.

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1. Introduction

Since 1991, the term agility was applied for the first time in order to describe the capacity needed for a modern production. Agility means the ability to respond and react quickly and successfully to the environmental changes. Like the manufacturers, other organizations and institutions are forced to seek the agility in order to compete in the twenty-first century because modern organizations are facing with a growing pressure for finding new ways of efficient competition in the world dynamic market. Agility improves the ability of organization to supply the high quality products and services and thus is an important factor for the effectiveness of organization. Most of the organizations start using the approaches such as the virtual organization and team in order to improve the organizational agility and develop themselves globally. However, sometimes the agility is seemed as the integration of processes, members, and also the features of organization with advanced technologies.

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Definitions of agility concept

In the dictionary, the term agile means: fast, active, and active move and the agility means the ability to move fast and easy, and being able to think fast and with a smart way. The root of agility comes from the Agile Manufacturing and the agile manufacturing is a concept, which has become popular in recent years and been accepted as a successful strategy by the manufacturers, who are preparing themselves for increasing the substantial performance. In such an environment, every organization should have the ability to produce different products with short service life simultaneously, redesign the products, change the production methods, and react efficiently to changes. If the manufacturing firm has such capabilities, it will be called an agile organization.

Sharifi and Zhang (1999) believe that the Agility means the ability of each organization to sense, understand and predict the current changes in the workplace. Such an organization should be able to detect the environmental changes and look to them as the factors of growth and prosperity. Moreover, in another text they have defined the agility as the ability to overcome the unexpected challenges in order to face with the unprecedented threats of workplace and gain the advantage and benefit from the changes as the opportunities for growth and advancement. Brian Maskell (2001) defines the agility as the ability of prosperity in an environment with continued and unpredictable changes. For this regard, the organizations should not be afraid of

changes in their workplace and avoid them, but they should imagine the change as an opportunity to gain the competitive advantage in their market environment. Vernadat (1999) believes: the agility can be defined as a closed consistency of organization with the changing business needs in order to gain a competitive advantage. In such an organization, the employees' aim is in consistent with the goals of organization and both each intend to give an appropriate response to the changing customer needs.

Based on the results and outcomes, the agility means the dynamic, status-oriented and bold changes and guarantees the success about the market portion, and access to a high number of customers. In other words, here the agility means the ability of a business unit to grow and survive in a competitive environment, which its changes are constant and unpredictable and requires quick response to the changing markets.

Without any doubt, this can be achieved by creating the value in the products and services required for the customers (Goldman et al, 1995). Thus, the agility may be defined as the ability to response quickly to the market requirements and customer needs.

Kidd (1994) believes that in order to operationalize the paradigm of agility, it can be considered as a combination of numerous institutions which each have several key skills or competencies for common activities and together can ready the organization to react quickly to the changing customer requirements. It is evident that Kidd's main purpose here is the virtual organization.

Kidd cites one of the most comprehensive definitions of organizational agility it as follows:

"An agile organization is a fast, adaptable and informed business which is capable of adapting quickly in response to the unexpected and unforeseen events and developments, market opportunities and customer needs. In such a business, there are processes and structures which facilitate the speed, compliancy and strength, and it has systematic and coordinated organization, which has the ability to achieve the competitive performance in a highly dynamic and unpredictable business environment, however this environment is not disproportionate with the current functions of organization (Kidd, 2000)".

Definition and meaning of organization agility

The word "agile" describes the speed and power of response when exposed to the external and internal events of organization.

Agility is to identify successfully the principles of competition (speed, flexibility, innovation, quality and profitability), integration of resources, and appropriate actions in the environment of knowledge with rapid changes, by providing the customer-friendly products and services.

Emergence process of the concept "agility"

From the late 1980s to mid 1990s and after the widespread political and economic developments worldwide, numerous efforts have been done in order to understand the origins and factors affecting new systems in the global business. For the first time, when the United States of America saw the dramatic downturn in the business world, especially in the production area (which had been faced with new competitions from Asia and Europe), became the leader if this movement. In 1991, a group of industry experts observed that the increasing rate of changes in the business environment is faster and more accelerated than the capabilities of traditional manufacturing organizations to adapt and cope with it. These organizations could not benefit from the opportunities, which were offered to them, and this inability to adapt to the changing conditions might lead to their bankruptcy and failure in the long term (Hormozi, 2001). Thus, a new paradigm was provided and released for the first time in the report entitled "the strategy of manufacturing firms in the twenty-first century: industry experts' views" by Iacocca Institute ad introduced to the public (Nigel and Dove, 1991). Immediately, the term "Agile Manufacturing" was used jointly by the public with releasing this report (Gunasekaran et al, 2001).

In order complete the above cases, it should be expressed that in 1991, Lehigh University sponsored by the Navy of United States of America and with Iacocca institute, conducted studies on 13 major manufacturers like General Motors, General Electric, IBM, Texas Instruments, etc.

The purpose of this study was to answer the question what features the successful organizations will have in the twenty-first century. Then, over a hundred other organizations were studied and in 1991 these studies were named as the study of manufacturing institutes in the 21st century, then in 1995, the obtained results of this research were published in a book by Steven Goldman, Nigel and Preiss, entitled: agile competitors and virtual organizations. Some of the results of mentioned studies include:

New competitive environments have created numerous developments in the manufacturing systems and organizations.

Organizations, which have competitive advantages in this new environment and are able to produce products according to the customers' needs, are agile and progressive.

Achieving the agility needs the existence of flexible manufacturing system, having a flexible

knowledgeable workforce, encouraging management structure, and team innovation (both within and between the organizations).

Principles for designing the agile organizations

These principles are necessary for any organization, which wants to work better than the rivals in order to respond and predict the changes. These principles are as follows:

1) Sourcing strategy: It contains a series of decisions which defines and integrates the internal and external sources. First, it identifies the services, which should be done in the organization and then assigns the individuals' responsibilities to them.

2) Resource management: It has an effective role in applying the individuals, skills and competencies in the right place and helps the organization to allocate the resources properly.

3) Competencies: It identifies the best organizational practices. During the past, the intelligence traditional agencies focused on the technical skills, but now by moving to the agility, the Competency has been more considered.

4) Leadership: In the agile organizations, the leadership is less focused on the ordering control and it more emphasizes on the preparation, conduction, influencing, delegating the authority, and persuasion.

5) Type of processes: It emphasizes here on the way under which the organizations work.

6) Structure: It more focuses on the organizational structure, and the way under which the components of organization are put together. An agile organization has a flexible structure.

7) Readiness for change: It is the ease of responding to unpredictable changes and demands. Readiness for change enables the organization to achieve the opportunities (in fact, the agility of business) and get rid of the difficulties (in fact, the organizational resilience).

Characteristics and features of organizational agility

Agility is based on three basic dimensions:

1- Performance, 2-Learning, 3- change

In general, the main features of an intelligent and agility system of businesses include:

• Knowledge Management: Having the right knowledge and applying it correctly and timely.

• Ability to answer: Having the competency to deal effectively with the unpredictable changes of any kind and in any field.

• Dynamic integration: Active management of sub-systems and adapting them with changing status of company in order to follow its goals.

• Management of the whole resources: Including the management of resources such as the knowledge, money, materials, machinery and processes, information and so on.

• Management of collective learning: Considering the learning process, value of continuous learning, seeking the new knowledge, collective learning and sharing the knowledge.

• Management of adaptive structure: Developing and providing the principles and patterns of interaction in the core business systems and coordinating them with the principles of adaptive systems.

• Management of change skill: Accepting the concepts of change skill in the whole business environment.

• Management of decisive action: Considering the timely decisions.

•Management of competency and talent: Having the proper and timely right for appropriate skills particularly about the quality of decision-making.

Rapid technological developments, increased risks, globalization, and the privatization expectations are the environmental features which the current business organizations are faced with. For being successful in this environment, agility creates a competitive advantage which can be maintained by being known in the innovation and quality. The agile organization makes the processes and individuals in an organization consistent with advanced technology and resolves the customer needs based on its own high quality products and services and in a relatively short period. However, this condition occurs when the agility is considered as an organizational systematic value and a competitive strategy for leaders.

2. Organizational agility

At the beginning of the 1990s, different organizations were widely under pressure from their customers to achieve the greater flexibility, shorter providing time, more varied products and services. Hence, in order to survive and develop they moved in a way to overcome the challenges such as the changing consumer demands, demand for high quality and minimum production cost, and accountability to the customers' specific needs. In response to these challenges, they re-engineered and restructured their businesses and developed a new approach called the organizational agility. In 1991, more than 150 industry executive directors participated in a study. The results of this research were published in a two-volume report entitled "The strategy of manufacturing institutions in the 21st Century" and in which it was described the competition in the manufacturing institutions of the United States of America in the next 15 years. As a result, the "Agile Manufacturing Enterprise Forum" affiliated with the Institute Iacocca at the University

Lehigh was formed and the concepts of agile manufacturing were introduced (Sheridan, 1993; Strobing, 1995; Richards, 1996; Nagel and Dove, 1991).

Proposed paradigm has the concept of one step forward and creating new meanings for better performance and success and practically is a strategic approach with regard to new conditions of business environment. Responding to the changes and considering their advantages through the strategic use of manufacturing, service and directorial tools and methods are the pivotal and basic concepts of agility (Sharifi and Zhang, 1999). "Charles Darwin" explained in his book entitled "The origin of species" that the species were changed over time in order to be proportional to the environment, and the species which remained were not stronger or smarter species, but they are the ones, who responded to changes more and better. The reflection of this theory on the business also allows the organizations to survive if they can adapt themselves to new and changing situations and environments and are ready to be changed.

The agility has nearly denied old ways of doing work, which were appropriate for the traditional static operation. In a competitive and highly changing environment, the organizations and equipment, which have the high flexibility and very high sensitivity towards the changes of environment and market, should be created and developed. Agility is defined as an ability to survive and thrive in a highly competitive environment with continuous and unpredictable changes by seeking to respond quickly and effectively to the changes and also making the products and services based on the customer demands (Crocitto and Youssef, 2003).

Since 1991, several researchers have offered numerous definitions and activities in this regard and the subject of most of them includes: the producer's abilities to react quickly to sudden and unpredictable changes (Noaker, 1994; Goldman et al, 1995; Richards , 1996; Van Assen et al, 2001), Before acting respond to changes (Nagel and Goldman, 1993; Bessant, 2001,113), profitability of environment (Noaker, 1994; Goldman and Nagel, 1993; Goldman et al, 1995), ability to survive and thrive in an environment with continuous and unpredictable changes (Dove, 1999; Maskell, 2001; Richards, 1996; Rigby et al, 2001).

Accordingly, in order to create the agility (or making the organization agile) the capabilities and enablers of agility are so important. Enablers of agility are the elements, concepts and techniques which help the organizations to achieve the desired level of capabilities of Agile. Each organization, which wants to be agile and stand in its place confidently, should have these capabilities at the desired level. Agility capabilities are provided in different categories and based on different approaches. The most popular categories which have been used in this article include: accountability, Competency, coincidence and Flexibility, and Quickness (Lin et al, 1995, Sharifi and Zhang, 1999).

Sometimes different researchers have offered various features for the agile and moving organizations in line with the agility with combining the agile enablers and capabilities. These characteristics act as the leaders of agility way, and illuminate the way of making the manufacturing and service organizations agile for more survive and competitiveness. For example, the existing literature in the field of agility has divided the agility provider tool into four different categories based on the nature and scope: strategies, technologies, systems and human resources (Sherehiy et al, 2007; Youssef et al. Bustelo and Avella, 2006). Also, the existing literature about each set is divided into several subsets, which aim to provide some of the key components of agility in each set and subset transparently and significantly. In order to respond effectively to the changing needs, there should be the agility in all functional areas of organization. Therefore, gaining the agility requires the flexibility and sensitivity in the strategies, technologies, systems and human resources (Byrd et al, 2001; Bharadwaj, 2000, Yusuf et al, 1999).

Environmental changes, the main factor for needing the agility

It seems that the change is one of the main characteristics of organizations in the new competitive era. Most of the organizations have experienced a change in their own environment for example in a period of three to six months or one year. According to the context, which is dominating the business world of organizations now, the organizations have no choice but to change the expected attitudes, knowledge, approaches, procedures, and results. By vast studies, Sharifi and Zhang (1999) have classified the areas, faced with the changes in the business environment, as follows:

- Market inconstancy and instability which are due to the development of small part of market, providing large number of new products, and decline of product lifetime.

- Severe competition which is due to quick changing market, increased cost pressure, increasing competitiveness, and short term developing of new products.

- Changes in customer needs which occur due to the custom demands, increased expectations of quality, and faster delivery time.

- Acceleration of technological changes which occur due to the introduction of new and efficient manufacturing facilities, and integration of hardware and software systems.

- Changes in the social factors which are emerged for protecting the environment, workforce expectations, and legal and juridical pressures.

However, the reason for changes in the business world can be outlined as follows: increasing access to the technology, intense competition for the technological development, globalization of markets and business competition, quick access to the technology, changes in the salary and wage levels and job skills, environmental responsibilities, resource limitations, and most importantly increasing the customer expectations (S. T. John et al, 2001).

Conceptual model of agility

A comprehensive model for achieving the agility is provided by Mr.Sharifi and Zhang(1999). This model, which is based on analyzing the conceptual literature of agility, is shown in Figure 1.

The first sector is the agility drivers, which in fact are the changes occurring in the business environment, and they can lead the institution to the new positions and gaining the competitive advantages.

The second sector is the agility capability which provides the power necessary for responding to the changes.

The third sector is the agility providers which in fact are the tools through

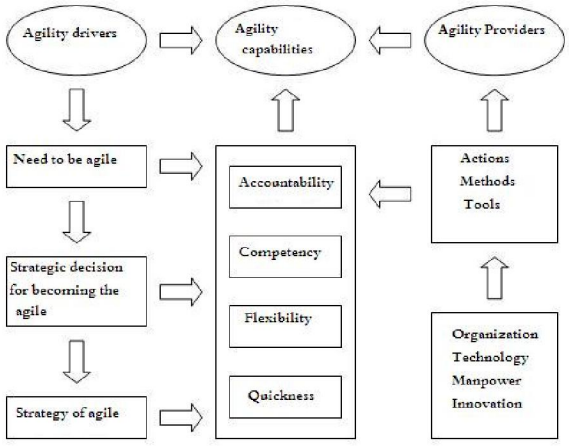

Figure 1: Conceptual model of agility

Why we should be agile?

Customer satisfaction

Customer satisfaction is one of the most important achievements for making the organization agile because in the agile environments, the customer satisfaction will be the main criteria for measuring the success of organization. Customer satisfaction will be achieved through his increased and almost every day interactions with the development team. In the agile environments, the customer is largely valued.

In the agile environments, different methods and measures have been predicted for customer satisfaction, some of them that include:

- Acceptance and reception of changing customer needs
- Delivering the operant Software, often every few weeks
- Constant interactions between the customer and development team

Quality Improvement

Another principle of becoming agile is providing the high quality products, so that this quality can be fully measured. As was mentioned for the previous case, our highest priority is the customer satisfaction; customer satisfaction creates the client's desired products for business. Providing the client's desired software will be one of factors for making high quality products, but by interactions of development team with the customer the innovations will be created which make much higher quality and more customer friendly products.

In the agile environments, different methods have been provided for improving the quality of product; some of them include:

- Face to face and constant communication of development team members with the customer in order to create the innovation
- Continuous attention to the technical preference and good design
- Maintaining the simplicity principle at all stages of product development
- Ongoing review of development team at each stage of development

Increasing the productivity

Increasing the productivity of manpower is one of the criteria for developing the team in agile environments. This increased productivity will be from 50% to 90%. The manpower is the most expensive element and developing the software is the basic element of each organization, thus the low productivity of this resource can be a disadvantage for the organization.

In the agile organizations, the methods, which motivate the workforce such as the following methods, are used in order to maximize the productivity:

- Self-organizing the manpower
- Creating the trust between the individuals
- Creating the self-confidence in the people

In order to conclude the discussion why we should be agile, it can be said: Each organization has

defined the strategies for its own success, so it will be able to meet each of these strategies with the minimal cost.

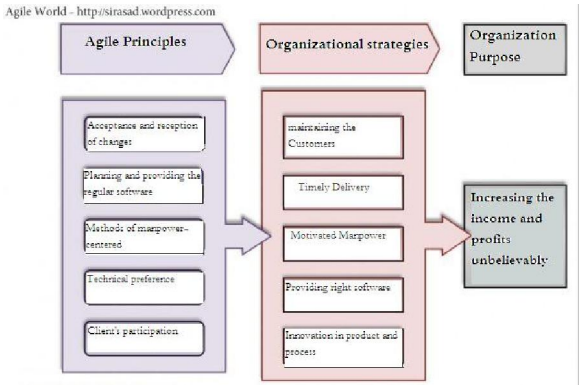

Figure 2: Chart of agility reasons

As you can see in the figure above, the organization has a series of strategies and the Agile for each strategy has a certain program, and by implementing this program of organization, the organization will be able to achieve this strategy; and achieving each strategy will lead to a close way and achievement of excellent purpose of an organization or higher profit and income.

What is needed for being agile?

Agile can be applied in the following environments and conditions easier and better:

- Quick delivery: In some cases, when the software is developing, the software should be delivered to the client more quickly otherwise the customer's work will be Gummed up. In the other words, at the same time the software will be developed and used by the customer.
- Lack of information and requirements of project or product during the start up time or initiate phase of project
- Constant availability of customer
- Adaptable manpower
- The manpower are deployed in one place
- A real and efficient team

The obstacles while implementing the Agile include:

- Lack of knowledge for Agile
- Very large teams
- Distributed and vast development beyond the local areas
- Closed contracts (based on the price and scope of project)
- Not-experienced or new workforce and new emerging teams
- Quick movement

Numerous conditions can be involved in making the organization agile or not; some of them are mentioned above, but the most important principle for becoming the agile is evaluating the ability of organization and determining the ready time to become an agile. Evaluating the organization is the most important thing which should be done for the necessary requirements of organization. For evaluating the organization by the workforce of that organization and without necessity for professionals from elsewhere, you can use the software, which has been prepared for this case.

3. Core Values of Agile Organization

According to the whole presented discussions, four basic values can be considered for the Agile Organizations. These four features are as follows:

- Personnel and their relationships have more value than the operating tools and procedures.
- Using the software and office automation has more value than the physical documentation.
- Customer satisfaction has more value than the exact enforcement of previous contracts.

Quick respond to the changes has more value than following the previous plans.

Advantages of improved and increased organizational agility level can be summarized in the following cases:

1-Quick promotion of organization towards the predetermined objectives;
2-better service, lower prices, and stable organization;
3-Getting the value for investing in the field of information technology;
4-Reduced volume of funding for in the field of information technology (IT);
5- Establishing the necessary coordination between the service providers of information technology (IT);
6- Ability of organization to change the processes and improve the business operations;
7- Quicker response of organization to the customer needs;
8-Increased employees' satisfaction;
9- Appropriate respond to the changes;
10- Significant development of staff skills;
11-Increased business and operational values;
12-Focous and emphasis on controlling the organization;
13-Developed structure of organizational processes;
14-Improved costs controlling and increased efficiency of organization because of controlling and reducing the costs.

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Some sufficient conditions for spirallike functions with argument properties

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Abstract. The aim of this paper is to establish certain sufficient conditions for some subclasses of analytic functions using argument properties. Some applications of our work to the generalized Alexander integral operator is also given.
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1. Introduction

Let $A(n)$ denote the class of functions $f(z)$ of the form

$$f(z) = z + \sum_{k=n+1}^{\infty} a_k z^k, \qquad (1.1)$$

which are analytic and multivalent in the open unit disk $\mathfrak{A} = \{z : |z| < 1\}$. By $S_\lambda^*(n,\alpha)$ and $C_\lambda(n,\alpha)$, λ is real with $|\lambda| < \frac{\pi}{2}$, $0 \le \alpha < 1$, $n \in \mathrm{N}$, we mean the subclasses of $A(n)$ consisting of all functions $f(z)$ of the form (1.1) which are defined, respectively, by

$$\mathrm{Re}\, e^{i\lambda} \frac{zf'(z)}{f(z)} > \alpha \cos\lambda, \ (z \in \mathfrak{A}), \qquad (1.2)$$

$$\mathrm{Re}\, e^{i\lambda} \left(1 + \frac{zf''(z)}{f'(z)}\right) > \alpha \cos\lambda, \ (z \in \mathfrak{A}). \qquad (1.3)$$

We note that for $\alpha = 0$ and $n = 1$, the above classes reduce to the class of spirallike functions introduced by Spacek [1] and the class of Robertson functions studied by Robertson [2] respectively. For more details on the subject of spirallike and Robertson functions, see [3-5].

Sufficient conditions were studied by various authors for different subclasses of analytic functions, for some of the related work see [6-12]. The object of the present paper is to obtain sufficient conditions for the classe $S_\lambda^*(n,\alpha)$ and $C_\lambda(n,\alpha)$. We also consider some special cases of our results which lead to various interesting corollaries and relevances of some of these with other known results are also mentioned. We will assume throughout our discussion, unless otherwise stated, that λ is real with $|\lambda| < \frac{\pi}{2}$, $0 \le \alpha < 1$ and $n \in \mathrm{N}$.

We need the following lemma due to Mocanu [13].

Lemma 1.1. If $p(z) \in A(n)$ satisfies the condition

$$\left|\arg p'(z)\right| < \frac{\pi}{2}\,\delta_n \quad (z \in \mathfrak{A}),$$

where δ_n is the unique root of the equation

$$2\tan^{-1}\left[n(1-\delta_n)\right] + \pi(1-2\delta_n) = 0, \qquad (1.4)$$

then $p(z) \in S^*(n,0)$.

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2. Main Results

Theorem 2.1. If $f(z) \in A(n)$ satisfies

$$\left| e^{i\lambda} \arg\left(\frac{f(z)}{z}\right) + \left((1-\alpha)\cos\lambda\right) \arg\left\{ e^{i\lambda} \frac{zf'(z)}{f(z)} - \alpha\cos\lambda - i\sin\lambda \right\} \right| < \frac{\pi}{2}\ \delta_n\ (1-\alpha)\cos\lambda \quad (z \in \mathfrak{A}), \qquad (2.1)$$

where δ_n is the unique root of (1.4), then

$$f(z) \in S_\lambda^*(n,\alpha).$$

Proof. Let us set

$$p(z) = z\left(\frac{f(z)}{z}\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}} = z + \frac{e^{i\lambda}\ a_{n+1}}{(1-\alpha)\cos\lambda} z^{n+1} + \ldots \qquad (2.2)$$

for $f(z) \in A(n)$. Then clearly (2.2) shows that $p(z) \in A(n)$.

Differentiating (2.2), we have

$$p'(z) = \left(\frac{f(z)}{z}\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}} \left\{ \frac{e^{i\lambda}}{(1-\alpha)\cos\lambda} \left[\frac{zf'(z)}{f(z)} - 1 \right] + 1 \right\} \qquad (2.3)$$

which gives

$$\left|\arg p'(z)\right| = \left| \arg\left(\frac{f(z)}{z}\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}} + \arg\left\{ e^{i\lambda} \frac{zf'(z)}{f(z)} - \alpha\cos\lambda - i\sin\lambda \right\} \right|.$$

Thus using (2.1), we have

$$\left|\arg p'(z)\right| \le \frac{\pi}{2}\ \delta_n \ \left(z \in \mathfrak{A}\right),$$

where δ_n is the root of (1.4). Hence, using Lemma 1.1, we have $p(z) \in S^*(n,0)$.

From (2.3), we can write

$$\frac{zp'(z)}{p(z)} = \frac{1}{(1-\alpha)\cos\lambda} \left[e^{i\lambda} \frac{zf'(z)}{f(z)} - (\alpha\cos\lambda + i\sin\lambda) \right].$$

Since $p(z) \in S^*(n,0)$, it implies that $\operatorname{Re}\frac{zp'(z)}{p(z)} > 0$. Therefore, we get

$$\frac{1}{(1-\alpha)\cos\lambda} \left[\operatorname{Re}\left(e^{i\lambda} \frac{zf'(z)}{f(z)} \right) - \alpha\cos\lambda \right] = \operatorname{Re}\frac{zp'(z)}{p(z)} > 0$$

or

$$\operatorname{Re}\left(e^{i\lambda} \frac{zf'(z)}{f(z)} \right) > \alpha\cos\lambda.$$

and this implies that $f(z) \in S_\lambda^*(n,\alpha)$.

Making $\lambda = 0$ in Theorem 2.1, we have

Corollary 2.2. If $f(z) \in A(n)$ satisfies

$$\left| \arg\left(\frac{f(z)}{z}\right) + (1-\alpha) \arg\left\{ \frac{zf'(z)}{f(z)} - \alpha \right\} \right| < \frac{\pi}{2}\ \delta_n\ (1-\alpha) \quad (z \in \mathfrak{A}),$$

then $f(z) \in S^*(n,\alpha)$.

Further if we take $n = 1$ in Corollary 2.2, we get the following result proved by Uyanik et al [12].

Corollary 2.3. If $f(z) \in A$ satisfies

$$\left| \arg\left(\frac{f(z)}{z}\right) + (1-\alpha) \arg\left\{ \frac{zf'(z)}{f(z)} - \alpha \right\} \right| < \frac{\pi}{2}\ \delta_1\ (1-\alpha),$$

where δ_1 is the unique root of the equation

$$2\tan^{-1}\left[(1-\delta_1)\right] + \pi(1-2\delta_1) = 0,$$

then $f(z)$ belongs to the class of starlike functions of order α.

Theorem 2.4. If $f(z) \in A$ satisfies

$$\left| e^{i\lambda} \arg\left(f'(z)\right) + (1-\alpha)\cos\lambda \arg\left\{ e^{i\lambda}\left(\frac{zf''(z)}{f'(z)} + 1\right) - \alpha\cos\lambda - i\sin\lambda \right\} \right| < \frac{\pi}{2}\delta_n\ (1-\alpha)\cos\lambda, \quad (z \in \mathfrak{A}),$$

where δ_n is the unique root of (1.4), then $f(z) \in C_\lambda(n,\alpha)$.

Proof. Let us set

$$p(z) = \int_0^z \left(f'(t)\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}} dt = z + \frac{e^{i\lambda} a_{1+n}}{(1-\alpha)\cos\lambda} z^{n+1} + \ldots.$$

Also let

$$g(z) = z\left(f'(z)\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}} = z + \frac{(n+1)e^{i\lambda} a_{n+1}}{(1-\alpha)\cos\lambda} z^{n+1} + \ldots.$$

Then clearly $p(z)$ and $g(z) \in A(n)$. Now

$$g(z) = z\left(f'(z)\right)^{\frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}}.$$

Differentiating logarithmically and then simple computation gives us

$$\left|\arg g'(z)\right| = \left| \arg\left(f'(z)\right)^{e^{i\lambda}/(1-\alpha)\cos\lambda} + \arg\left\{ e^{i\lambda}\left(\frac{zf''(z)}{f'(z)} + 1\right) - \alpha\cos\lambda - i\sin\lambda \right\} \right| < \frac{\pi}{2}\delta_n.$$

Therefore, by using Lemma 1.1, we have

$$g(z) = zp'(z) \in S^*(n,0)$$

which implies that $p(z) \in C(n,0)$. Since

$$\frac{zp''(z)}{p'(z)} = \frac{e^{i\lambda}}{(1-\alpha)\cos\lambda}\left\{\frac{zf''(z)}{f'(z)}\right\},$$

therefore

$$\mathrm{Re}\left(1+\frac{zp''(z)}{p'(z)}\right) = \frac{1}{(1-\alpha)\cos\lambda}\left\{\mathrm{Re}\, e^{i\lambda}\left(1+\frac{zf''(z)}{f'(z)}\right) - \alpha\cos\lambda\right\}.$$

Since $p(z) \in C(n,0)$, So

$$\frac{1}{(1-\alpha)\cos\lambda}\left\{\mathrm{Re}\, e^{i\lambda}\left(1+\frac{zf''(z)}{f'(z)}\right) - \alpha\cos\lambda\right\} > 0,$$

or

$$\mathrm{Re}\, e^{i\lambda}\left(1+\frac{zf''(z)}{f'(z)}\right) > \alpha\cos\lambda.$$

It follows that $f(z) \in C_\lambda(n,\alpha)$.

Taking $\lambda = 0$ in Theorem 2.4, we have

Corollary 2.5. If $f(z) \in A(n)$ satisfies

$$\left|\arg\left(f'(z)\right) + (1-\alpha)\arg\left\{\frac{zf''(z)}{f'(z)} + 1 - \alpha\right\}\right| < \frac{\pi}{2}\delta_n(1-\alpha),$$

then $f(z) \in C(n,\alpha)$.

Further If we take $n = 1$ in Corollary 2.5, we get the following result proved in [12].

Corollary 2.6. If $f(z) \in A$ satisfies

$$\left|\arg f'(z) + (1-\alpha)\arg\left\{\frac{zf''(z)}{f'(z)} + 1 - \alpha\right\}\right| < \frac{\pi}{2}\delta_1(1-\alpha),$$

for $0 \le \alpha < 1$, then $f(z) \in C(\alpha)$, the class of convex functions of order α.

Remark 2.1. If we put $\alpha = 0$ in Corollary 2.6, we get the result proved in [13].

3. Generalized Integral Operator

For $f(z) \in A(n)$, we consider

$$G(z) = \int_0^z \left(\frac{f(t)}{t}\right)^\gamma dt$$

$$= z + \frac{\gamma\, a_{1+n}}{n+1} z^{n+1} + \ldots \qquad (3.1)$$

Clearly $G(z) \in A(n)$ and when $\gamma = 1$ then (3.1) reduces to the well-known Alexander integral operator [14].

Theorem 3.1. If $\gamma \ge 1$ and $f(z) \in A(n)$ with

$$\left|\arg\left(\frac{f(z)}{z}\right)^\gamma + \arg\left\{\gamma\left(\frac{zf'(z)}{f(z)} - 1\right) + 1\right\}\right| < \frac{\pi}{2}\delta_n, \quad (3.2)$$

then $f(z) \in S^*(n,0)$.

Proof. From (3.1), we get

$$G'(z) = \left(\frac{f(z)}{z}\right)^\gamma. \qquad (3.3)$$

Differentiating (3.3), logarithmically, we get

$$\frac{zG''(z)}{G'(z)} = \gamma\left(\frac{zf'(z)}{f(z)} - 1\right). \qquad (3.4)$$

Then by simple computation, we have,

$$\left|\arg\left(zG''(z) + G'(z)\right)\right| = \left|\arg\left(\frac{f(z)}{z}\right)^\gamma + \arg\left\{\gamma\left(\frac{zf'(z)}{f(z)} - 1\right) + 1\right\}\right| < \frac{\pi}{2}\delta_n,$$

where we have used (3.2). Therefore

$$\left|\arg\left(zG''(z) + G'(z)\right)\right| < \frac{\pi}{2}\delta_n,$$

By using Theorem 2.4 with $\alpha = 0$ and $\lambda = 0$, we have $G(z) \in C_0(n,0)$.

From (3.4), we can write

$$\mathrm{Re}\left(1 + \frac{zG''(z)}{G'(z)}\right) = \gamma\,\mathrm{Re}\frac{zf'(z)}{f(z)} - \gamma + 1,$$

since $G(z) \in C_0(n,0)$. Therefore we have

$$\mathrm{Re}\frac{zf'(z)}{f(z)} > \left(1 - \frac{1}{\gamma}\right),$$

which shows $f(z) \in S^*(n,0)$, where $\gamma \ge 1$.

Conclusion:

In this paper we established certain sufficient conditions for some subclasses of analytic functions using argument properties. We also gave some applications of our work to the generalized Alexander integral operator..

In future work, the formal approach will be used to develop logical connection between analytic function and formal specification. Formal specification are the mathematical approaches used for many applications [15-26].

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Comparative Studies on the Effect of Aflatoxins Types on the Immunization of One-Day-Old Broiler Chicks Simultaneously Vaccinated Against Newcastle Disease and Infectious Bronchitis Disease

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Abstract: This study was done to investigate the effect of the ingestion of contaminated feed with Aflatoxins types which produced with different types of fungus on the immunoresponse of one-day old broiler chicks to attenuated live virus vaccines for Newcastle disease (ND) and infectious bronchitis disease (IB) to non Aflatoxins treated groups.Concurrent exposure of chickens to 400 parts per billion (ppb) aflatoxin previously prepared from *Aspergillus parasiticus*, NRRL 2899, as a potent aflatoxigenic strain, and to 10 parts per million (ppm) Aflatoxins previously prepared from *Aspergillus flavus* NRRL 3357 as they were the most common types of fungus can produce Aflatoxins in feed and vaccination against ND, IB resulted in lack of adequate protection against subsequent experimental challenge, as assessed by antibody responses compared to chickens fed aflatoxin free ration which determined by the ELISA test. The performance parameters include food consumption, body weight, food utilization, mortality and liver pathology. **Conclusions:** The mortalities were higher in chickens fed 400 ppb of Aflatoxins from *Aspergillus parasiticus* than in the chickens fed on 10 ppm aflatoxin from *Aspergillus flavus* during the challenge test against NDV and IBV as the low levels of protective antibodies due to their immunosuppressions effect.
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Key words: Aflatoxins, failure of vaccination and immune response against ND, IB, decrease in rate gain and body weight

1. Introduction

Vaccinal failure considered as a problem affecting broiler chicken flocks and has multifactorial causes either infectious or non infectious causes, and mycotoxins is one of the major non infectious causes which can affect on rate of gain and feed efficiency for raising healthy and profitable broiler chicken flocks, also affect seriously on the immune response of vaccination against the major infectious diseases in poultry production such as Newcastle (ND) infectious bronchitis (IB) and infectious bursal disease (IBD) as vaccination against these viral diseases were the vital to safeguard against these diseases ***(Allan et al., 1978; McFerrin & McCracken, 1988; Lukert & Saif, 1991)***. Aflatoxins (AF), a group of closely related, extremely toxic chemicals, are produced by strains of *Aspergillus flavus* and *Aspergillus parasiticus* and can occur as natural contaminants of poultry feeds ***Edds and Bortell, (1983).*** Aflatoxins were responsible for "turkey X disease," which caused high mortality in turkey poults in England in 1960. Since then, the toxicity of AF to poultry has been well documented, as indicated by ***Huff et al. (1988).*** Aflatoxins is a type of mycotoxins as a toxic product of fungal growth produced primarily by the mold, Aspergillus flavus in cereal grains, particularly rice and corn in which its spores germinate during storage. Aflatoxins contamination of feed stuffs and prepared feeds is widespread ***(Bryden et al., 1980; Buckle, 1983; Jelinek et al., 1989; Hegazi et al.,1991).*** Our Studies evaluate the effect of Aflatoxins types as immunosuppressive due to its ingestion in feed has which resulted in decreased immunity in vaccinated birds ***(Campbell et al., 1988; Gush et al., 1990; Hegazi et al., 1991; Mohiudin, 1993; Azzam & Gabal, 1997). A***lso its economical effects on the mortality rates, body gains, feed conversions rate and increase the condemnation rates of both contaminated ration and carcasses of chickens. These levels of aflatoxicosis produced signs and lesions as well as a significant decrease in weight gain and feed conversion during 5 weeks. In addition, microscopic lesions, indicative of aflatoxicosis, were evident and significant decreases in neither humoral immunity nor the development of the acquired immunity to Newcastle disease or Infectious bronchitis.

2. Material and Methods

1- Experimental Chicks:

A total of 210 One-day-old commercial broiler Hubbard chicks were used (El Arabia Company for poultry production, Cairo). The chickens were fed a commercial corn-soybean meal starter ration formulated to meet or exceed the recommended nutrient requirements ***National Research Council,***

(***1984)*** and housed in heated starter batteries under continuous fluorescent lighting. Experimental diets and water were provided for *ad libitum* consumption. Individual feed intake and BW were recorded weekly. These chicks were derived from breeders vaccinated with both live and inactivated IB and NDV vaccines. Individually weighed, wing banded.

2-Aflatoxins

Two groups of Aflatoxin were prepared according to the type of fungus producing it:

1-Aflatoxin was locally prepared by the kindly help of (National Reach center Laboratory, Giza) as produced via fermentation of rice by Aspergillus parasiticus NRRL 2999 as described by ***Shotwell et al. (1966)*** and modified by ***West et al. (1973).*** Fermented rice was autoclaved and ground and the AF content measured by spectrophotometric analysis ***Nabney and Nesbitt, 1965; Wiseman et al., (1967).*** Of the total AF content in the rice powder, 79% was AFB1, 16% was AFG1, 4% was AFB2, and 1% was AFG2. The rice powder was incorporated into the basal diet and confirmed by HPLC to provide the desired level of 4 mg AF/kg (400 parts/billion ppb)/chicken/day. Aflatoxin concentration of diets was based on AFB1

2-Another Aflatoxin prepared locally in our laboratory by growing Aspergillus flavus NRRL 3357 was grown on enriched long-grain rice for 7-10 days to produce aflatoxin B1 (AFB1). The quantity of AFB1 in moldy rice was determined by thin-layer chromatography using ultraviolet light. Used as dried moldy rice powder was fed in unmedicated feed by (AFB1 level 10 ppm).

-The two types of aflatoxin feeding were continued for 2 months during the experiment

3- Vaccines:

1- ***AVINEW***(Merial, France) Live vaccine against Newcastle disease VG/VA Strain – Freeze-dried pellet.

Composition:

The Vaccinal strain is the VG/GA strain of Newcastle disease virus. Each dose contains at least 15 PD90 (protective dose 90%)

Doses:

Use within 2 hours after reconstitution with physiological saline or special diluent via ocular route individually by dose of 10^3 EID 50

AVINEW a Lentogenic virus isolated by Gilson and Villages from digestive system (intestine) of turkey ***(Glisson et al., 1990;Mayo, 2002; Nunes, et al., 2002;).***

2- **Gallimune ND:** Inactivated vaccine against Newcastle disease.

Composition:

The vaccine contains inactivated Newcastle disease virus, a preservative and an oil excipient .As a booster for the respective vaccination.

Dosage*:*

0.3 ml dose per chicken

3-**Nobilis® IB H120** (Merck AH the Netherlands) **is** a live vaccine against Infectious Bronchitis serotype Massachusetts (strain H120) in poultry. H120 IBV live vaccine was used.

Composition:

Active components per dose: Live IB strain H120: >= 3.0 log10 EID50 as freeze-dried pellet.

4-**Nobilis® Ma5 + Clone 30** (Merck AH the Netherlands) is a live vaccine against Infectious Bronchitis serotype Massachusetts (strain Ma5) and Newcastle Disease (strain Clone 30) in chickens.

Composition*:*

Active components per dose:

- Live I.B. strain Ma5: >= 3.0 $\log^{10}$ EID_{50}
- Live ND strain Clone 30: >= 6.0 $\log^{10}$ EID_{50}

AS freeze-dried pellet *intraocular instillation procedure:* Dissolve the vaccine in physiological saline solution (usually 30 ml per 1000 doses) and administer by means of a standardised dropper. One drop should be applied from a height of a few centimetres into one eye. The handler should ensure that the eye drop is inhaled by the bird and then free the chicken.

Vaccination via injection:

Shake well prior to use Subcutaneous and/or intramuscular route

Procedure:

The chicks groups were vaccinated at one day old by ND, IB and combined ND + IB Live vaccines through ocular instillation. The all chicks groups were revaccinated against ND via ocular instillation using ND live vaccine (VG/GA strain- Avinew), at $15^{th,}$ 30^{th} days of age. The vaccine was diluted to give each bird approximately a dose of 10^3 EID $_{50}$ and finally vaccinated at 40^{th}, 55^{th} days of age by inactivated ND vaccine.

4-Embryonated chicken eggs

SPF E.C.E obtained from Nile SPF (Koom Oshiem, Fayoum, Egypt) were used for titration of the vaccines strains

5-Vaccine titration:

The used vaccines were titrated in SPF embryonated chicken eggs according to ***(Villegas and Purchase,* 1989*),*** the titer was expressed as 50% embryo infective dose(EID_{50})/ml and it was calculated as ***Reed and Munch (1938).***

6-Challenge virus strains

NDV, IBV strains, obtained from the National Reachers center Laboratories, Giza, Egypt. Challenge viruses were given by eye drop bilaterally applying (0.2 ml) on each eye of $10^{3.5}$ median egg infectious

dose (EID_{50})/ml NDV and 10^4 EID^{50} of IBV Challenged groups were isolated in cages in separate rooms and Control, nonchallenged groups all groups were observed for 14 days post challenge. Symptoms, mortality and grossly visible lesions at necropsy were recorded.

7-Serum samples

Blood samples were collected every two weeks from individual chickens in all groups, from wing vein in clean dry, sterile Wassermann tubes. The tubes containing blood samples were stroppered and left in horizontal position for an hour at room temperature and then left for another hour at 4°C then centrifuged at 3000 r.p.m. for 15 minutes. Sera were separated, inactivated at 56°C for 30 minutes in a water bath and frozen at - 20°C until tested at the end of the experiment to determining the antibody titres of NDV, IBV by ELISA test.

5-ELISA Kits:

NDV and IBV-ELISA Kits were obtained from Kikegaard and Perry laboratories (Kpl), U.S.A.

6- ELISA test procedures:

ELISA test was carried out according to manufactural instructions as while

Calculation of ELISA titers:

- Negative control mean (NCx) = well $\frac{A1+ well A2}{2}$ = NCx

- Positive control mean (PCx) = $\frac{well A3+ well A4}{2}$ = PCx

- S/P ratio = $\frac{sample mean - NCx}{PCx - NCx}$ = S/P

-Titer- Relates S/P at a 1:500 dilution to an endpoint titer: Log_{10} titer=1.09(log_{10} S/P)

8-Statistical analysis:

Statistical Analysis of variance **(ANOVA)** test was used to estimate differences among treatments according to ***(Steel and Torrie, 1960).*** Correlation and linear regression analysis were also performed using Microsoft excel program.

9- Performance parameters:

Performance parameters for broiler chicks including average weekly mortality rate, body weight gain /gm., cumulative feed intake/gm (CFI/gm) and feed conversion rate (FCR) were used and calculated according to ***Sainsbury (1984).***

10-Expermint procedure:

230 One-day-old commercial broiler Hubbard chicks were divided into four groups **A,B,C,D and E** ,the groups **A,B,C** consists of 60 one day old chick and the group **D** and **E** have 20 one day old chick for each **D** kept as vaccinated ,none Aflatoxins fed and challenged while group **E** kept as non vaccinated ,free aflatoxin feeding control (control –ve)

-The group **A** (vaccinated intra ocular at one day old by ***AVINEW***for **ND)**

- The group **B** (vaccinated intra ocular at one day old by **Nobilis IB H120**)

- The group **C** (vaccinated intra ocular at one day old by **Nobilis® Ma5 + Clone 30**)

-The groups **A, B, C** were revaccinated with *AVINEW* for ND at 15th, 30th days of age the revaccinate by the inactivated vaccine against ND at 40th and 55th days of age

- The groups **A, B, C** were divided into sub groups (A1, A2), (B1, B2) and (C1, C2) the sub group A,B of 30 sub group C was 40 one day old vaccinated chicks as previously stated.

-The sub groups (A1, B1, and C1) feed on ration contain Aflatoxin produced by Aspergillus parasiticus, NRRL 2899, a potent aflatoxigenic strain, by a dose 4 mg AF/kg (400 parts/billion ppb)/chicken/day for 8weeks

-While the other sub groups (A2, B2, and C2) feed on ration contain Aflatoxin produced by Aspergillus flavus NRRL 3357 by a dose level 10 ppm of AFB1/chicken/day for 8weeks

-Challenging for each group by NDV (28th day old), IBV (40th day old) Challenge viruses strains were given at 28th and 40th days of age respectively for each virus strain by eye drop bilaterally applying (0.2 ml) on each eye of $10^{3.5}$ median egg infectious dose (EID_{50})/ml NDV and 10^4 EID^{50} of IBV Challenged groups were isolated in cages in separate rooms and Control, nonchallenged groups all groups were observed for 14 days post challenge. Symptoms, mortality and grossly visible lesions at necropsy were recorded.

3. Results and Disscusion

In this study, we directed our work to investigate the comparative effect of the ingestion of contaminated feed with Aflatoxins types which produced with different types of fungus on the immunoresponse of one-day old broiler chicks to the most popularly attenuated live virus vaccines for Newcastle disease (ND) and infectious bronchitis disease (IB) to non Aflatoxins treated groups in the presence of maternal antibodies in chicken flocks, experiment design shown in table (1), Vaccination of 1- day old broiler chicks which possess natural maternal antibodies show pronounced immunity between 3 and 4 weeks of age, the ability of mothers to transmit antibodies to their offspring was documented in both mammals and birds over100 years *ago* ***(Giambrone and Ronald, ,1986); Jennifer et al., (2003) and Hamal et al., 2006)*** , maternal antibodies is protective and during the vaccination the maternal antibodies neutralize the vaccine antigen rendering the vaccine in effective ,also the age of chicks at vaccination and the level of maternal antibody greatly influence immune response of broiler chickens to the vicinal antigen

(Awang et al.,1992). Data on the effects of aflatoxin on antibody titres are shown in Tables 3 to 5. The titres were markedly higher in the vaccinated, non-aflatoxin exposed groups than in those exposed to aflatoxin. They were also considerably higher than the values of the negative controls (data not shown) provided with each ELISA kit. The statistical analysis of the ELISA data showed that the effect of aflatoxin on the titres was highly significant. No significant differences were observed between the different groups in relation to whether the vaccines were administered singly or in combination. The titres in the non-vaccinated groups seemed to be correlated to maternal immunity. Mortality was higher following challenge in the aflatoxin exposed groups especially which exposed to NRRL2899 (Aspergillus parasiticus) 2oo ppb compared to the other group which exposed to NRRL3357 (Aspergillus flavus) 10 ppm and the non aflatoxin exposed groups **(Table 2,)(Fig. 1).** There was mortality in the IBV-challenged groups at an older age. Chickens which died following IB challenge in the aflatoxin exposed and vaccinated groups showed symptoms and postmortem findings similar to those found in the non vaccinated chickens, including tracheitis with or without catarrhal discharge, caseous plugs in the lower trachea or bronchi, pneumonia and varying degrees of air sacculitis. Those challenged with NDV showed lesions in Proventriculus, caecae and small intestines with and without septicaemic findings.

We found that, the ingestion of aflatoxin contaminated feed significantly lowered antibody titres in chickens immunized against ND and IB compared to non aflatoxin treated groups. The immunosuppressive effect of aflatoxin has been related to its direct inhibition of protein synthesis, including those with specific functions such as immunoglobulins IgG, IgA, inhibition of migration of macrophages, interferance with the haemolytic activity of complement, reduction in the number of lymphocytes through its toxic effect on the Bursa of Fabricius as in histopathological section of bursa found lymphocytic depilation and bursa vaccuolation ***(M. Denli et al., 2009)*****(plate 1)** and impairment of cytokines formation by lymphocytes ***(Richard et al., 1974; Pier et al., 1979; Campbell et al., 1988; Azzam & Gabal, 1997).*** Although mortality from IB field outbreaks usually occurs in birds up to 5 weeks of age, the mortality in our study in older chickens may have been attributed to the virulence of the challenge strain used and/or the challenge dose. Some IBV strains have been characterized as nephropathic ***(King & Cavanagh, 1991).*** Aflatoxin is also a potent nephrotoxin and the continued exposure to aflatoxin resulted in tremendous kidney damage and thus made it easier for IBV to kill the birds. The suppression of the immunoresponse was observed in birds vaccinated with single or combined vaccines. However, no significant effect or adverse interaction on the titres was observed between the groups which received a single versus combined vaccination ***(Hanson et al., 1956; Thornton & Muskett, 1975).*** Major infectious diseases of poultry have been controlled by immunization and effective management practices. Lack of adequate protection and interference with immunity of birds seem to have important roles in such cases. Aflatoxin is an immunosuppressant of widespread nature in feed and feed raw materials, and exposure of poultry to subclinical doses of aflatoxin has been shown to cause infection, even among immunized birds in field situations. Outbreaks of fowl cholera and IBD have been reported in vaccinated flocks associated with ingestion of aflatoxin contaminated feed ***(Hegazi et al., 1991; Anjum, 1994).*** The widespread distribution of both Aspergillus parasiticus and flavus were the main fungal species which produces aflatoxin in feed and raw feed materials, suggests that aflatoxin contamination must be seriously considered in the poultry industry. Although several measures have been introduced to alleviate contamination problems, costs are still a major barrier for their general use ***(Gabal, 1987;Jindal et al., 1993;Devegowda et al., 1994; Hirano et al., 1994;).*** Until more cost efficient solutions are found to prevent aflatoxin from reaching the food chain, regular and vigorous quality controls of feed are required to safeguard poultry.

Table (1) *Experimental design*

groups		Types of aflatoxin fed	Type of vaccine and age of vaccination(days)				
			1 day	15th	30th	40th	55th
A	A_1	NRRL2899(Aspergillus parasiticus)4oo ppb	Live attenuated ND vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Inactivated ND vaccine
	A_2	NRRL3357(Aspergillus flavus)10 ppm					
B	B_1	NRRL2899(Aspergillus parasiticus)4oo ppb	Live attenuated IB vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Inactivated ND vaccine
	B_2	NRRL3357(Aspergillus flavus)10 ppm					
C	C_1	NRRL2899(Aspergillus parasiticus)4oo ppb	Live attenuated ND+IB vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Inactivated ND vaccine
	C_2	NRRL3357(Aspergillus flavus)10 ppm					
D		none	Live attenuated ND+IB vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Live attenuated ND vaccine	Inactivated ND vaccine
E		none	none	none	none	none	none

Table (2) Mortality % in challenged, vaccinated and aflatoxin exposed groups

Groups		Types of aflatoxin fed	Number of chicks in each group	Type of challenged virus strain	Total Number of dead chicks	Mortality rate %
A	A_1	NRRL2899(Aspergillus parasiticus)4oo ppb	15	NDV	11	73.3%
	A_2	NRRL3357(Aspergillus flavus)10 ppm	15	NDV	6	40%
B	B_1	NRRL2899(Aspergillus parasiticus)4oo ppb	15	IBV	8	53.3%
	B_2	NRRL3357(Aspergillus flavus)10 ppm	15	IBV	5	33.3%
C	C_1	NRRL2899(Aspergillus parasiticus)4oo ppb	10^a	NDV	9	90%
			10^b	IBV	5	50%
	C_2	NRRL3357(Aspergillus flavus)10 ppm	10^c	NDV	6	60%
			10^d	IBV	4	40%
D	D_1	none	10	NDV	1	10%
	D_2	none	10	IBV	-	0%
E		none	20	-	-	-

a: number of chicks in groupC_1 treated with NRRL 2899 and challenged with NDV ,b: number of chicks in groupC_1 treated with NRRL2899 andchallenged with IBV ,c: number of chicks in groupC_1 treated with NRRL 3357 and challenged with NDV, d: number of chicks in groupC_1 treated with NRRL 3357 and challenged with IBV

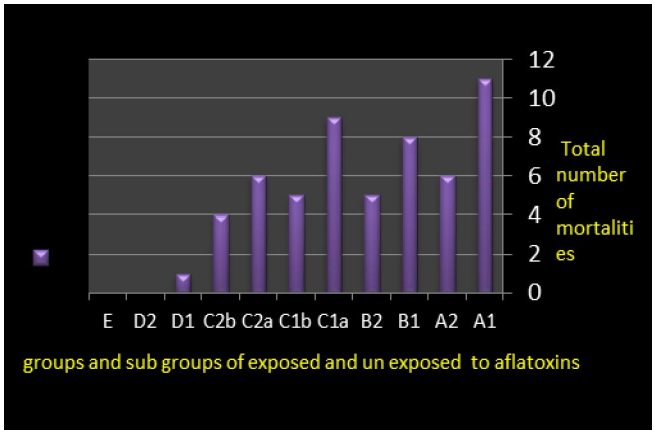

Fig (1) Total number of mortalities in groups and subgroups of exposed and unexposed to aflatoxins in challenged vaccinated chicks.

Table (3): Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated NDV (Avinew) and challenged with NDV strain

Age(days)	Vaccinated ,challenged non exposed to Aflatoxins	Vaccinated ,challenged exposed to Aflatoxins	
	D_1	A_1	A_2
0	$9634^a \pm 436$	$9845^b \pm 324$	$9845^b \pm 324$
15	$10956^a \pm 423$	$4162^b \pm 221$	$6342^b \pm 312$
30	$8432^a \pm 342$	$2186^b \pm 264$	$4321^b \pm 231$
45	$7013^a \pm 278$	$1218^b \pm 79$	$3229^b \pm 145$
60	$6281^a \pm 207$	$820^b \pm 17$	$1455^b \pm 79$

S.E: standard error superscripts letter (a &b)are significantly different ($P< 0.05$).

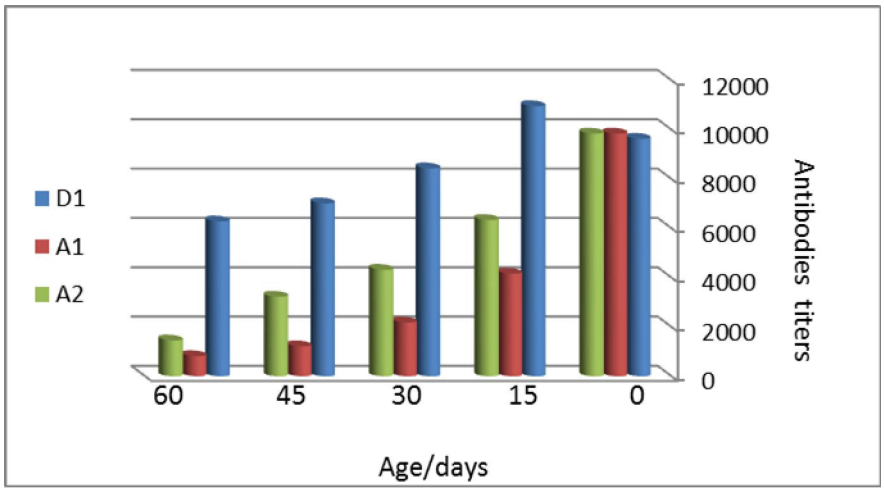

Fig (2) Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated NDV (Avinew) and challenged with NDV strain

Table (4) Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated IB H120 vaccine and challenged with IBV strain

Age(days)	Vaccinated ,challenged non exposed to Aflatoxins	Vaccinated ,challenged exposed to Aflatoxins	
	D_2	B_1	B_2
0	8394^{a} ±454	8485^{b} ±366	8485^{b} ±366
15	9956^{a} ±478	3682^{b} ±271	5740^{b} ±279
30	8136^{a} ±316	2456^{b} ±214	4870^{b} ±298
45	6824^{a} ±278	988^{b} ±60	3406^{b} ±147
60	5791^{a} ±237	805^{b} ±13	985^{b} ±76

S.E: standard error superscripts letter (a &b)are significantly different ($P< 0.05$).

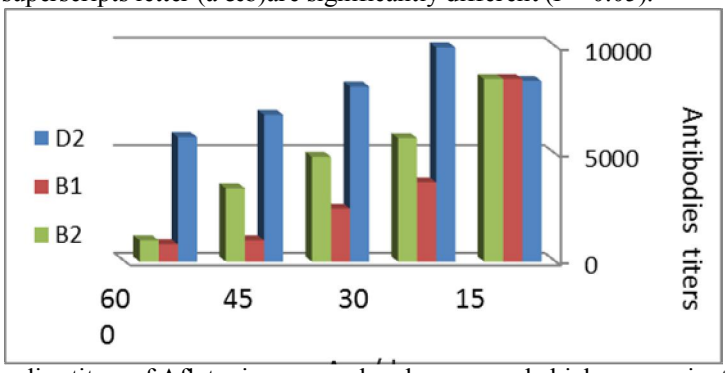

Fig.(3) Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated IB H120 vaccine and challenged with IBV strain.

Table (5) Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated Ma5 + Clone 30vaccine and challenged with IBV and NDV strains

Age(days)	Vaccinated ,challenged non exposed to Aflatoxins		Vaccinated ,challenged exposed to Aflatoxins			
	D		C_1		C_2	
	D_1	D_2	C_{1a}	C_{1b}	C_{2a}	C_{2b}
0	9634^{a} ±436	8394^{a} ±454	9485^{b}±382	9485^{b} ±382	9485^{b} ±382	9485^{b} ±382
15	10956^{a} ±423	9956^{a} ±478	4972^{b} ±312	5492^{b} ±357	6321^{b} ±322	5234^{b} ±362
30	8432^{a} ±342	8136^{a} ±316	3480^{b} ±307	2750^{b} ±287	3456^{b} ±212	4283^{b} ±297
45	7013^{a} ±278	6824^{a} ±278	2187^{b} ±169	1987^{b} ±194	1769^{b} ±143	3861^{b} ±310
60	6281^{a} ±207	5791^{a} ±237	1678^{b} ±93	$989\pm^{b}$ 63	753^{b} ±28	1674^{b} ±69

S.E: standard error superscripts letter (a &b)are significantly different ($P< 0.05$).

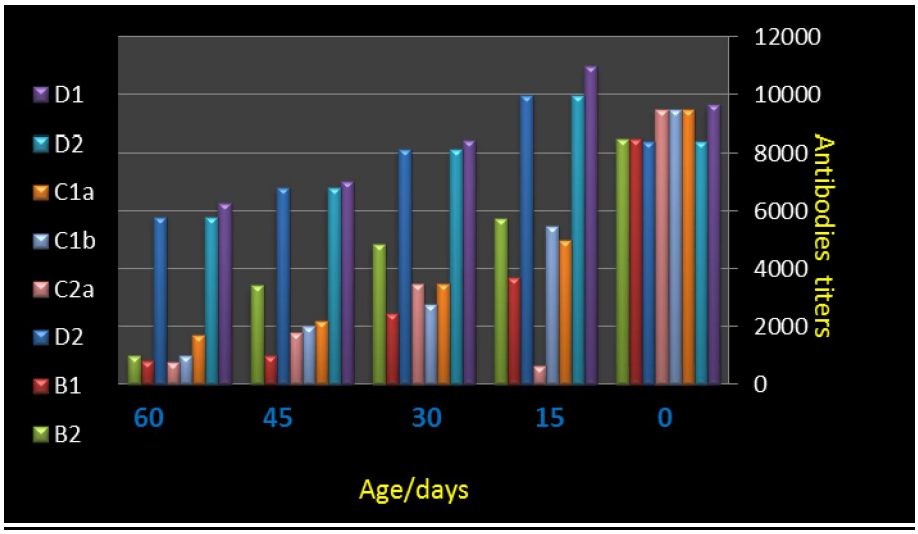

Fig (4):Mean ELISA antibodies titers of Aflatoxins exposed and unexposed chickens vaccinated with live attenuated Ma5 + Clone 30vaccine and challenged with IBV and NDV strains

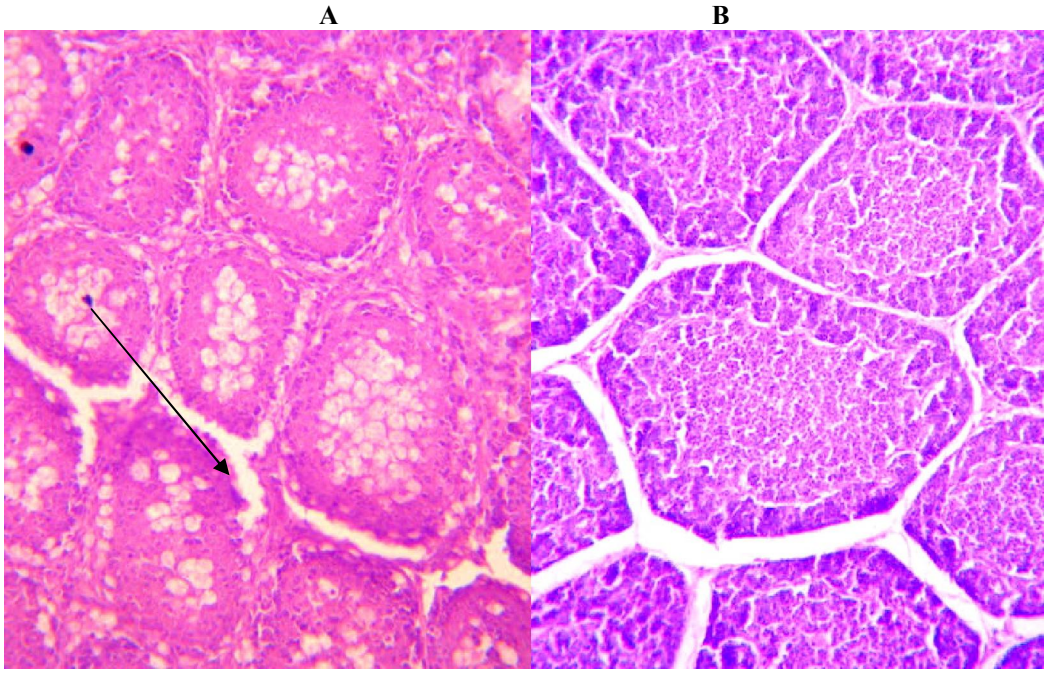

Plate (1): A, Bursal sections of bursa at 35 days age showing: Severe lymphocytic depletion and necrosis (arrow) and medulla of lymphoid follicles showed vacuolated reticular cells cyst formation (Lesion score: 5) X200.stained with H&E; **B**, normal control bursa

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11/20/2012

Differences in heart rate variability parameters before and after kidney transplantation in patients with renal failure

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Abstract: Introduction: Heart Rate Variability(HRV) is defined as R-R interval changes over time and is used in assessment of sympathetic and Vagal nerve effects on sinus node and thus on the heart rate. It has been seen that HRV abnormalities is reversible after normalization of renal function in kidney transplantation even in patients with long term dialysis, the kidney transplantation had normalized the HRV. Methods: In a cross–sectional and analytical study, we evaluated the HRV changes before and after kidney transplantation in 20 patients with chronic renal failure after, changes in HRV 20 patients with chronic renal failure after achieving the inclusion criteria. The patients were followed for 6 months and the results were assessed for HRV changes and other paraclinical factors. Results: In total, 11(61.1%) of patients were male and 7 (38.9 %) were female. Mean age of patients was 42.7±25 which was in the range of 25-59 years. Between parameters of HRV in patients, only the increase in the VLF and ULF was significant which had a statistically meaningful changes in comparison with the pre transplantation period (P=0.05, P=0.01). The changes in the other parameters were not statistically significant. Conclusion: With regard to the findings of this study we can defend the theory of inhibited HRV return in hemodialysis patients after the kidney transplantation, but there is need for studies with more cases to prove and confirm this theory.
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Keywords: Chronic renal failure; Heart rate variability; Kidney transplantation

1. Introduction

The changes in the R-R interval which is called Heart rate variability is used for evaluation of the sympathetic and Vagus nerve on the sinus node and as a result on the heart rate (Tulppo and Huikuri, 2004) this can be helpful in finding the patients which are at the risk of cardiovascular disease or mortalities(Malik, 2000).

HRV is measured by two methods: Time Domain Method and Frequency domain method. The signal changes in a period of time are called Time domain method and the frequency domain method measures the signal sin frequency bond (Malik, 2000).

The both of above methods can be used for evaluating the HRV but the periodical analysis can evaluate the sympathetic and parasympathetic activity in a more accurate way (Zipes and Jalife, 2004).

There are several factors that impact on heart rate variability (HRV) including cardiovascular disease (Karcz, 2003). Other affecting factors include Body mass index (BMI), increased blood sugar, high blood pressure and certain health conditions such as kidney disease (Huikuri and Makikallio, 2001).

The autonomic system dysfunction is the predominant feature of the uremic situation. Autonomic neuropathy associated with renal failure can cause sympathetic and parasympathetic involvement and is also associated with peripheral neuropathy (Campese, 1981).

One of the most important presentations of autonomic dysfunction caused by uremia is the abnormal control of the cardiovascular system which has a major role on hypertensive attacks during hemodialysis specially in diabetic patients (Travis and Henrich, 1989).

There are several studies about HRV in patients with chronic renal failure (CRF) which most of them is about patients under hemodialysis.

In the studies on the patients under hemodialysis the sizable decrease in all frequencies and specially low frequencies was seen.

It is concluded that the HRV abnormalities is a reversible situation after normalizing the renal function with renal transplantation (Axelrod, 1987).

Even in patients under long term hemodialysis the renal transplantation can normalize the HRV (Dvora, 1999).

In other studies the autonomic function reverse is reported after the renal transplantation (Heidbreder, 1985).

This reverse in autonomic function is suggestive of the opinion that autonomic control of the heart rate in renal failure is a result of uremic wastes (Tamura, 1998).

With regarding to the fact that there are no previous studies in this issue and with considering the importance of this matter the aim of this study is the evaluation of the HRV changes in patients before and after renal transplantation in patients with CRF.

2. Material and Methods

In a cross sectional descriptive-analytic study that performed in cardiovascular disease department of Tabriz university of medical sciences on patients with chronic renal failure candidate for kidney transplantation, we measured the Hart rate variability parameters before and after the transplantation.

We enrolled 20 patients to the survey upon inclusion and exclusion criteria.

The complete cardiac evaluation (Trans thoracic echocardiography, and Electrocardiogram (ECG)), HRV (with 24 hours holter monitoring) and laboratory tests such as Urea, Creatinine, Hemoglobin and hematocrit was done for patients before kidney transplantation, patients was evaluated for HRV changes and Urea and Creatinine 6 months after transplantation.

Exclusion criteria:

1-History of cardiac failure as 2 and 3 function class

2-Unsuccessful kidney transplantation

3- Patients not referring 6 months after transplantation

4 - Lack of consent to participate in the study.

The obtained data was coded and then entered into a computer and statistically analyzed by SPSS software. T-Test and chi-square test were used for data analysis. Significance level for tests was determined as 95% ($P< 0.05$).

3. Results

In a cross sectional descriptive –analytic study, we evaluated the HRV changes in 20 patients with chronic renal failure candidate for renal transplantation before and after renal transplantation. We excluded 1 patient because of transplanted kidney rejection and another patient for not referring 6 months after transplantation. At the end the analysis is presented upon data taken from 18 patients.

11 of patients (61.1%) was male and 7 (38.9%) was female. the mean age of the patients' was 42.7±12 years in the range of 25 to 59 years of old. The demographic findings of patients are shown in table 1.

2 of patients (11.1%) had a simultaneous coronary artery disease. 94.4% of patients had normal sinus rhythm and the AF rhythm was present in 5.6% of patients. 27.8% of patients had Left Ventricular Hypertrophy (LVH) in their ECG. There was no the branch blocks and other types of block in studied patients and there was ST-T changes in 1 patient.

Table 1: Demographics characteristics of patients

Variable	Mean ± SD	Range
Height(*cm*)	164±0.05	150-172
Weight(*Kg*)	63.6 ± 6.9	44-74
BMI($^{Kg}/_{m^2}$)	23.6 ± 2.6	16.3-27.3
SBP(*mmHg*)	138.8 ± 19.9	100-165
DBP(*mmHg*)	84.4 ± 12.1	60-110
HB	12.2 ± 6.5	8.3-16.1
HCT	30.9 ± 6.3	22.1-37.4
BUN	104.3 ± 9	41-150
Cr	8.7 ± 2.4	5.3-12.8
Ejection Fraction	55.8 ± 12.1	30-75

HRV for patients before and after the transplantation is shown in table 2. The laboratory findings of patients are also shown in table 3. There was a significant reduce in BUN and Cr of patients before and after transplantation (P=0.0001). Distributions of HRV parameters in before and after the transplantation are shown in Chart 1 and 2.

Table 2: HRV of patient's in Pre Transplantation and post Transplantation

Variable	Pre Transplantation (N=18)	Post Transplantation (N=18)	P
SDNN	110.7±50.6	122.2±2.8	0.41
SDANN	118.6±82.4	104.7±41.8	0.34
RMSSD	65.7±6.1	57.1±4.1	0.60
HRV	39.1±4.3	39.5±4.1	0.89
ULF	108.8±43.9	123.9±10.4	0.05
VLF	233±90.3	295.3±100	0.01
LF	129.4±51.5	132.7±63.3	0.76
HF	125.5±45.9	115±34.5	0.25
LF/HF	1.3±0.6	1.4±0.6	0.23

Table 3: Laboratory finding in pre and post transplantation

	Mean ± Std Deviation	Range
Admission HB	12.3 ± 6.6	8.3 -38.1
Admission HCT	30.9 ± 6.4	12.1 - 37.4
Admission Creatinine	8.53 ± 2.45	5.30 - 12.80
Admission BUN	104.35 ± 37.32	41 – 150
Creatinine after	1.32 ± .21	1.00 - 1.70
Bun after	43.33 ± 5.27	36 – 56

4. Discussions

There are several factors that impact on HRV including cardiovascular disease (Karcz, 2003). Other affecting factors include BMI, increased blood sugar, high blood pressure and certain health conditions such as kidney disease (Huikuri and Makikallio, 2001).

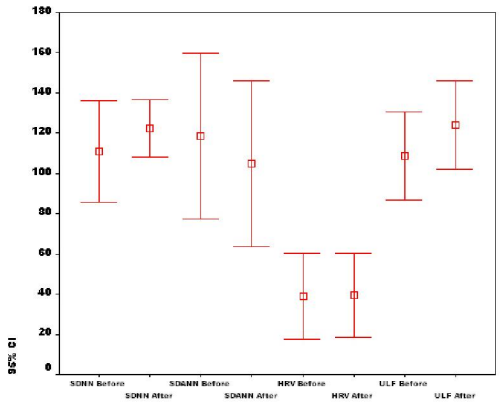

Chart 1. Distribution of SDNN, SDANN, HRV and ULF of patients in before and after the transplantation

This reverse in autonomic function is suggestive of the opinion that autonomic control of the heart rate in renal failure is a result of uremic wastes (Tamura, 1998).

There is no similar study in Iran evaluating the role of kidney transplantation in patients with CRF, the effect of some other treatments like replacement therapy on HRV such as hemodialysis is studied so far .and this can be suggestive for the innovation of our study.

Fukuta and colleague in 2003 have stated that reductions in some parameters of HRV including those presenting the long term changes in HRV in patients under chronic hemodialysis is independent predictors for cardiovascular events (Fukuta, 2003).

Giordano and colleague in 2001 have shown that patients with CRF and Diabetes under chronic hemodialysis show severe impairments in HRV that can be a result of diabetes caused autonomic neuropathy and chronic renal failure. Whereas the HRV parameters is reversible in non diabetic patient's in comparison with diabetic patient's after the hemodialysis (Giordano, 2001).

In the study of Axelord and colleague on hemodialysis patients there seemed a significant reduce in all frequencies specially in low frequencies regarding to the HRV parameters. They reported a reverse in HRV impairments after normalizing the kidney function (Axelrod, 1987).

In our study despite the findings of Axelord study, there was not a significant changes in LF parameter in patients after the renal transplantation (p=0.76).

In our study there was a history of receiving Calcium channel blocker agents in 14 cases(82.4%) and beta blockers in 17(94.4%) of patients.

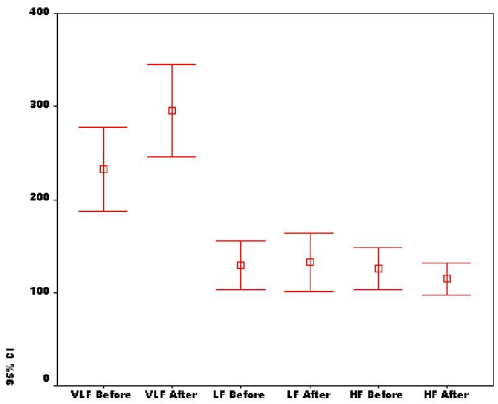

Chart 2. Distribution of VLF, LF and HF of patients in before and after the transplantation

In a similar study by Ondocin et al in USA, the ACEs effect on HRV was studied on hemodialysis patients and stated that despite normal population, in patients with ESRD, ACEs can increase the sympathetic activity in patients leading in severe changes in HRV (Ondocin and Narsipur 2006).

In the study of Ondocin, the mean age of patients was 50.6 years and the causes of ESRD in 4 patients (36%) was diabetes and in 5 cases (45%) the underlying cause was the HTN (Ondocin and Narsipur 2006).

In our study the risk factor was an above and the underlying disease was similar to study above, diabetes and hypertension was the most common causes of end stage renal disease(ESRD) ,there was also simultaneous coronary artery disease in 2 (11.1%) of patients.

In study of Ondocin and his colleague the most HRV parameters which was affected from HRV was SDNN and SDANN (Ondocin and Narsipur 2006).

Isaline and colleagues have stated that the circadian rhythm of the HRV in patients with ESRD can normalize after renal transplantation the sudden cardiac death in patients with ESRD can be associated with autonomic dysfunction lead in decrease in HRV (Isaline, 2005).

In the study of Brodde and his colleague it is stated that autonomic dysfunction in hemodialysis patient was improved after renal transplantation and sympathetic and parasympathetic function is also

improved specially in primary levels (Brodde and Daul, 1984).

In 2001 Agelink and colleagues studied the effect of age and gender on HRV in patient with CRF and showed that there is a significant decrease in ULF and LF/HF in young women comparing to the young men in the same age, its also stated that women have a more rest Heart rate than similar aged men (Agelink, 2001).

Ranpuria and colleague have stated that HRV parameters changes can be used to predict cardiovascular events in patients under chronic hemodialysis and these events can be prevented with effective treatment of coronary artery diseases and reducing the HRV impairments, considering the point that coronary artery disease can be of most common causes of death in ESRD patients (Ranpuria, 2008).

Conclusion:

With regard to the findings of this study we can defend the hypothesis of the inhibited HRV reverse in patients under hemodialysis after renal transplantation, but the certification of this hypothesis needs multicenter studies with more cases.

Suggestions:

There were some limitation in our study and we can propose some suggestion with eliminating them:

1-conducting a similar study with more cases and comparing the HRV parameters changes in patients after transplantation and its relationship with duration of illness.

2-conducting a similar study on patients with ESRD in the form of two groups, patients who underwent renal transplantation and patients under chronic hemodialysis and assessing the above modalities on HRV parameters

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10/31/2012

Association between hormone replacement therapy and occurrence of breast cancer

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Abstract: Using hormone replacement therapy for relieving menopausal symptoms and also for preventing some diseases such as hip fractures had led to a widespread use of it in postmenopausal women but there is a concern about risks of breast cancer occurrence using HRT. In this study, 1000 women older than 40 years old without any clinical symptoms were selected. They were referred to a radiology center for a screening mammography. By using a questionnaire the information about using HRT was gathered. 16.7% of cases were using HRT and 83.3% had no history of using HRT. Among 1000 cases, 13 mammograms had signs of malignancy. In these cases 7.7% was using HRT and 92.3% didn't have any history of using HRT. It was concluded that there isn't any statistically significant association between the development of breast cancer and using HRT (P=0.604).
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Keywords: HRT; Breast Cancer; Mammography

1. Introduction

Breast cancer is the most frequent cancer among women, and it is also the most common cause of cancer death in both developed and developing regions (Ferlay, 2010). Various risk factors have been described for development of breast cancer. One of them is HRT .Using hormone replacement therapy for relieving menopausal symptoms and also for preventing some diseases such as hip fractures had led to a widespread use of it in postmenopausal women. Concern that hormone replacement therapy (HRT) may cause breast cancer has existed since the time it was introduced, and based on evidence in three studies, the Collaborative Reanalysis (CR), the Women's Health Initiative (WHI) and the Million Women Study (MWS), it is claimed that causality is now established (Shapiro, 2011). One aspect of WHI (Women's Health Initiative randomized controlled trial) study was discussing the increased incidence of breast cancer in the group receiving HRT (Rossouw, 2002). There are also other studies evaluated the association between the incidence of breast cancer and using HRT. Some of them approved a positive link between using HRT and increased incidence of breast cancer among women (De, 2010). In contrast, some other studies couldn't find any relationship between using HRT and breast cancer (Antoine, 2011; Stanford, 1995). With regard to these controversies, we conducted a study to analyze the relationship between using HRT and occurrence of breast cancer in Iranian population.

2. Material and Methods

In a descriptive analytical study, 1000 women older than 40 years old without any clinical symptoms who came to a radiology center in Tabriz (capital of East Azerbaijan province in Iran) were selected. They were referred to a radiology center for a screening mammography. By using a questionnaire the information about using HRT was gathered .the screening technique included physical examination of breasts by an experienced physician before taking mammograms and then performing screening mammography in two standard views: craniocaudal (CC) and mediolateral-oblique (MLO) view.
A radiologist read the mammograms and any kind of abnormal findings were recorded. If there was any need, the patients were referred for further evaluation or to a surgeon for a biopsy. The association between the HRT therapy and breast cancer occurrences was analyzed.

Ethical considerations:

This study was in perfect compliance with privacy protection, and all patients' information is completely confidential and their name and specifications have never been revealed.

3. Results

1000 women between ages 40-77 years old and without any clinical symptoms were evaluated. The frequency of age groups in the sample is shown chart 1.

In this sample, 167 cases (16.7%) were referred for a checkup because of using HRT. 381 cases (38.1%) were referred for a checkup before initiating HRT and 452 cases (45.2%) were referred for a general checkup.16.7% of cases was using HRT and 83.3% had no history of using HRT. Among 1000 cases, 13 mammograms had signs of malignancy. In these cases 7.7% was using HRT and 92.3% didn't have any history of using HRT. Among the cases that were using HRT, 93.4% had normal mammograms, 6% had signs of benign mass in mammograms and 1.8% had calcification in their breast.

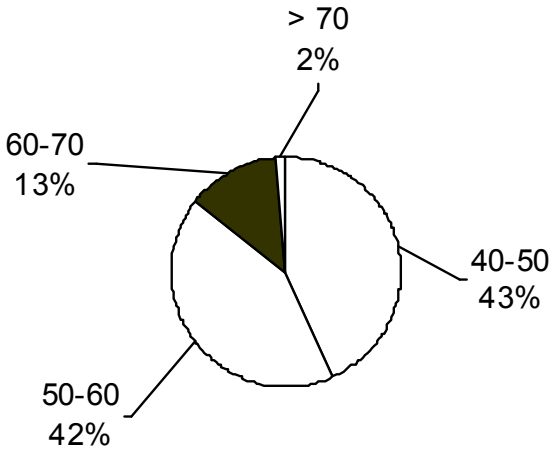

Chart 1. Frequency of age groups in the sample

4. Discussions

In this study we couldn't find any significant association between the development of breast cancer and using HRT (P=0.604). Würtz et al in one case control study in 2012 on 348 eligible cases among 20,861 postmenopausal women reported that there is Modest direct associations between estrogen levels and breast cancer incidence among both never and baseline HRT users. Estrone and estrone sulfate were more consistently associated among both groups than estradiol. They concluded that higher serum estrogen levels were associated with a higher risk of breast cancer among both never and baseline HRT users (Würtz, 2012).

Turkoz et al in one cross-sectional study that consisted of 1884 invasive breast cancer cases in 2012 reported an increased risks for postmenopausal women with HER-2 over expressing (OR 2.20, 95% CI 0.93-5.17; p=0.04) and luminal A (OR 1.87, 95% CI 0.93-3.90, p=0.02) breast cancers, who used hormone replacement therapy for 5 years or more (Turkoz, 2012).

Antoine et al in 2012 in the study on Belgium reported that There is a significant association between the invasive BC incidence rate and estimated rate of HRT users in the previous year: p-value<0.001.and concluded that Although this study is hampered by a number of limitations, these data support the idea that the drop in BC incidence can be partly attributed to the decrease in HRT use. Since HRT remains the most used medication for climacteric symptoms, we encourage the creation of a prospective registry in Europe, collecting detailed data in various European countries, in order to assess the adjusted increase in BC risk associated with HRT, which may be population and regimen dependent (Antoine, 2012).

Ritte and et al in 2012 Within the European EPIC cohort reported that Current use of HRT is significantly associated with an increased risk of receptor-negative (HRT current use compared to HRT never use HR: 1.30 (1.05 to 1.62) and positive tumors (HR: 1.74 (1.56 to 1.95)), although this risk increase was weaker for ER-PR- disease (Phet = 0.035) (Ritte, 2012).

Cerne and et al in 2012, in a case control study reported that in postmenopausal women using HRT, the KRAS variant might lead to HER2 over expressed and poorly-differentiated breast tumors, both indicators of a worse prognosis (Cerne, 2012).

Calvocoressi and et al in 2012, in a population-based case-control study on 1179 post-menopausal women (603 controls and 576 cases) reported that no association between DCIS and ever use of any HT (adjusted odds ratio (OR) =0.85, 95% confidence interval (CI): 0.65-1.11); of estrogen alone (adjusted OR=0.93; 95% CI: 0.68-1.29) or of estrogen and progesterone (adjusted OR=0.75; 95% CI: 0.52-1.08). There was also no association between DCIS and current use of these hormones. In addition, estimated risk of DCIS did not increase with duration of use of these preparations (Calvocoressi, 2012).

Shapiro and et al in 2012, Using generally accepted causal criteria, in one study, evaluate the findings in the MWS (Million Women Study) for E+P and for ET. They reported that despite the massive size of the MWS the findings for E+P and for ET did not adequately satisfy the criteria of time order, information bias, detection bias, confounding, statistical stability and strength of association, duration-response, internal consistency, external consistency or biological plausibility. Had detection bias resulted in the identification in women aged 50-55 years of 0.3 additional cases of breast cancer in

ET users per 1000 per year, or 1.2 in E+P users, it would have nullified the apparent risks reported and concluded that HRT may or may not increase the risk of breast cancer, but the MWS did not establish that it does (Shapiro, 2012).

Shapiro and et al in 2011, Using generally accepted causal criteria; evaluate the findings in the WHI (Women's Health Initiative) for estrogen plus progesterone. For estrogen plus progesterone the findings did not adequately satisfy the criteria of bias, confounding, statistical stability and strength of association, duration-response, internal consistency, external consistency or biological plausibility and concluded that HRT with estrogen plus progesterone may or may not increase the risk of breast cancer, but the WHI did not establish that it does(Shapiro, 2011).

Shapiro and et al in 2011, Using generally accepted causal criteria; evaluate the findings in the Collaborative Reanalysis (CR) for hormone replacement therapy cause breast cancer? The findings in the CR did not adequately satisfy the criteria of time order, bias, confounding, statistical stability and strength of association, dose/duration-response, internal consistency, external consistency or biological plausibility they concluded that HRT may or may not increase the risk of breast cancer, but the CR did not establish that it does(Shapiro, 2011).

Despite our result in Iranian women, in other studies on Caucasian women almost there is association between HRT and occurrence of breast cancer.

Conclusion:

In this survey, by using statistical analysis, it seems there isn't any statistically significant association between the development of breast cancer and using HRT (P=0.604) in our study on Iranian women in contrast with another studies, it can due to our people different races with other studies (on Caucasian) in this study or another effective factors in breast cancer as same as gen and environment or maybe to our small no of samples. Further studies with large no of samples may be needed to investigate the association in our population.

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Efficiency of Action Potential Simulation (APS) therapy in compare to Transcutaneous Electrical Nerve Stimulation (TENS) in knee osteoarthritis

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Abstract: Introduction: The knee joint osteoarthritis is one of the most important causes of musculoskeletal pains and disability. Beside the medical treatments, rehabilitation and physiotherapy has a major role in reducing the pain and improving the function of patients with knee osteoarthritis. The aim of this study was the evaluation of the Action Potential Simulation (APS) and Transcutaneous Electrical Nerve Stimulation (TENS) modalities in patients with knee osteoarthritis. Methods and Materials: In a clinical trial in the Physical medicine and rehabilitation department of Tabriz University of Medical Sciences on 70 patients with knee joint osteoarthritis, we compared the two APS and TENS in patients with knee osteoarthritis and their effect on the Visual Analogue Scale (VAS) and Western Ontario and McMaster Universities Osteoarthritis (WOMAC) index. Results: Over all, 5(7.1%) of patients was male and 65(92.9%) was female, the mean age of the patients was 57.1±7.7 years in the range of 50 to 85 years. The mean VAS score before the intervention was 7±1.9 in the APS group which was reduced to 4.5±1.9.the mean VAS score in the TENS groups was decreased from 6.8±1.2 to 4.6±1.9 which there was significant difference for two groups ($p<0.001$). The overall changes in the total score of the WOMAC and Timed up and go test before and after the treatment was significant in both groups ($P<0.001$). Conclusion: With regard to the findings of our study we can conclude that both APS and TENS modalities are effective in the pain relief and improving the functions of knee joints in the patients with knee osteoarthritis and they have no benefits to each other.
[Toopchizadeh V, Babaei-Ghazani A, Eftekhar Sadat B. **Efficiency of Action Potential Simulation (APS) therapy in compare to Transcutaneous Electrical Nerve Stimulation (TENS) in knee osteoarthritis**. *Life Sci J* 2012;9(4):3790-3794] (ISSN:1097-8135). http://www.lifesciencesite.com. 563

Keywords: Knee Osteoarthritis; Action Potential Simulation; Transcutaneous Electrical Nerve Stimulation

1. Introduction

The knee joint osteoarthritis is one of the important causes of musculoskeletal pains and disability of affected patients and because of performance loss and early retirement cause a heavy burden and cost on society (Salaffi, 2003).

The Symptomatic knee osteoarthritis is more common in women and its prevalence increases with age (Faik, 2008). The knee osteoarthritis is more common upon radiographic evidences (Faik, 2008).

Beside the medical treatments, rehabilitation and physiotherapy has an important effect on pain relief and improving the performance of patients with knee osteoarthritis. For assessing the effect of treatment in each treatment modality the acceptable measures are needed (Carr, 1999).

Electrotherapy is one of the effective rehabilitations in patients with osteoarthritis. Electrotherapy is based on using electricity for creating a known physiologic response with the aim of pain reliving (Papendrop, 2000)

Transcutaneous Electrical Nerve Stimulation (TENS) activates the A – beta neurons and by this way decreases the afferent pain neurons irritability (A-delta and c) in spinal cord (Papendrop, 2000).

Action potential stimulation is one of the newest pain relief methods which is introduced in 1992 and widely used for the chronic pain reliefs by physiotherapists (Fengler, 2007).

The APS has a different pulse waves from TENS and several physiologic effects like increasing in leukeine, enkephalin, plasma melatonin, tissue ATP, decrease in plasma beta endorphin and topical vascular vasodilation which all of these factors has a positive effect on pain relief (Oosthuizen, 2011).

With regarding several studies about different modalities of knee joint osteoarthritis treatment in different research centers worldwide, considering the high prevalence of the osteoarthritis of knee joint in our country and debilitating pains of this condition ,there seems a need for new treatment for this disease.

So we decided to plan a study for evaluating the effect of APS therapy in patients with knee joint osteoarthritis and its comparison with TENS method for improving the treatments and reducing the commercial burdens on the healthcare system.

The aim of this study is the comparison of Action potential simulation method with Transcutaneous Electrical Nerve Stimulation method in patients with knee joint osteoarthritis.

2. Material and Methods

In a clinical trial study in the rehabilitation department of Tabriz University of medical sciences on patients with knee osteoarthritis, we compared Action potential simulation method with Transcutaneous Electrical Nerve Stimulation method in treatment of knee osteoarthritis.

We selected 70 patients with mild or moderate knee osteoarthritis after achieving inclusion criteria and randomized them into two equal groups.

The group A of patients received APS therapy and the group B received TENS. One of patients in group A could not complete the treatment course because of personal problems and 2 of TENS group could not complete the treatment course one for personal problems and the other for the trauma.

This study was done in the physical medicine and rehabilitation clinic of Shohada Hospital, in Tabriz University of medical sciences.

There was no non-normative interventional treatment for patient. All data from patients were confidential. Each of treatment used in this study is based on valid references and academic methods which are used regularly by physicians and there is no ethical limitation for the study. With regard to these issues the written consent was obtained for all patients.

In addition we did not impose any additional cost to the patient. For illiterate patients questionnaires read and completed by medical staff.

It should be stated that the research has been approved by the ethics committee of Tabriz University of Medical Sciences. This study is registered under number 201112171292 N2, as a clinical trial in IRCT site.

All participants met the inclusion criteria and provided consent to participate in the study period of one year within the two groups was examined. Patients were randomly assigned to one of the groups simply by sealed envelopes A and B.

To determine the sample size we used the results of the Van Papendrop and colleagues' study (4). In this study, the scores of pain intensity were reduced to 2.7 from 6.6 before the intervention. With α=0.05 and the 20 percent decrease in the pain, the cases assigned 70 patients.

The American college of rheumatology criteria for knee joint osteoarthritis was used in our study.

The radiologic criteria for defining the severity in knee joints include;

Radiological scoring (X-ray finding):

0 Normal

1 Doubtful narrowing of joint space/possible osteophytes lipping

2 Definite osteophytes/absent or questionable narrowing of joint space

3 Moderate multiple osteophytes, definite narrowing of joint space, some sclerosis, possible joint deformity of bone ends

4 Large osteophytes marked narrowing of joint space, severe sclerosis, definitive joint deformity of bone ends and subchondral cysts may be present.

Group A of patients underwent APS therapy intervention and the second group received TENS intervention. During the study all patients in both groups received common treatment for the osteoarthritis including Glucosamine and Acetaminophen.

The VAS and WOMAC questionnaires was completed for all patients and the Timed up and go test was done for patients after obtaining written consent.

WOMAC questionnaire is designed to measure patients' pain and dysfunction, associated with osteoarthritis of the lower extremities, and assesses the functional activity in 17 subscales, 5 subscales of pain and two categories of activities related to the stiffness (Mc Conelli, 2001).

The Timed Up and Go Test was administered to patients in this way: the patient was still sitting on the chair and began walking in three meters long path then coming back and sitting on the same chair. We measured the time for this test in seconds.

The steps of the treatment intervention concluded 10 sessions of physiotherapy (5 sessions a week). In physiotherapy sessions normal physical modalities like deep and superficial heat, the strengthening exercises of the muscles near the knee, stretch of hamstring tendons and heel cords was done equally for all patients.

The only different modality for two groups is the type of the electrotherapy. That the APS was for group A and TENS method for group B. The time needed for APS modality was 15 minutes and for the TENS method it was 30 minutes.

The specifications of two modalities are as below:

APS: Frequency 151 Hz, pulse width 800 microseconds, Constant current, maximum amplitude 1.5 m amp

TENS: Pulse duration 20-600 microseconds, 50% duty cycle, Current amplitude, maximum tolerated painful tangling, Frequency< 200 pps

In different groups patients was not informed for intervention. Due to the different types and manuals of electrotherapy devices on patients, unawareness of therapist was not possible. The

person responsible for statistical analysis was not informed the type of the electrotherapy modality.

After receiving the treatment (upon the group of patients) in the last treatment session, the VAS and WOMAC questionnaires' was completed for patients and timed up and go test was done for second time.

In this study the primary outcome was done upon the VAS and WOMAC scoring system and the 20% decrease in the VAS and 30% decrease in WOMAC after the treatment defined as improvement in patients. All data after reviewing all the necessary information's from the patients, we analyzed them with proper analytical tests.

Inclusion criteria were:

1 - Mild or moderate knee osteoarthritis (Mild or Moderate) upon America College of Rheumatology criteria (ACR)

2- Age more than 50 years of old.

Exclusion criteria were:

1- Patients with rheumatologic problems such as rheumatoid arthritis

2 - The history of surgery on knee

3 - A history of lower extremity fractures in the bones with knee joint surface involvement

4 - severe osteoarthritis of the knee (severe): radiological score 4

5 - People with electrical implants such as pacemakers and...

6 - A history of heart disease, conduction block

7 - People with Epilepsy

8 - Patients with Cancer

9 - Pregnant women

10 - People with lower extremity thrombosis (DVT)

11-People who for every reason are not able to cooperate in order to complete the questionnaire and complete the survey

12-history of knee injections in 6 months

13-People with balance disorders

14-People with neuropathy and Sensory Disorders

15- Presence of skin injuries around the knee

Statistical analysis:

The obtained data was coded and then entered into a computer and statistically analyzed by SPSS software. T-Test and chi-square test were used for data analysis. Significance level for tests was determined as 95% ($P< 0.05$).

3. Results

In a clinical trial study, we evaluated 70 patients with mild or moderate knee osteoarthritis in the form of two groups.

The group A of patients received APS therapy and the group B received TENS. One of patients in group A could not complete the treatment course because of personal problems and 2 of TENS group could not complete the treatment course one for personal problems and the other for the trauma.

5 of patients (7.1%) were male and 65 of patients (92.9%) were female. In group A, 2(5.7%) were male and 33 (94.3%) were female and in group B, 3(8.6%) were male and 32 (91.6%) were female. Two groups were similar in both sexes (p=0.29).

The mean age of patients was 57.1±7.7 years in the range of 50 to 58 years.

The demographic findings of patients like weight, height and Body Mass Index (BMI) in two groups are shown in table 1.

The description and comparison of variables between two groups before and after the intervention is shown in table 2.

The description and comparison of variables before and after the intervention in each group is shown in table 3.

As mentioned earlier, as a 20% decrease in the VAS score and 30% decrease in the WOMAC score defined as the primary outcome for study. With regard to this issue, 91.4 % of patients in group APS and 93.8% of patients in group TENS has achieved the defined outcome.

Table 1. Demographics finding of two groups

	Group A	Group B	P
Weight(*Kg*)	75.2 ± 11	73.3 ± 10.5	0.48
Height(*cm*)	156.3 ± 0.06	155.8 ± 0.06	0.71
BMI($^{Kg}/_{m^2}$)	29 ± 5	28.1 ± 3.5	0.44

4. Discussions

Knee joint osteoarthritis is one of the most prevalent disorders of adulthood which cause a lot of functional impairments. These patients have more needs for health care systems services (Faik, 2008).

These debilitating diseases are associated with decrease in the quality of life. Nowadays despite the increasing life expectancy ,the prevalence of these diseases rises so the world health organization have designed a comprehensive program in association with international society of rheumatology as the name Community Oriented Programmed for Control of the Rheumatic Disease (COPCORD) for controlling the rheumatic diseases (Mc Conelli, 2001).

The WOMAC questionnaire is designed specially for evaluating the patients with knee and hip osteoarthritis. Original English version of the questionnaire has been translated into 50 languages and has been used by physicians so far (Faik, 2008).

Electrotherapy is one of the effective treatments of rehabilitations in patients with knee osteoarthritis which cause a known physiologic response for pain relieving (Papendrop, 2000).

Table 2. Evaluation of VAS and WOMAC subscales of patients in pre and post treatment between two groups

	Pre treatment			Post treatment		
	Group A	Group B	P	Group A	Group B	P
VAS(0-10)	7±1.9	6.8±1.2	0.73	4.5±1.9	4.6±1.9	0.87
WOMAC subscales						
Pain, 0-20	12.2±4	11.1±3.3	0.22	7.5±3.2	6.6±3.3	0.27
Stiffness, 0-8	3.9±2.2	2.8±1.9	0.03	2.5±1.7	1.8±1.4	0.09
Physical function, 0-68	38.4±12.3	34.6±10.6	0.18	25.2±11.3	25.1±11.4	0.96
Total, 0-96	54.6±17.3	48.6±13.1	0.11	35.2±15.5	33.6±15.1	0.66
Timed up and go test, second	11.2±2.7	12.1±3.9	0.30	9.5±2.1	10.4±2.8	0.11

Table 3. Evaluation of VAS and WOMAC subscales of patients in each group at pre and post treatment

	APS Group			TENS Group		
	Pre Trial	Post Trial	P value	Pre Trial	Post Trial	P value
VAS, 0-10	7±1.9	4.5±1.9	<0.001	6.8±1.2	4.6±1.9	<0.001
WOMAC subscales						
Pain, 0-20	12.2±4	7.5±3.2	<0.001	11.1±3.3	6.6±3.3	<0.001
Stiffness, 0-8	3.9±2.2	2.5±1.7	<0.001	2.8±1.9	1.8±1.4	0.004
Physical function, 0-68	38.4±12.3	25.2±11.3	<0.001	34.6±10.6	25.1±11.4	<0.001
Total, 0-96	54.6±17.3	35.2±15.5	<0.001	48.6±13.1	33.6±15.1	<0.001
Timed up and go test, second	11.2±2.7	9.5±2.1	<0.001	12.1±3.9	10.4±2.8	<0.001

The electrical modalities like Transcutaneous Electrical Nerve Stimulation (TENS) with original mechanism of activating A – Beta neurons which are cutaneous mechanoreceptors with Low skin irritation threshold cause decrease in irritability of pain afferent neurons in spinal cord (Papendrop, 2000).

Panahi and his colleague in 2008 showed that APS therapy can reduce the pain in patients with musculoskeletal pains (P<0.005). There was not a significant relation between pain relief and level of education, duration of illness and past history of the physiotherapy, they also introduced the APS method as a pain relief method in patients with musculoskeletal pains (Shariatpanahi and Mehdibarzi, 2007).

In our study the both APS and TENS modalities was effective and there was not significant difference in the results of treatments between tow groups (p=0.62).

Atamaz and colleagues in 2012 assessed the effects of TENS and Shortwave diathermy in the treatment of the knee osteoarthritis and stated that there is no difference between physical modalities in the treatment of the knee joint osteoarthritis and they have no benefits to each other but they are effective in pain relief and improving the function of the patients in comparison to medical and educational treatments alone (Atamaz, 2012)

In 2011, Rahimi and colleagues compared the results of the conventional physiotherapy results versus APS in knee osteoarthritis and stated that APS has a greater effect on reducing the Knee pain and the swelling of the knee in patients with knee joint osteoarthritis. So using of this device is recommended in patients above (Rahimi, 2011).

Papendrop and colleagues in 2002 compared the results of the TENS , APS method and placebo in the treatment of the knee joint osteoarthritis and showed that using APS as long as 8 minutes has a significant effect on knee joint range of motion in comparison with TENS and placebo group(Papendorp, 2002).

The results of these studies had a similarity to present study whereas we did not assess the range of motion as an independent factor.

Myerz and colleague conducted a study in the Cape Town University and stated that the pain relief after using the APS modality has more persistence than normal physiotherapy methods (Myerz, 2001).

Despite the results of the study by Myerz et al in our study we did not assessed the pain relief persistence as a secondary outcome in each of study groups.

In the study by Fengler and his colleagues in 2007 it's stated that the effect of placebo on treatment of patients with fibromyalgia was more than effect of the APS therapy (Fengler, 2007).

This discrepancy may be due to different diseases, and subjects of the two studies. Because patients with fibromyalgia have a lower threshold of stimulation that are offended by the very low threshold of stimulation and is expected to be more satisfied with the placebo.

While those with mild to moderate osteoarthritis of the knee have normal threshold, as a result the difference between fibromyalgia and osteoarthritis patients compared to stimulation, seems logical.

Conclusion:

With regard to the results of the study both APS (Action Potential Simulation) and TENS modalities are effective in the pain relief and improvement of function in patients with knee osteoarthritis and have no benefits to each other.

Suggestions:

There were some limitation in our study and we can propose some suggestion with eliminating them.

1-Conducting a similar study and evaluating the patients in long term for assessing the persistency of two modalities and their comparison.

2- Conducting a similar study and evaluating the different frequencies of APS on knee osteoarthritis

3- Conducting a similar study and comparing the effects of the APS with placebo in knee osteoarthritis.

4- Conducting a similar study and evaluating the effects of APS with other analgesic modalities like interferential currents**.**

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Association between the type of child delivery and occurrence of breast cancer

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Abstract: To explore the risk of breast cancer in relation to the type of child delivery we tested whether a type of delivery carries a high risk of breast cancer. This factor doesn't study earlier as we know. 1000 healthy women who were sent to one radiology center for general check-up or for initiating or continuing hormone-replacement therapy were selected. They were given a questionnaire about the type of prior child deliveries and also examined by an experienced physician to look for any signs of breast cancer. Screening mammography was performed in two standard views (craniocaudal and oblique mediolateral view). Among the mothers 19.39% had vaginal delivery and 80.61% had delivered by cesarean section. Among the women who had vagina delivery 93.6% had normal mammogram and 1.3% of them had malignancy and 3.2% had a benign breast nodule. P value for the association between the type of delivery and breast cancer was 0.617, which doesn't have any statistical significance. In this study, we concluded that the type of child delivery doesn't influence the risk of breast cancer in mothers.
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Keywords: Breast Cancer; Type of Delivery; Mammography

1. Introduction

Breast cancer is a type of cancer originating from breast tissue, most commonly from the inner lining of milk ducts or the lobules that supply the ducts with milk (Sariego, 2010). Worldwide, breast cancer comprises 22.9% of all cancers (excluding non-melanoma skin cancers) in women (Tomatis, 2002). In 2008, breast cancer caused 458,503 deaths worldwide (13.7% of cancer deaths in women) (Tomatis, 2002). Breast cancer is also the most common cancer in Iranian women and vast majority of patients in Iran are diagnosed in advanced stages (Harirchi, 2011; Ebrahimi, 2002) .Iranian breast cancer patients are younger than the patients in western countries (Yavari, 2008).Various risk factors have been described for development of breast cancer. The primary risk factors for breast cancer are female sex and older age (Reeder and Vogel, 2008). Other potential risk factors include: lack of childbearing or breastfeeding (Collaborative Group on Hormonal Factors in Breast Cancer, 2002), higher hormone levels, diet and obesity (Yager, 2006; Santoro, 2009).

Reproductive factors are related with development of breast cancer in some studies. Nulliparity and late age at first child delivery are linked to increased rate of breast cancer (Kelsey, 1993). Late age at menarche and prolonged lifelong lactation are reported as factors, which lower the risk of breast cancer (Jordan, 2010; Hsieh, 1990).

Multiple child births and preeclampsia may moderately reduce the risk of breast cancer (Nechuta, 2010). Some studies propose the raised levels of endogenous sex hormones may play a role in mechanisms of reproductive risk factors for breast cancer (Hankinson, 2005-2006; Key, 2002). Regarding to these facts we conducted a study in order to evaluate the association between the type of child delivery and risk of developing breast cancer, a factor which isn't studied earlier as we know?

2. Material and Methods

This is cross sectional study. 1000 healthy women who were sent to one radiology center for general check-up or for initiating or continuing hormone-replacement therapy were selected. They were given a questionnaire about the type of prior child deliveries and also examined by an experienced physician to look for any signs of breast cancer. Screening mammography was performed in two standard views (craniocaudal and oblique mediolateral view). The mammograms were read by a radiologist and any kind of abnormal findings were recorded. If there was any need, the patients were referred for further evaluation or to a surgeon for a biopsy. The association between the type of child delivery and breast cancer occurrences was analyzed.

3. Results

1000 women between ages 40-77 years old and without any clinical symptoms were evaluated. The frequency of age groups in the sample is shown table 1.

Among the mothers 19.39% had vaginal delivery and 80.61% had delivered by cesarean section. Among the women who had vagina delivery 93.6% had normal mammogram and 1.3% of them had malignancy and 3.2% had a benign breast nodule. P value for the association between the type of delivery and breast cancer was 0.617, which doesn't have any statistical significance.

Table 1. The frequency of age groups of samples

Age Range in year	Percentage
40-49	43.6%
50-59	41.8%
60-69	12.8%
>70	1.8%

4. Discussions

We conducted a study in order to evaluate the association between the type of child delivery and risk of developing breast cancer, a factor which isn't studied earlier as we know. 1000 healthy women who were sent to one radiology center for general check-up or for initiating or continuing hormone-replacement therapy were selected. They were given a questionnaire about the type of prior child deliveries and also examined by an experienced physician to look for any signs of breast cancer. Screening mammography was performed in two standard views (craniocaudal and oblique mediolateral view). Among the mothers 19.39% had vaginal delivery and 80.61% had delivered by cesarean section. Among the women who had vagina delivery 93.6% had normal mammogram and 1.3% of them had malignancy and 3.2% had a benign breast nodule. P value for the association between the type of delivery and breast cancer was 0.617, which doesn't have any statistical significance. In this study, we concluded that the type of child delivery doesn't influence the risk of breast cancer in mothers.

Melbye et al in one large cohort study of almost half a million porous women in 1999 found reassuring evidence that a preterm delivery of 32+ weeks' gestation does not significantly increase the risk of premenopausal breast cancer. Overall, 84% of all preterm deliveries are of 32+ weeks' gestation. Only for the small group of preterm deliveries of less than 32 weeks' gestation was there a twofold increased risk of breast cancer when comparing with a full term delivery. This elevated relative risk was obtained in an analysis in which a woman's person-years at risk were calculated continuously according to the gestational age of the most recent birth (Melbye, 1999).

Isilay Kalan in one study that consisted of 985 consecutive breast cancer patients in 2009 reported that the tumors in breast cancer patients who had a history of cesarean section tend to have more frequent extra capsular extension and lymph vascular invasion. The results of the present study may indicate that breast cancer occurring in patients who had previously undergone cesarean section delivery have a particularly aggressive biological behavior leading a somewhat unfavorable prognosis. Because the maternal serum (Kalan, 2010).

Conclusion:

In this survey, by using statistical analysis, it seems there isn't any statistically significant association between the development of breast cancer and type of delivery (P=0.617) in our study on Iranian women.

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The Effect of Pre-Operative Preparation Program and Mothers Presence during Induction on Anxiety Level and Behavior Change in Young Children Undergoing Elective Surgery

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Abstract: Perioperative anxiety is a complex combination of fear, apprehension and worry often accompanied by physical sensations. Preoperative preparation programs allow reduce anxiety, it is effective and can prevent many behavioral and physiologic manifestations of anxiety as well. The study aimed to evaluate The effect of pre-operative preparation program and mothers presence during induction on anxiety level and behavior change in young children undergoing elective surgery. This study was carried out in the Pediatric Surgery department at new surgical hospital affiliated to the Zagazig University hospital. A quasi- experimental design was used in this study. The total number of children undergoing elective surgery (appendectomy and herniorrhapy) throughout the year of 2011 were 153. Only 120 child accompanied his/her mother who agree to participate in this study. The participants were randomly and equally assigned by the researchers into two group; study and control group. Data were collected using Speilberger state anxiety inventories to assess the level of children and mothers anxiety , Post Hospitalization Behavioral Questionnaire to assess post- operative behaviors change of children and induction compliance checklist to assess children compliance during induction of anesthesia. The finding of the study indicated that the mean of the state anxiety scores of children in study and control groups before intervention were 45.16±3.18 and 45.23±3,19, after intervention 36.63±2.18 and 44.8±3.18 respectively. The state anxiety score was lower significantly in the study group prior to surgery than in the control group (P=0.001). While, The mean and standard deviation of the state anxiety scores of mothers in study and control groups before intervention were 41.8±3.11 and 42.23±3,12, after intervention 36.8±2.19 and 43.8±3.17 respectively. The state anxiety score was lower significantly in the study group prior to surgery than in the control group (P=0.01). The compliance of the children were significantly higher during the induction of anesthesia in the study group as compared with the control groups (65% vs 33.%, p = 0.001). Additionally, there was significant differences in the improvement of postoperative eating behaviors and decreased sleeping problems among the study group. It is recommended that The nursing personnel should take the preoperative therapeutic play intervention as a duty and regard it as a role in doing the nursing practices in order to give the children the psychological care beside the routine physical care. Moreover, they should enhance the development of communication skills and coping abilities of children that help in reducing their anxiety.

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Key words: preoperative anxiety and therapeutic play

1. Introduction:

Perioperative anxiety is a complex combination of fear, apprehension and worry often accompanied by physical sensations (**Wollin *et al.*, 2004**). Pre-or perioperative anxiety refers to anxiety regarding the events that take place prior to surgery (**Ben-Amitay *et al.*, 2006)**

Anxiety is delineated as either trait or state. Trait anxiety is the form of anxiety inherent to and ever-present within the individual, while state anxiety is the form of anxiety exhibited by the individual at a particular moment in time as a consequence of some provoking stimulus (**Kain *et al.*, 2004**). State anxiety is the type of anxiety manifesting in patients preoperatively. Family separation, fear of pain and the unknown, and loss of control are recognized stressors contributing to preoperative pediatric anxiety (**Brewer *et al.*, 2006; Li & Lopez, 2008).**

It is estimated that 50% to 70% 0f children under-going surgery will develop extreme anxiety during the perioperative period and this phenomenon is important not only because of the associated postoperative maladaptive behaviors, but also because of clinical outcomes and quality improvements efforts(**Vagnoli *et al.*, 2005**). Postoperative behavioral changes resulting from preoperative anxiety in children may manifest as feeding and sleeping problems, bedwetting, withdrawal and apathy, nightmares, disobedient behaviors, separation anxiety, loss of temper, and fear of healthcare workers, (**McCann & Kain, 2001 and Kain *et al.*, 2006).**

Surgery is a cause of psychological stress on the part of the child. The hospitalized child reactions are thought to be a reflection of the child's fears of separation from parents and home, loss of control, unfamiliar routines, surgical instruments and hospital procedures. This case causes the child to suffer from considerable stress during treatment. So it is of importance to provide physical healing and continuity of sentimental development to the hospitalized children (**Ca- vusoglu, 2004**). Furthermore, review of literature reveals that lake of understanding about the upcoming procedures, unfamiliarity with the hospital environment and uncertainty about the illness and its treatment are the major factors contributing to parental stress. Therefore, parental involvement is important in the pre-operative preparation program of their child for surgery (**Li and Lam, 2003**).

Extensive agreement amongst researchers thoroughly supported the premise that parental anxiety greatly impacts children (**Li & Lam, 2003 and Wollin *et al.,* 2003, Kain *et al.,* 2004, Davidson *et al.,* 2006 and Kain *et al.,* 2006**). Therefore, preoperative interventions should be aimed at identifying and treating the phenomena of parental anxiety, thereby indirectly managing a child's anxiety via appropriate preparation of parents (**Kain *et al.,* 2004**). A family-centered approach in the management of preoperative pediatric anxiety will yield beneficial results (**Kain *et al.,* 2007**).

Earlier studies have shown that preoperative preparation programs allow reduce anxiety, it is effective and can prevent many behavioral and physiologic manifestations of anxiety as well [**Frank and Spencer,2005, Kain and Caldwell-andrews, 2005, Justus *et al.,* 2006 and Li *et al.,* 2007)**. Preparation through therapeutic play is the best method of orientation and preparing a child for carrying out medical and surgical procedures. Review of literature also have shown that therapeutic play is effective for a child coping with stressful situation [**O'connor and Drenna, 2003, Algern and Arnow, 2005 and Brewer *et al.,* 2006**]. In this line **Li *et al.* (2007**) showed that therapeutic play intervention with using doll demonstration is effective for declining children's anxiety.

Therapeutic play is a set of structured activities designed according to age, cognitive development and health- related issues to promote the psycho-physiological well- being of hospitalized children(**Li *et al.,* 2007, jun- Tain, 2008 and Li and Lopez,2008**). In addition, therapeutic play involves creating an environment that maximizes the natural therapeutic benefits of play. (**O conner - Von, 2000)**

Magnitude of the problem:

On the basis of personal experience of the researchers, as well as feedback from various hospital, it appears that the majority of children who are scheduled for or have already gone elective surgery as well as their parents, are poorly informed and were not adequately prepared for the procedures. This is apparent in the nature of the questions raised and obvious misconceptions about the procedures. In addition, medical and nursing personal stated that, there are varying level of anxiety and fear from many children and their parents immediately before and after the surgery. Therefore, the researchers developing preparation program by using therapeutic play intervention aimed to reduce children and their parent anxiety, fear and improve the postoperative outcomes.

Aim of the study:

This study aimed to evaluate The effect of pre-operative preparation program and mothers presence during induction on anxiety level and behavior change in young children undergoing elective surgery.

Research questions:

1- Is the level of anxiety was better in the intervention group after preoperative preparation program by using therapeutic play intervention?
2- Is mother's presence during induction process has beneficial effects on anxiety level in children?
3- What are the changes of behaviour that occur in children after surgery?

2. Subjects and Methods:

Research design:

The study was used a quasi experimental design

Setting:

The study was carried out in the pediatric surgery department at new surgical hospital affiliated to the Zagazig University hospital. The hospital composed of four flower. It is bed capacity is 600 beds. The pediatric surgery department is found in the fourth flower and is consisted of two rooms with bed capacity was 12 beds and total number of staff nurses was 8 nurses.

Subjects:

The total number of children undergoing elective surgery (appendectomy and herniorrhapy) throughout the year of 2011 were 153. Only 120 child accompanied his/her mother who agree to participate in this study. The participants were randomly and equally assigned into two group:

Group I: Study group consisted of 60 children accompanied their mothers participate in the pre-operative program by using therapeutic play intervention by the researchers beside routine care and mothers were present during anesthesia induction process.

Group II: Control group consisted of 60 children accompanied their mothers received traditional

routine care from the surgeons included usual information about the procedure and preparation for the surgery.

The criteria were considered in the selection of subjects to be included in the study were:

* Children age ranged between 9 -12 years.
* Children being accompanied by their mothers on the day of surgery.

Children had no operative background.*

* Children with the current neurological or other chronic medical problems such as epilepsy, asthma, diabetic, hematological problems were excluded from the study.
* Children with psychiatric problems including mental retardation, depression and any kinds of psychotic disorders were excluded from the study.

Tools of date selection:

Four tools were used for data collection, namely; An interviewing questionnaire, State Anxiety Inventory, Post Hospitalization Behavioral Questionnaire and Induction compliance checklist.

Tool I:

An interviewing questionnaire was designed by the researchers to collect data related to both children and mothers personal data such as gender, age, educations and disease diagnoses.

Tool II:

State Anxiety Inventory: It is a part of the State-Trait Anxiety Inventory. It was developed by (Speilberger *et al.,* 1983). It was designed to be self-administering for assessing the level of children's and their mothers state anxiety. This inventory consisted of twenty statements with four point likert scale ranging from "not at all"(1) to "very much so."(4).

Scoring system

The scores from 20 to 37 indicates low anxiety, scores from 38 to 44 indicates moderate anxiety and scores ranging from 45 to 80 indicates high anxiety (Ruffinengo *et al.,* 2009).

Tool III:

Post Hospitalization Behavioral Questionnaire

It was developed by Vernon *et al.* (1966). This questionnaire is self - report questionnaire for mothers to evaluate maladaptive behavioral responses and developmental regression in children. It consisted of 27 items in 6 domains of anxiety, including general anxiety, separation anxiety, sleep anxiety, eating disturbances, aggression against authority and apathy/withdrawal. Mothers completed the PHBQ 1,2,3 postoperative and 7days during follow-up visit. It is important to emphasize that parents were specifically instructed to indicate only new behavioral changes that occurred after surgery.

Tool IV:

Induction compliance checklist (ICC)

This observation scale was developed by researchers based on Kain *et al.* (1998) to describe the compliance of a child during induction of anesthesia. It consisted of four items was rated as (compliance = 0, non compliance = 1). For example, if the child did not exhibit any of these behaviors, it is a perfect induction and scored as a zero.

Methods of data collection

An official approval from the dean of faculty of nursing in Zagazig was directed to the responsible authority at the study setting to take the permission to conduct the study, explaining its purpose and methodology. The purpose of the study was explained by the researchers to the potential study participants for obtain their written consent. They were informed that they had the right to go out of the study at any time and were assured of the confidentiality of the study.

State Anxiety Inventory, Post Hospitalization Behavioral Questionnaire and Induction compliance checklist were translated into Arabic and English tools were submitted to three experts from English section, Faculty of literature, at Zagazig University, Egypt to be reviewed for its translation.

Before data collection, the four tools were developed and adopted, then we established content validity of the four tools for our proposed sample, by asking 5 faculty members at the Zagazig and Ain shams Universities schools of nursing to evaluate the tools using a structured form that asking about readability, clarity, and acceptability. Their comments, generally around selection of vocabulary and sentence construction were used to revise the forms. Next, we administered the tools as a pilot to twelve (10% of the total sample) children accompanied their mothers undergoing elective surgery to evaluate the content of tools and to estimate the time needed for data collection, no further modification was suggested. As these twelve children accompanied their mothers attended the therapeutic play intervention subsequently, we incorporated their data in our study.

The reliability of the three tools were tested using Crombach alpha coefficient, it was 0.92 for state anxiety scale for mothers, was ranged from 0.73 to o.86 for state anxiety scale for children (Spielberger *et al.,* 1983), was 0.47 for Post Hospitalization Behavioral Questionnaire(Vernon *et al.,* 1966) and was 0.998 for Induction compliance checklist (Kain *et al.,* 1998).

Intervention:

On the day before the day of operation, according the hospital policy the child must be admitted for making investigation. During this time, the researchers asked children and their mothers to participate in the study and After obtaining their

agreement, the researcher start to dividing the numbers of participants into study and control groups according to the number of children in operation list that done one day per week. The method of simple complete randomization was carried out by drawing lots. the children with the odd numbers belongs to the study group, and the ones with the even numbers belonged to the control group. pretest before implementation the therapeutic play intervention to assess anxiety of children and mothers. Two tools namely An interviewing questionnaire and state anxiety inventory were distributed and collected from children and their mothers by the researchers in both groups (study and control group). These tools needed about 20 minutes to complete which took 15 minutes to complete in our pilot. In the control group, children and their mothers received routine information preparation (usual care). It consisted of a brief explanation on pre and postoperative care, which included information about preoperative fasting time, personal hygiene, control of vital signs, control of losing teeth, location of dressing, wound care, use of analgesic drugs to relieve pain after the surgery. The content was given by the surgeon. In the study group the therapeutic play intervention was implemented in special class at Pediatric Surgery Department by the researchers 1 day before the day of surgery which included a set of structured activities, designed to prepare children psychologically for surgery according to their developmental stage. The therapeutic play was implemented in small groups of three children accompanied their mothers by the researchers. The mothers as a close caregiver accompanied their children at all time watching these activities. The content of the activities in therapeutic play included a preoperative tour visit to the operation room, a manikin demonstration by the researchers, and a return demonstration by the children on preoperative procedures. Each child and his/her mother started tour individually according to the hospital policy, visiting orientation of environment of reception area, meeting the hospital staff, operation room, recovery room, observing equipments which are in this area such as operating table, monitoring machines, operating lamp. Then for presentation the procedures on the manikin, the researchers came back again to the surgery ward and performed the procedures on a pediatric manikin that was ready beforehand. The activities such as obtaining vital signs, attaching blood pressure cuff to the manikin's arm, attaching a stethoscope to the manikin's chest, use of oxygen catheter and placing mask on the manikin's face were done by the researchers. After that, the children were encouraged to touch the various equipments and were invited to demonstrate the activities on the manikin under supervision and guidance. The therapeutic play was lasted for 2 hour. In addition, the researchers gives toys to the children to enhance interacting and adoption process. After that, the researchers answered all the children and their mothers questions related to operation. The researchers used simple attractive media to appreciate the participant to follow them during the intervention such as pediatric manikin, and toys. However, classroom presentations, role playing and group discussion were used as a teaching methods. After the completion of intervention and immediately before surgery, the pre-assessment tools (State Anxiety Inventories for children and mothers) were reassess again (post intervention). otherwise, during the operation, children compliance during induction process was measured by using induction compliance checklist by the researchers Then, after the operation and the complete recovery of anesthesia, children post-hospitalization behaviors was filled by mothers through using Post Hospitalization Behavioral Questionnaire. The data collection took a periods of 12 months started from January to December 2011.

Statistical Analysis:

Data were revised, coded, analyzed and tabulated using number and percentage distribution and carried out in the computer. Proper statistical tests were used to find out the effect of training program and mothers present during induction process on the children anxiety and behaviour recovery. The following statistical techniques were used: Mean and Standard deviation, T test, percentage and Chi-square. the level of significance was set at $p < 0.05$.

3. Results:

Table (1) revealed that the study and control groups were similar with respect to the age and gender of children, educational level of the parents and diagnosis of the children, suggestion a high level of homogeneity of variance between the two groups in this study. When tested the difference between the data of the study group and the control group appeared no difference.

Table (2) shows that, the prevalence of high anxiety among children were 58.3% among the study group and 41.7% among the control group before intervention. After intervention, only 11.7% reported high anxiety in the study groups compared with 16.7% among the control groups.

Table (3) shows that, the comparison of the anxiety level of children before Preoperative preparation by using therapeutic play between the study group and the control group was different without the statistic significance (p = o.911) and when comparing the anxiety level of children post intervention between the study group and the control

group, It was found out to be different with highly statistic significance ($p = 0.001$).

Table (4) shows that, the comparison of the anxiety level of mothers before the intervention between the study group and the control group was not statistic significance different ($p = 0.88$) and when comparing the anxiety level of mothers after intervention between the study group and the control group, It was found out to be different with statistic significance ($p = <0.01$).

Table (4) shows that, The number and percentage during the induction of anesthesia in which compliance of the children were significantly higher in the study group as compared with the control groups (65% vs 33.3% $p = 0.001$).

POD1= postoperative day one

$P < 0.05$

Figure (1) shows that, there were significant differences in the improvement of postoperative eating between the groups. That is, on POD 2, 3 and 7, significantly more children in the experimental group exhibited improved eating behavior compared with children from the control group (POD2, 50 % vs 33.3%, POD3, 66.7% vs 41.7 % ,POD7, 83.3% vs 66.7%, $p = <0.05$).

Figure (2) shows that, during the hospital stay, children in the control group had more problems falling a sleep, staying a sleep and waking up crying as compared with children in the experimental group (POD1 51.3% vs 44.6% POD2: 40.7% vs 33.2%). At home, children in the control group had increased trouble getting to sleep on POD3 (28.9% vs 17.7%). There were significant differences in the incidences of postoperative sleep problems between the groups ($P = o.o5$).

POD1= postoperative day one

$P < 0.05$

Table (1): The general characteristics of the study and control groups

Characteristics	study group (n = 60)		Control group (n = 60)		X2	*P* - value
1- Gender:	No	%	No	%		
- Male	26	43.3	25	41.7		
- Female	34	56.7	35	58.3	.00	1.0
- Total	60	100	60	100		
2- Children Age (year) Mean (S.D.)	10.26 (1.14)		10.39 (1.24)		-	>0.424
3-Mothers Age (year) Mean (S.D.)	36 ± 5		37± 6		.82	.99
4- Educational level (father)						
Primary school	11	18.3	7	11.7		
High school	12	20	19	31.6	4.40	.22
Diploma	17	28.3	22	36.7		
Bachelors degree or higher	20	33.3	12	20		
5- Educational level (Mother)						
Primary school	6	10	4	6.7	1.49	
High school	18	30	15	25		.82
Diploma	29	48.3	20	33.3		
Bachelors degree or higher	16	26.7	12	20		
6- Diagnosis:						
Appendicitis	48	80	50	83.3	.00	1.00
Umbilical and inguinal Hernia	12	20	10	16.7		

Table (2) : Number and percentage distribution of children anxiety level before and after intervention

	Pre- intervention				Post- intervention			
	Study group(n=60)		Control group(n=60)		study group(n=60)		Control group(n=60)	
	No.	%	No.	%	No.	%	No.	%
LOW (≤ 37)	12	20.0	21	35.0	45	75.0	35	58.3
Moderate (38 - 44)	13	21.7	14	23.3	8	13.3	15	25.0
High (≥ 45)	35	58.3	25	41.7	7	11.7	10	16.7

Table (3): Comparison of the mean state anxiety scores in children before and after the intervention between the study and control groups

Sample group	Pre- intervention					Post- intervention				
	N	Mean	±SD	T	*p*-value	N	Mean	±SD	T	*p*-value
study group	60	45.16	±3.18	2.03ns	0.911	60	36.63	±2.18	**6.93	0.001<
Controlled group	60	45.23	±3.19			60	44.8	±3.18		

* = significance at level. 05; ** = significance at level 01; ns = no significance

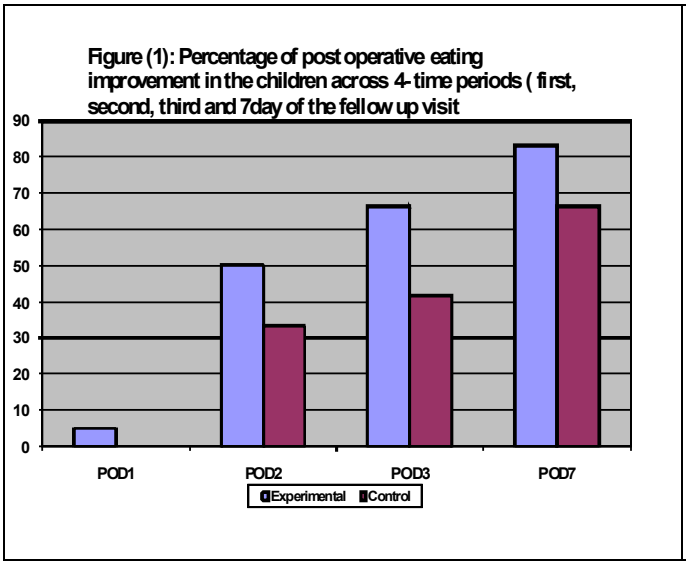
Table (4): Comparison of the mean state anxiety scores in mothers before and after the intervention between the study and control groups

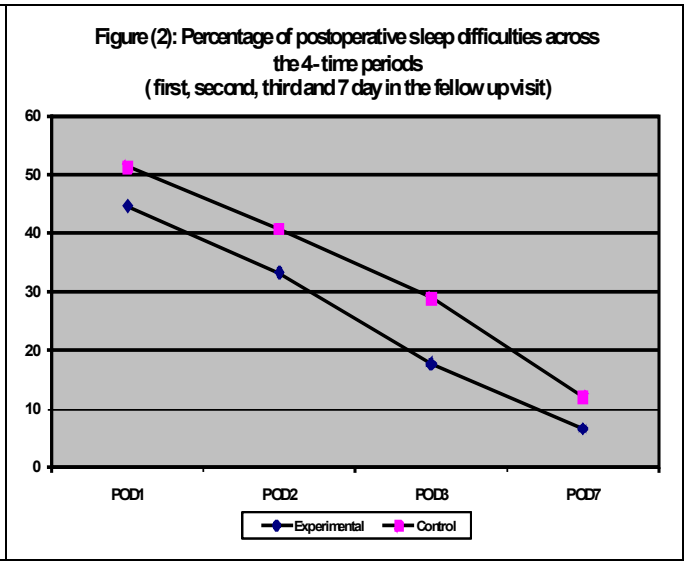
Sample group	Pre- intervention					Post- intervention				
	N	mean	±SD	T	*p*-value	n	Mean	±SD	T	*p*-value
Study group	60	41.8	±3.11	2.08ns	0. 88	60	36.8	±2.19	**5.06	0.01<
Controlled group	60	42.23	±3.12			60	43.8	±3.17		

* = significance at level . 05 ** = significance at level . 01 ns = no significance

Table (5) : The number and percentage of levels of child compliance during the induction of anesthesia

During the induction	Study group		Control group		*P* - value
	No	%	No	%	
Compliance	39	65.0	20	33.3	0.001
Non compliance	21	35.0	40	66.7	





4. Discussion:

Preoperative anxiety in children is a common phenomenon that has been associated with a number of negative behaviors during the surgery experience (Wright *et al.,* 2007). Studies suggest that during the preoperative period anxiety is characterized by feelings of tension, restlessness, anxiety, and psychological stress.(Kain *et al.,* 1997 and Golden *et al.,* 2006) that it seems to be present in most patients undergoing pediatric surgical procedures, and it may be expressed by a behavior showing fear, trembling, panic, cry and restlessness (Kain *et al.,* 1997, Bersch, 2005 and Justus *et al.,* 2006).

Based on behavioral and physiological measures of anxiety, the induction of anesthesia in children has been identified as the most stressful point during the preoperative period (Kain *et al.,* 2007). Further, the post operative recovery is more complicated in children with higher preoperative level of anxiety (Kain *et al.,* 2006). so that, health professionals developed preoperative preparation programs that are directed at relieving children's anxiety and to facilitate coping. These preparation methods took the form of film modeling, picture books, rehearsals, visit to the operating room, the presence of 1 of the 2 parents during the induction of anesthesia, use of music as a

distraction and therapeutic play activities [Vagnoli *et al.,* 2005 and Brewer, 2006].

This study aimed to evaluate the effect of preoperative preparation by using therapeutic play and mothers presence during induction process on anxiety level and post operative behavior change in young children undergoing surgery.

The current study showed that the preoperative preparation by using therapeutic play are effective in improving post- operative outcomes of children. The result revealed that the study group had lower state anxiety than control group, significantly at the time prior to surgery. This may be attributed to the fact that the therapeutic play intervention success in enhancing the children's personal control and their adaption abilities towards potential stressful situations through familiarizing the child with personnel, the setting such as recovery and operating room. Also, explaining and demonstrating procedures before surgery on manikin through therapeutic play is fun for the child that causes the child to show less anxiety to probable stressful situations he faces. This result was in contrast with a study performed by Li and Lopez, (2008) who evaluated the use of therapeutic play in the preoperative preparation of children and indicated this intervention reduced children's anxiety greater than children who were not prepared in this manner. Also, this result is supporting by another research performed by Brewer *et al.*(2006) who identified that, children were less anxious postoperatively when they had participated in preoperative preparation program encompassing tours, or interactive play and recommended all children would benefit from preoperative preparation, not just children presenting with a perceived need.

The current study revealed that, 58.3% of children in the study group showed high level of anxiety pre intervention. This may be due to the fact that these children may be felt distress resulting from being in a strange environment, wearing unusual clothes (aprons without underwear); and by the lack of confidence caused by the risk of undergoing procedures that require anesthesia. As emphasized by Bar-Mor, (1997) and Vagnoli *et al.*(2005) a child's responses to the surgical process depends on his/her (emotional and cognitive) developmental stage, coping mechanisms, perception and interpretation of himself/herself and feelings and sensations triggered by the hospital environment.

The present study has shown that 75% of children in the study group had lower levels of anxiety post intervention. This might be due to the children provide with toys during therapeutic play intervention shown to stimulate the adaptation process that provide children with stimulating and fun activities, make them calm down and feel safer. In this respect Golden *et al.*(2006) who determined whether giving a small toy to a child would decrease anxiety. Additionally, interaction between the children, professionals and materials during play intervention give them the opportunity to decide about what she/he wants to do, able to create their own world, where the activities are relevant to deal with the situation they are going through and to ensure that these experiences provide them with satisfaction and pleasure. However, when there is personal involvement of adults in the playful activities of children, these experiences may be very significant for children, being a solid basis upon which they will build several other relationships that, leads to balance of power and affective feeling, as well as a sensation of safety and reliability (Bersch *et al.,* 2005).

The current study indicated that, The anxiety score change was significantly better for mothers in the study group than for those in the control group after therapeutic play intervention ($t = 5{,}06$, $p = 0.01$). These improvements indicate that therapeutic play intervention succeeded in lowering the level of anxiety among the mothers. This result was in agreement with the study performed by Himes *et al.*(2003) and Kain *et al.*(2004) who have stated that the therapeutic play interventions were demonstrated to positively impact parents anxiety.

In our study, we found that, there was significant decrease in the child negative behaviour regarding eating disturbance in the study group than for those in the control group after therapeutic play intervention. These differences demonstrate the effectiveness of our intervention in improvement of child appetite and decrease their refusal toward eating. This result was in line with Kain *et al.*(2007) who indicated that a preoperative preparation program decreased the postoperative negative behaviors regarding eating problems as compared to those who did not participate.

Extensive agreement amongst researchers thoroughly supported the premise that parental anxiety greatly impacts children (Li & Lam, 2003 and Wollin *et al.,* 2003, Kain *et al.,* 2004, Davidson *et al.,* 2006 and Kain *et al.,* 2006). This was in line with the result of the present study which hypothesized that The increase in mothers anxiety scores in the control group prior to surgery will result in increased their children anxiety and negative behaviors. Supporting this result the researchers found that children in the control group had higher mean state anxiety scores prior to surgery (44.8±3.18) and more sleeping problems as falling asleep, staying asleep and waking up crying during hospital stay and at home as compared with children in the study group. This result comes in accordance with Kain *et al.* (2006) who found that, children in the high anxiety group had more problems

falling asleep, staying asleep and waking up crying as compared with children in the control group during the hospital stay and at home. This finding may be related to the mothers and their children not receiving any preoperative preparation program related to reduce their anxiety and enhancing coping abilities prior to surgery that lead to increasing the level of anxiety and postoperative negative behaviors changes.

Parental presence at induction is one of the methods of reducing the separation anxiety and is performed in many centers according to hospital policy (Mc cann and Kain, 2001). Previous research believe that parental presence decrease child anxiety, increase cooperation and enhancing parental satisfaction (Golden *et al.,* 2006 , Patel *et al.,* 2006, and Li *et al.,* 2007). Furthermore, Kain *et al.* (2004) who indicated that most parents prefer to be present during anesthetic induction and that they feel that their presence is benefit to their child. Similarly, in our study, all mothers regardless of their group and anxiety level indicated that if their children needed surgery again, they would like to be present during the induction. This result was in contrast with that of the study conducted by Kain *et al.* (2003) who reported that, more than 80% of all parents of children undergoing a current surgery chose to be present during anesthetic induction again. on the other hand, a study that was conducted by Piira and Colleagues, (2005) has pointed out that parents were not routinely informed about what they could do to help their child if they were going to be present during the procedure. For this reason, Piira and Colleagues, (2005) assert that the combination of preparation program and parental presence could further improve parent and child outcomes when parents are present during medical procedures such as anesthetic induction.

The result of this study indicated that, children in the study group had statistically significant higher compliance scores during induction as compared with children in the control group. this result could due to children adaptation process with materials, personnel's and environment that result from their participation to the therapeutic play intervention prior to surgery that help them to become calm and less anxious. Additionally, preoperative preparation help in reducing mothers' anxiety prior to surgery and this considered a contributor factor in reducing children anxiety and increase their compliance during induction. This comes in accordance with Li and Lopez (2008) who commented that, the use of therapeutic play was essential for reestablishing the child's overall sense of self-control and enhance the adaptation process. Furthermore, Kain *et al.*(2004) suggested the importance of preoperative preparatory programs in light of identifying parental anxiety as contributory to the child's level of anxiety and related to postoperative negative behaviors. Therefore, appropriate education and preparation of not only the child patient, but the parent as well, can significantly impact patient care (Himes *et al.,* 2003). We strongly advocate the use of intervention such as these for all children and their parent prior to surgery.

Conclusion:

The study showed that therapeutic play intervention and mothers presence during induction of anesthesia are an appropriate method for preparing children and their mothers before surgery and effective in minimizing their level of anxiety post intervention. Also, combination of these intervention are effective in increase children compliance prior to surgery and improve postoperative recovery in the intervention group.

Recommendation:

Based on the main study finding, the following recommendation can be detected:

1- Incorporating therapeutic play intervention in the preoperative periods, thereby charting a path towards promoting holistic and quality care.
2- There should be a comparative study of the results of the knowledge providing by these preparation program with every kind of operative children. So that, the results of the study will be more comprehensively used in the future.
3- The health education work in the hospital should be organized to have a distinct role. there should be a cooperation among the doctors, the nurses, parents and health educators to disseminate the advice and information to the children undergoing surgery.
4- Incorporate mothers in preoperative preparation and during induction could have an additive effects in terms of reducing the mothers and children anxiety and postoperative behavioral change.
5- The nursing personnel should take the preoperative therapeutic play intervention as a duty and regard it as a role in doing the nursing practices in order to give the children the psychological care beside the routine physical care. Moreover, they should enhance the development of communication skills and coping abilities of children that help in reducing their anxiety.

Limitation of the study:

The limitation of this study was that all of data were collected in one setting that might limit the ability to generalize the result. Another limitation is that a homogenous sample of children aged 9-12 years was recruited in this study. Therefore, it is not clear whether children below this age range can also benefit from the intervention as younger children are particularly vulnerable to the stress of surgery. Also,

this study was aimed to discover the anxiety of children undergoing elective surgery who did not have any physical limitations. It is suggested to perform this study also on children with physical limitations who undergo elective surgery.

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A proposed image processing framework to support Early liver Cancer Diagnosis

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Abstract: Image recognition mining deals with the extraction of image patterns from a large collection of images stored in particular multimedia databases. Image mining is different from low-level computer vision and image processing techniques because the focus of image mining is in extraction of patterns from large collection of images, whereas the focus of computer vision and image processing techniques is in understanding and/or extracting specific features from a single image. Although there looks like to be some overlaps between image mining and content-based retrieval (both are dealing with large collection of images), image mining goes beyond the problem of retrieving relevant images. In image mining, the aim is the discovery of image patterns that are considerable in a given collection of images. Medical images include huge amount of unseen information that exploited by physicians in making reasoned decisions about a patient. However, extracting this relevant hidden information is a critical first step to their use. For this reason we use data mining techniques for efficient knowledge extraction. The dual reading (reading by two physicians or radiologists) of liver x-ray improved the accuracy rate, but at high costs. According to the fact that the medical domain involves high accuracy and particularly the rate of false negatives are very low. The computer diagnosis systems are necessary to support the medical staff to achieve high capability and effectiveness. This is the main reason for the development of classification systems to Diagnosing liver Cancer. The aims of this paper is pointed out as use some image mining techniques such as neural networks and association rule mining techniques to detection early liver Cancer using and helping physicians to decide an important decision on a particular patient state.
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Key words: Classification, medical imaging, association rule mining, neural networks, image mining, Image Recognition, Early Cancer Diagnosing.

1. Introduction

With advanced in secondary storage capacity coupled with a relatively low storage cost more and more non-slandered data is being accumulated. One category of non-slandered data is image, video, sound, etc.... There are big collections of image data that can be mined to discover new and valuable knowledge. The central research issue in image mining is to how to reprocess image set or how to represents image sets in the form that supports the application of data mining algorithms. A common representation is that of feature vectors or each image representation in vector. We segment the image or this vector into sub images to finding the region of interest in image and store this region attributes in vector.

The image mining technique deals with the extraction of implicit knowledge and image with data relationship or other patterns not explicitly stored in the images. It is an extension of data mining to image domain. The main objective of this research is to apply image mining in the domain such as Magnetic Resonance Image (MRI) and/or other rays kinds to classify and detect the cancerous tissue.

Image mining of medical images is used to collect effective models, relations, rules, abnormalities and patterns from large volume of images. This procedure can accelerate the diagnosis process and decision-making. Different methods of image mining have been used to detect and classify anomalies in mammogram images such as wavelets [9], statistical methods and most of them used feature extracted using image processing techniques. Some other methods are based on fuzzy theory [6] and neural networks [3]. Here the overview of historical studies in this field:

2-background study

Ashraf et.al.(2008) [1] roposed a segmentation algorithm operates by first extracting regions satisfying the statistical characteristics (gray level distributions) of the Corpus Callosum that have relatively high intensity values. This is then processed using graph analysis and classification procedures.

Wynne et.al.(2000) [10] roposed an system called IRIS, an Integrated Retinal Information system, has been built up to afford medical professionals trouble-free and unified access to the

screening, trend and development of diabetic-related eye diseases in a diabetic patient database.

Rajendran et.al. (2010) [8] Proposed a method deals with the detection of brain tumor in the CT scan brain images. First preprocessing technique applied on the images eliminates the inconsistent data from the CT scan brain images. Then feature extraction process is applied to extracts the features from the brain images. A Novel Fuzzy Association Rule Mining (NFARM) applied on the image transaction database contains the features extracted from the CT scan brain images. The NFARM gives the diagnosis keywords to physicians for making a better diagnosis system.

Jaba et.al.(2007) [5] proposed a system using image mining techniques to categorize the images either as normal or abnormal and then classify the tissues of the abnormal brain MRI to identify brain related diseases.

Rajendran et.al.(2010) [7] proposed a method concerned with the classification of brain tumor in the CT scan brain images. The main steps involved in the system are: pre-processing, feature extraction, association rule mining and hybrid classifier. The pre-processing is done using the median filtering and edge features are extracted using canny edge detection technique. The combination of two image mining approach is been proposed. The frequent patterns from the CT scan images are produced by frequent pattern tree (FP-Tree) algorithm that mines the association rules. The decision tree method is used to categorize the medical images for diagnosis. This system improves the classification process to be more accurate. The hybrid method enhances the efficiency of the proposed method than the traditional image mining methods.

Aswini et.al. (2010) [2] applied image mining in the domain such as breast mammograms to classify and detect the cancerous tissue. A hybrid approach of feature selection using fast branch and bound algorithm and a hybrid genetic algorithms are used which approximately reduces 75% of the features and new decision tree is used for classification and provide promising results.

The objectives of the paper

The aims of this paper is pointed out as use some image mining techniques such as neural networks and association rule mining techniques to detection early liver Cancer using and helping physicians to decide an important decision on a particular patient state.

Research problem

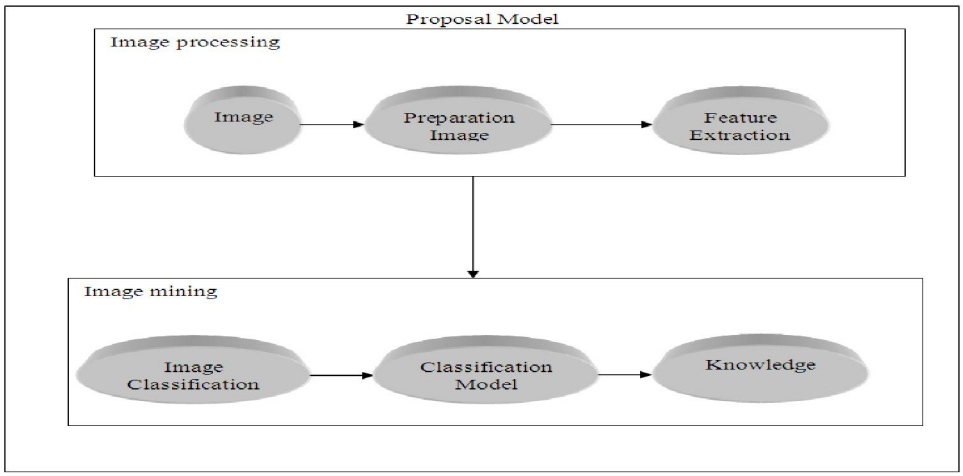
The computer aided diagnosis systems are necessary to support the medical staff to achieve high capability and effectiveness. This is the main reason for the development of classification systems to Diagnosing liver Cancer.

Image recognition mining deals with the extraction of image patterns from a large collection of images stored in particular multimedia databases. Image mining is different from low-level computer vision and image processing techniques because the focus of image mining is in extraction of patterns from large collection of images, whereas the focus of computer vision and image processing techniques is in understanding and/or extracting specific features from a single image. Although there looks like to be some overlaps between image mining and content-based retrieval (both are dealing with large collection of images), image mining goes beyond the problem of retrieving relevant images. In image mining, the aim is the discovery of image patterns that are considerable in a given collection of images [4].

Medical data mining is a promising area of computational intelligence applied to an automatically analyze patients' records aiming at the discovery of new knowledge potentially useful for medical decision-making. Induced knowledge is anticipated not only to increase accurate diagnosis and successful disease treatment, but also to enhance safety by reducing medication-related errors.

Then we can formulate the research problem as statements as following:

"This research analyze automatically the patient records to discover new knowledge"
"It increases the accuracy of diagnoses and decision making for the physicians and radiologist"



There are two tasks in our framework:

I-Image processing task

Preprocessing phase of the images is necessary to improve the quality of the images and make the feature extraction phase more reliable. This phase consists of some processes. These processes contain data normalization, data preparation, data transformation, data cleaning, and data formatting.

Using wavelet transforms represent to transform the image. We also use Segmentation to recognize regions of interest (ROI).because the medical image is large and contain huge amount of information then we use the segmentation step finds consequent regions within an image.

Images usually have a huge number of features. It is important to recognize and extract interesting features for an exacting task in order to decrease the complexity of processing. Image processing algorithms used, which automatically extract image attributes such as local color, global color, texture, and structure.

Texture is the mainly useful description property of an image and it specifies attributes, such as resolution, which used in image mining Jaba et.al.(2009) [12].

Feature extraction from images are required for many image mining applications such as content based information retrieval (CBIR), image classification etc. These features typically extracted based on the image's information by image processing only Tianxia et.al. (2008) [13].

This step consists of several steps - improve the quality of image to extracts the feature for image easily following steps:

1- Image normalization (putting the image in fixed size)

2- Image preparation (put the image in known format such as .jpg or bmp)

3- Image transformation (for example using wavelet transform)

4- Cleaning the image from noise

5- Segmentation step in which we segment the image into regions to extract the feature

6- Feature extraction

We use several feature such as:

a- Color feature is the combination of (red, blue, green) components

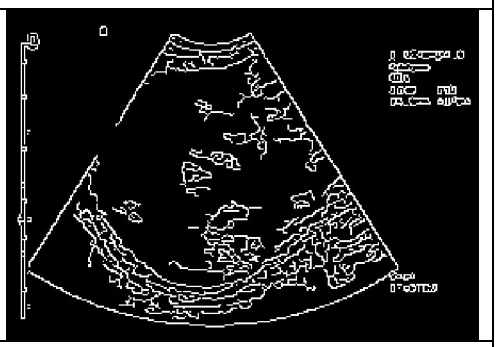
b- Texture feature: Texture is a very interesting image feature that has been used for characterization of images, with application in content based image retrieval. A major characteristic of texture is the repetition of a pattern or patterns over a region in an image. The elements of patterns are sometimes called textons.

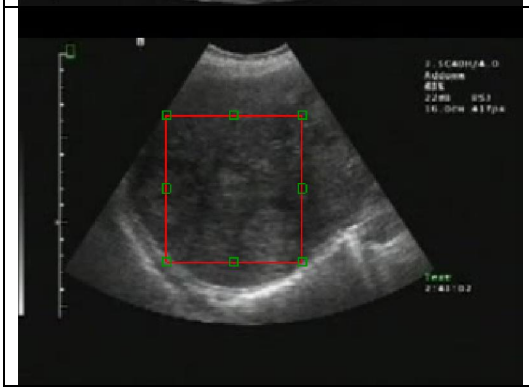
C- Edge feature is simply a large change in frequency

There are several states in liver diseases such as: Cirrhosis, Hemangioma, Hydatid liver disease, Metastases, Portal hypertension, Accessory fissure of the liver, acute calculus cholecystitis with pericholecystic abscess.

Here are some image samples and its suggested feature as mean, Standard Deviation and Variance.

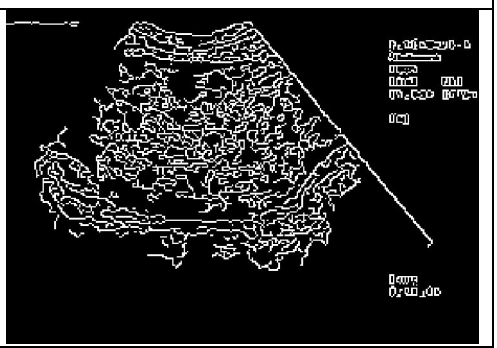
Metastases

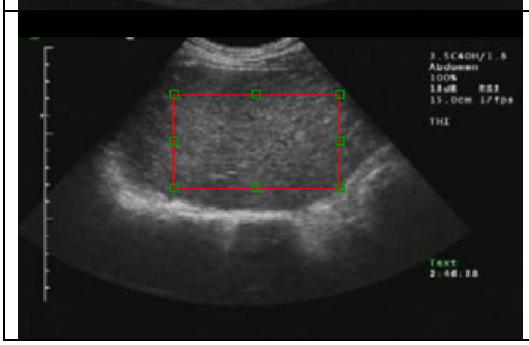




Mean: 46.4783
Standard Deviation: 12.7864
Variance: 163.493

Cirrhosis





Mean: 80.0554
Standard Deviation: 12.6949
Variance: 161.161

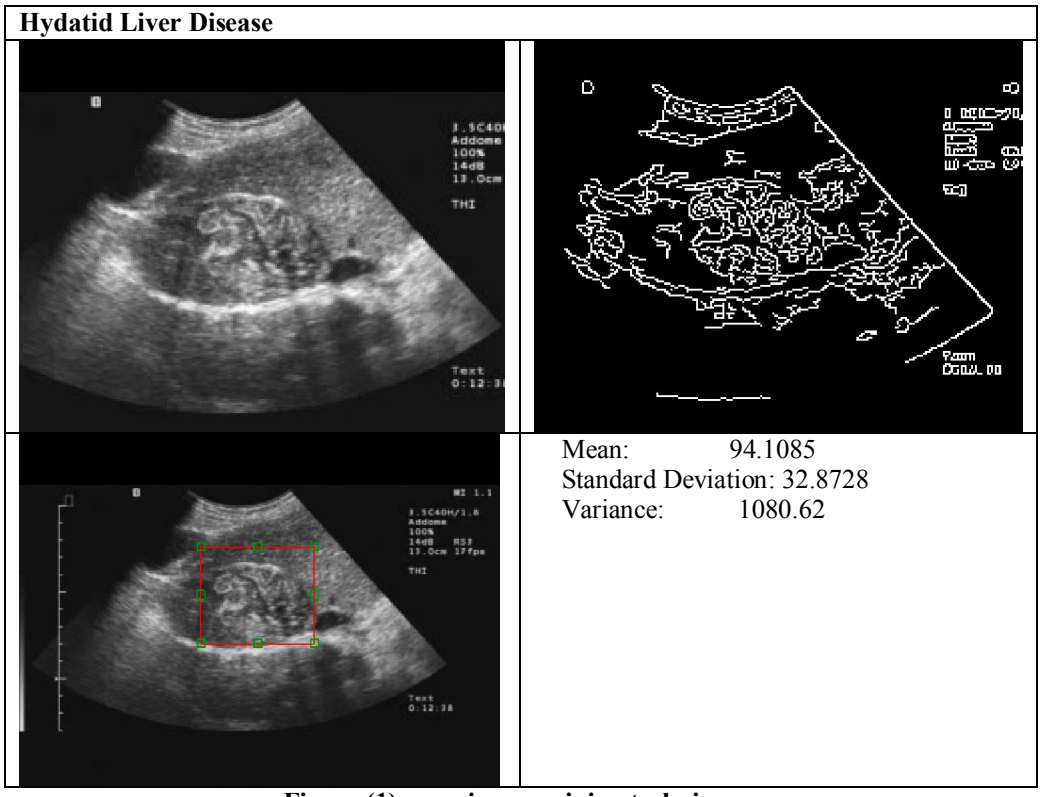


Figure (1) some image mining techniques.

II Image Mining Task

We use some image mining techniques such as neural networks and association rule mining techniques to detection early liver Cancer using and helping physicians to decide an important decision on a particular patient state. In recent years, many advanced classification approaches, such as neural networks, fuzzy-sets, and expert systems, have been widely applied for image classification.

Neural networks

Neural networks are of particular interest because they offer a means of efficiently modeling large and complex problems in which there may be hundreds of predictor variables that have many interactions.(Actual biological neural networks are incomparably more complex.) Neural nets may be used in classification problems (where the output is a categorical variable) or for regressions (where the output variable is continuous)(By Two Crows Corporation)(2008) [11].

A neural network (Figure 2) starts with an input layer, where each node corresponds to a predictor variable. These input nodes are connected to a number of nodes in a hidden layer. Each input node is connected to every node in the hidden layer. The nodes in the hidden layer may be connected to nodes in another hidden layer, or to an output layer. The output layer consists of one or more response variables (By Two Crows Corporation)(2008) [11].

Findings discussion and conclusion

This is the pilot study about using image mining for early digenesis on liver cancer. First we use image processing techniques for pre-processing and extract feature from it. Second we use image mining technique for discover knowledge from the extracted image. We used about 20 images for liver and the results is promised

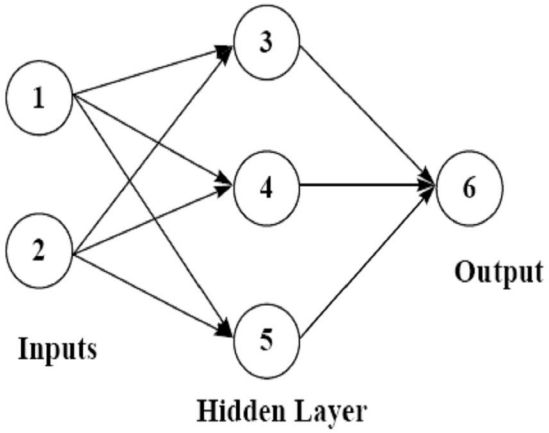


Figure (2) a neural network with one hidden layer.

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The impact of Perception of Organizational Collaborative climate on organizational commitment

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Abstract: In this study the relationship between the perception of organizational collaborative climate and organizational commitment has been investigated. Data gathered using questionnaire. The study samples were 322 employees of Fars province social welfare organization that were selected using proportionate categorical random sampling for further analysis. The study results showed that the relationship between perceptions of organizational collaborative climate and organizational commitment is significant. Also the relationship between the collaborative climate and dimensions of organizational commitment (normative, affective and continuance commitment) were significant.

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Keywords: Organizational collaborative climate, organizational commitment, organizational climate, perceptions.

1. Introduction

Collaborative climate refers to shared elements of an organization's culture that inspires staff to share knowledge (Sveiby and Simons, 2002). According to Sveiby and Simons, the success of knowledge management practices depends on the incorporation of trust and collaboration in organizational culture. They confirmed that in the collaborative climate of a business unit, an immediate superior and coworkers in a workgroup play the most important roles in collaborative climate creation.

Organizational commitment is the individual's psychological attachment to the organization. The basis behind many of these studies was to find ways to improve how workers feel about their jobs so that these workers would become more committed to their organizations. Organizational commitment predicts work variables such as turnover, organizational citizenship behavior, and job performance. Some of the factors such as role stress, empowerment, job insecurity and employability, and distribution of leadership have been shown to be connected to a worker's sense of organizational commitment.

Organizational commitment can be contrasted with other work-related attitudes, such as job satisfaction, defined as an employee's feelings about their job, and organizational identification, defined as the degree to which an employee experiences a 'sense of oneness' with their organization.

Organizational scientists have also developed many nuanced definitions of organizational commitment, and numerous scales to measure them. Exemplary of this work is Meyer and Allen's model of commitment, which was developed to integrate numerous definitions of commitment that had been proliferated in the literature. Meyer and Allen's model has also been critiqued because the model is not consistent with empirical findings.

This Study aims to investigate the impact of collaborative work climate on organizational commitment in social welfare organization in Fars Province, Iran

Research Hypotheses:

There is a positive and significant relationship between organizational collaborative climate and organizational commitment.

The second hypothesis: There is a positive and significant relationship between organizational collaborative climate and affective commitment

There is a positive and significant relationship between the organizational collaborative climate and the normative commitment.

The fourth hypothesis: There is a positive and significant relationship between organizational collaborative climate and continuance commitment.

2. Methodology

Data gathering was done by a multi-process measurement among 332 employees of Fars province social welfare organization. The proportionate stratified sampling method was selected, Data gathered using questionnaire. All calculations of Alpha cronbach showed that the measures are reliable. The expert opinions also showed that the questionnaires are valid.

3. Data analysis and Results:

The correlation exam :

The main hypothesis: There is a positive and significant relationship between organizational

collaborative climate and organizational commitment.

The Pearson correlation Index results have shown that the R amount is 0.594 and the p amount is 0.0001. Thus, the fifth hypothesis was supported. The results show that in the study samples being considered, the organizational collaborative climate feeling, enhances the organizational commitment.

According to Pearson correlation Index results , the R amount is 0.45 and the P amount is 0/0001 . Thus, the first hypothesis was supported . the results show that , in the study samples being considered, not only the organizational collaborative climate feeling increases the employees' motivation for policy making , but also it has a positive effect on it .

However, with regard to the low amount of (0.212) , this is a weak influence .

The second hypothesis: There is a positive and significant relationship between organizational collaborative climate and affective commitment

According to Pearson correlation Index results, the R amount is 0.67 and the P amount is 0.0001 .

Thus, the second hypothesis was supported. The results show that in the study samples being considered , not only the organizational collaborative climate feeling enhances the employees' sense of affective commitment , but also has a positive influence on it .

The third hypothesis:There is a positive and significant relationship between the organizational collaborative climate and the normative commitment.

According to Pearson correlation Index results, the R amount is 0/654 and the P amount is 0.0001. So, the third hypothesis was supported. The result show that, in the study samples being considered, the organizational collaborative climate feeling, enhances the commitment of employees to public interests.

The fourth hypothesis: There is a positive and significant relationship between organizational collaborative climate and continuance commitment.

The Pearson correlation Index results show that the R amount is 0.642 and the P amount is 0.0001 .Thus, the fourth hypothesis is supported. According to the results, in the research samples being considered, the organizational collaborative climate feeling increases the employees' continuance commitment.

11/06/2012

4. Discussion and Conclusion:

The main purpose of this research was considering the relationship between employees' perceptions of organizational collaborative climate and the organizational commitment. The research samples included Fars province employees of social welfare organization. Further researches can be done with the purpose of measuring organizational commitment in other governmental organs and among larger statistical samples. So, a lot of attention should be paid in the correct and rapid use of the current research results.

The results of main hypothesis analysis show that this relationship is positive and significant, and the organizational collaborative climate feeling has a medium to high influence on the organizational commitment.

The results also show that, in case there is a collaborative climate in the organization, the employees will feel more commitment to public interests and properties and show more self-sacrificing.

Since the organization values the employees, they will bind themselves to help the people of the whole society, regarding the objectives and missions of the organization.

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Export Performance a Vital Indicator for Measuring Industry Competitiveness: Evidence from Pakistan Textile and Clothing Industry

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Abstract - Federal Bureau of Statistics Pakistan is regularly collecting and maintaining data for exports for industrial sectors (textile, food and other manufacturing commodities) and Service Sector. Export performance is a vital indicator for measuring any industry competitiveness. Pakistan Textile and Clothing Export data from 2005-2006 – 2009-2010 was explored for competitive performance analysis. Sector was further divided into three categories low, medium and high based on their share. Performance was anlaysed using SPSS.19 and Microsoft Excel. It was found that Cotton Yarn, Knit-Wear and Towel had positive compound annual growth rate (CAGR), whereas, Cotton Cloth, Bed-Wear and Ready- Made Garment comprising of 50-60% of the group had negative CAGR. Poor performance were found to be due to low quality, less value added products, weak competitive intelligence, low product mix, lack of skills, weak marketing, high production cost, out dated technology, old manufacturing techniques, electricity and gas shortage and severe competition from China after its integration into World Trade Organizations (WTO) Structures on termination of post quota regime. To achieve sustainable competitiveness, foreign investment should be encouraged through making strategic alliances with major players by exploiting competitive advantage of raw material and low wage labour potential. Moreover, industry should be strengthen upstream and downstream through advancement in biotechnology, development of energy availability strategies, investment in technology, institutionalising workers skills, exploiting low labour cost, improve marketing, and transforming small and medium units into well-organized high quality, high value added, low cost competitive large units.

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Keywords: Export data exploration, Textile and clothing sector, Export performance, Competitiveness.

1. Introduction

Organizations irrespective of their size and capabilities remain in the quest, other than their domestic market, of global market not just to develop their business but at the same time to survive in the international competitive business community. Descotes and Walliser (2011) validated that organizations capability to acquire timely knowledge and information pertaining to global markets and its timely exploitation plays a vital role in the global economy. Therefore, organizations must be vigilant enough to continuously acquire competitive intelligence and analyse the market trends, and respond accordingly to the turbulent changing dimensions of the international market and avoid to being surprised by their competitors and are forced to reactive mode instead of being proactive and will not be able to achieve sustainable competitiveness. May et al., (2000) also suggest that "Information and its management is even more important in the international setting, where entirely new parameters and environments are encountered". Eusebio et al., (2007b) believed that the business environment characteristics are defined by the competition intensity and market turbulence. For all business (especially Textile and clothing), in such dynamic environment, the export performance is playing a vital role in the development of business among countries. It has been well established that country's economic well-being is positively associated with their foreign trade strength. Developed countries have higher share in international trade as compared to less-developed countries(Held, 1999). A country's exports provide a platform to augment its people quality of life (QoL) by opening more jobs in the exporting sector. Macroeconomic performance based on the export performance of a country determine its competitiveness, whereas, the microeconomics performance rely on the organizational and structural features of companies. The past studies investigated the result from microeconomic perspective and concluded that the global market performance of a company is deeply associated with the institutional performance and environment created by its source country(Porter, 1990). The global competitiveness of an organization depends upon two major pillars, one is its capacity and second is its strategic initiatives (Aaby & Slater, 1989; Leonidou, 1998; Zou & Stan, 1998). Therefore, an

organization before making a decision to enter into export must have a sound rational analysis of organization's internal capabilities and competitive intensity of international market and develop a business strategy and plans which will attain sustainable competitiveness and improve the organization operational, market and financial performance.

In Pakistan, Federal Bureau of Statistics (FBS) collects and analyse data on all the macroeconomic indicators including export. The same is also maintained for reference of individual researchers, organizations and government authorities for further use. Analysis of such data available with Federal Bureau of Statistics and Trade Development Authorities of Pakistan (TDAP) is sufficient enough to investigate the changing trends of the textile export business. This research focused on data exploration of Pakistan Textile and Clothing exports performance considering it a core indicator for measuring industry competitiveness and identification of factors which affects the industry competitiveness and provide recommendations to improve the industry competitiveness.

2. PAKISTAN TEXTILE AND CLOTHING SECTOR

Pakistan Textile and Clothing industry accounts for 50-65% country's export shares, provides 38% employment to the manufacturing labour force and have substantial contribution of 8.5% in the gross domestic production (GDP). Pakistan holds the title of fourth largest in cotton producers and third largest in cotton consumers("Paksitan Economic Survey ", 2005-06; "Paksitan Economic Survey," 2010-11). No other industry or service sector of Pakistan has such gigantic potential to support economy through foreign revenues and at the same time provide employment opportunities at large scale. Pakistan textile and clothing industry holds a significant position in the international market since its inception (four decades ago approximately), but quota system ending has posed a serious challenge to this industry and export share has been seriously affected. From 2004-2009, International textile products trade has amplified from US$ 456.1 billion in 2004 to $527 billion in 2009 at Compound Annual Growth Rate (CAGR) of 2.93%. From 2004-2009, clothing trade grew from 260.6 billion US$ to 316 billion US$ at CAGR of 3.93%, whereas, textile trade grew from $195.5 billion US$ to 211 billion US$ at CAGR 1.53%. Clothing products trade outpaced textile products trade. Pakistan textile and clothing trade has increased from 9.1 billion US$ in 2004 to 9.5 billion US$ in 2009 at CAGR of 0.86% as shown in Figure 1.

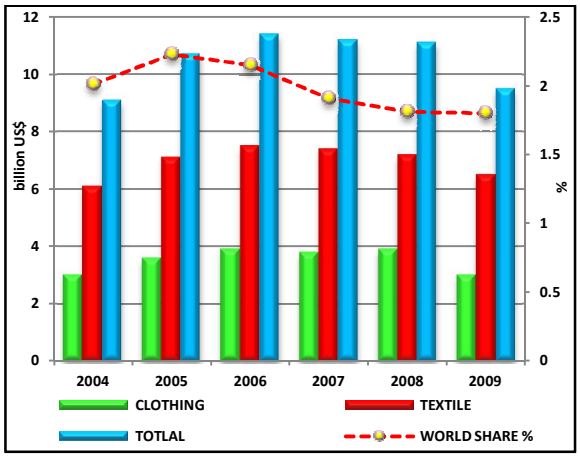

Figure 1. Pakistan export market share from 2005-06 to 2009-10

From 2004-2009 Textile trade grew from 6.1 billion US$ to $6.5 billion US$ at CAGR of 1.28% whereas, clothing trade remained the same from $3 billion US$ to $3 billion US$ with minor fluctuations. Pakistan had a meagre share in the world textile and clothing ranging between 1.8 - 2.23%. Pakistan trade is decreasing as opposite to world trade and is unable to make any significant improvement particularly in clothing sector. Moreover, Textile and Clothing share in overall Pakistan exports decreased from 64% in 2004-2005 to 54.46% in 2009-2010 of total exports at a decreasing CAGR of (-3.1%).

3. Scope

The scope of this study is limited to Pakistan Textile and Clothing sector export performance from 2005-2006 to 2009-2010. The sector is further sub divided into seven sub-sectors as following.

- Cotton Yarn
- Cotton Cloth
- Ready-Made Garments
- Bed-Wear
- Knit-Wear
- Towels
- Others, (comprises of Raw Cotton, Carpets, Canvas, Tents, Synthetic Articles, etc)

The first six sub-sectors Cotton Yarn, Cotton Cloth, Ready-Made Garment, Knit-Wear, Bed-Wear and Towels accounts for 85-90% of the total textile sector export. Therefore, the data of these six sub sectors is considered sufficient enough to analyse the overall industry export performance. The current study based on data exploration for investigation of textile and clothing export performance. The textile and clothing industry data from 2005-2006 to 2009-2010 for five years has been analysed. Statistical

applications such as SPSS.19 and Microsoft Excel were used to perform exhaustive numerical analysis.

4. Results Analysis and Discussion

4.1 Descriptive Statistics

Descriptive statistics of six sub sectors from 2005-2006 to 2009-2010 are calculated as shown in Table 1.

Table 1. Descriptive Statistics - Textile and Clothing Export from 2005-06 to 2009-10

Million US$

Cat	Sub Sector	Mean	Std. Deviation	Max	Min	Range
Low	Towels	622.8762	32.43976	668.24	587.64	80.60
Medium	Ready-Made	1329.319	89.54759	1452.48	1230.02	222.46
	Cotton yarn	1331.959	132.44030	1433.09	1114.82	318.27
High	Knit-wear	1817.971	95.71032	1961.05	1740.53	220.52
	Bed-wear	1883.345	139.96593	2038.06	1735.02	303.05
	Cotton-cloth	1980.105	114.57589	2108.18	1800.06	308.13

Moreover, these sub-sectors are further divided in three categories based on their business share, Low (500-1000 US$ Mns), Medium (1001-1500 US$ Mns) and High (1501-2200 US$ Mns) as shown in Figure 2. Three categories based on business share can easily been differentiated.

Figure 2. Sub-sectors export market share from 2005-06 to 2009-10

Among the sub sectors, it is found that Towels had the lowest export share with (Mean = 622.87$, Standard Deviation = 32.43) but low standard deviation showed export stability. Ready-Made Garments and Cotton Yarn falls under medium category with (Mean = 1329.3198, Standard Deviation = 89.54759 and Mean = 1331.95, Standard Deviation = 132.44) respectively. Both showed instability as compared to Towel sector due to high standard deviation. Knit-wear, Bed-wear and Cotton Cloth falls under high value category with (Mean = 1817.9710, Standard Deviation = 95.71032, Mean = 1883.3458, Standard Deviation = 139.96593 and Mean = 1980.1052, Standard Deviation =114.57589) respectively. All three accounts major contribution to the business, however, high standard deviation reflects their significant market share instability.

4.2 Towels Export From 2005-2006 to 2009-2010

Towels sector performance is evaluated as shown in Figure 3 to arrive at following outcomes:

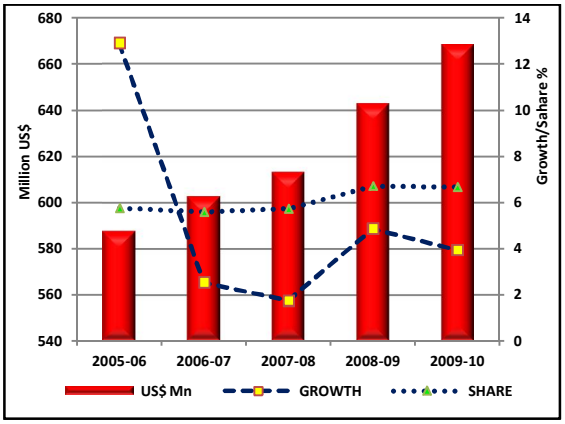

Figure 3. Towels export market share from 2005-06 to 2009-10

- It accounts for 5-6% of the group share
- It was growing at CAGR of 3.27%.
- The major reason for steady growth is due to less competition in the export market. Hence, this sector is showing improvement after post quota era.
- Keeping in view its increasing export potential it is considered best suited for investment.

4.3 Ready-Made Export From 2005-06 to 2009-10

Ready-made sector performance is evaluated as shown in figure 4 to arrive at following outcomes:

- It accounts for 12-13% share of the group.
- It showed a negative CAGR of (0.785%).
- It showed a constant negative growth till 2008-09 and then a marginal improvement of 3.19% in 2009-2010.
- Primarily, the poor performance is due to low quality, low value added and less innovative

products, low product mix, poor workers skills, weak marketing and high production cost.

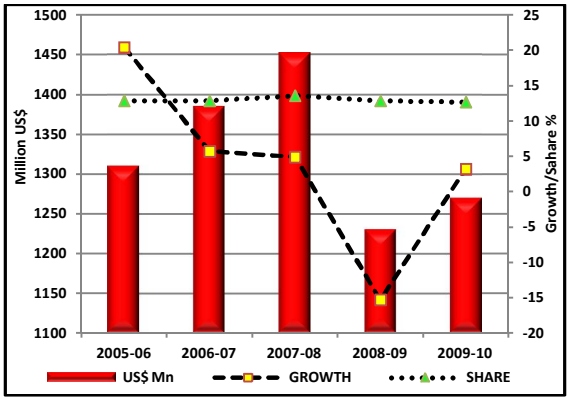

Figure 4. Ready-made export market share from 2005-06 to 2009-10

- The unexpected upsurge in utilities cost, (power, transport, fuel and gas,) has impacted viability. The power and gas shortage have further deteriorated capacity utilization.
- Non adaptability of lean and agile manufacturing practices to eliminate product and process waste and to response diversified market demands respectively.
- The world export trend has been showing a tremendous shift from textiles to high value clothing. Whereas, Pakistan's textile exports continue to focus on textile items (cotton, yarn, grey fabric, etc.) rather on the value-added segment of ready-made garments. Moreover, Pakistan is actually a raw material supplier to its own competitors (China and Bangladesh).
- Pakistani textile industry did not effectively built downstream capacities by developing value added garment. Moreover, this Industry is distributed in small, medium and large scale units most of them having 50 machines and below which results high variation in product quality.

4.4 Cotton Yarn Export From 2005-2006 to 2009-2010

Cotton yarn sector performance is evaluated as shown in Figure 5 to arrive at following outcomes:

- It accounts for 14 – 15 % share of the group.
- It showed a CAGR of 0.895%.
- It showed a constant negative growth from 2005-2006 to 2008-2009 and then there was a major improvement making 28% improvement in 2009-2010.
- Primarily, low performance is due to the production of low value-added yarns i.e. in coarse and medium counts.
- Secondly, the primary concern of this sector was non-availability of electricity and gas which seriously affected the effective capacity utilization. Major players have installed their own generation plants which made it non cost-effective and less competitive in the international market.

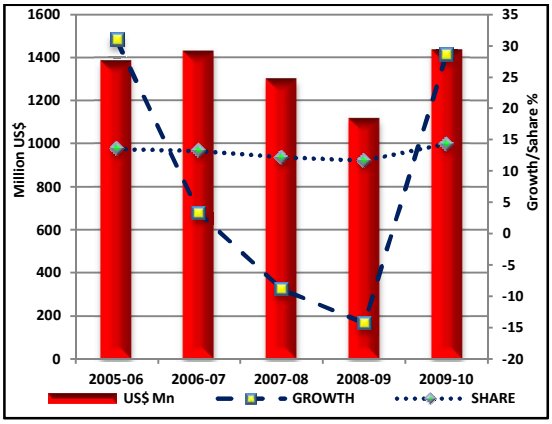

Figure 5. Cotton yarn market share from 2005-2006 to 2009-2010

4.5 Knit-Wear Export From 2005-2006 to 2009-2010

Knit-wear sector performance was evaluated as shown in Figure 6 to arrive at following outcomes:

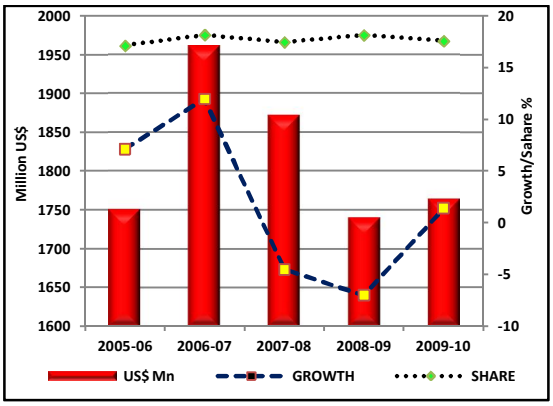

Figure 6. Knit-wear market share from 2005-2006 to 2009-2010

- It accounts for 17 – 18.5 % share of the group and showed a CAGR of 0.188%.
- It showed a negative growth from 2005-2006 to 2008-2009 and then there was a marginal improvement of 1.39% in 2009-2010.
- Poor performance is due to lack of skilled manpower and outdated technology.

4.6 Bed-Wear Export From 2005-2006 to 2009-2010

Bed-wear performance was evaluated as shown in Figure 7 to arrive at following outcomes:

- It accounts for 18 – 20 % share of the group and showed a negative CAGR of (3.817%).
- It showed a constant negative growth from 2005-2006 – 2008-2009 and then there was a minor improvement of 0.5% in 2009-2010.
- Outdated processing technology being used by the industry is not adequate to meet the requirements of the quality market.
- Lack of skilled manpower in design, development and processing fields also affected the product quality.

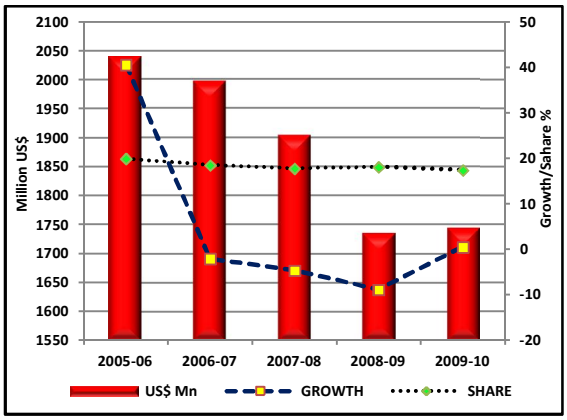

Figure 7. Bed-wear export market share from 2005-2006 to 2009-2010

4.7 Cotton Cloth From 2005-2006 to 2009-2010

Cotton cloths sector performance was evaluated as shown in figure 8 to arrive at following outcomes:

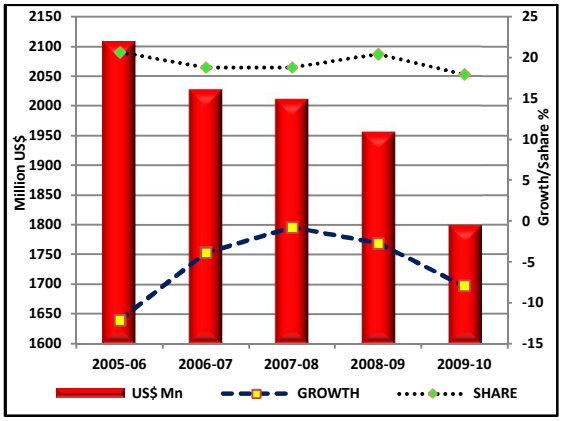

Figure 8. Cotton-cloth export market share from 2005-2006 to 2009-2010

- It accounts for 19 – 21 % share of the group and showed a negative CAGR of (-3.873%).
- It showed a constant negative growth from 2007-2008 to 2009-2010.
- This segment is making relatively low value added grey cloth of mostly inferior quality. Inability to meet the demand of high quality cloth in the international market and being low quality producer this sector would be unable to sustain its competitiveness.
- Poor performance is due to out-dated Power looms technology, shortage of quality yarn and deficiency of formal financing.
- Constant negative growth is seriously going to affect the overall textile export sector performance as it belongs to high value sub-sector.

4.8 Compound Annual Growth Rate From 2005-2006 to 2009-2010

CAGR of subsectors gives a clear picture of the entire sector as shown in Figure 9.

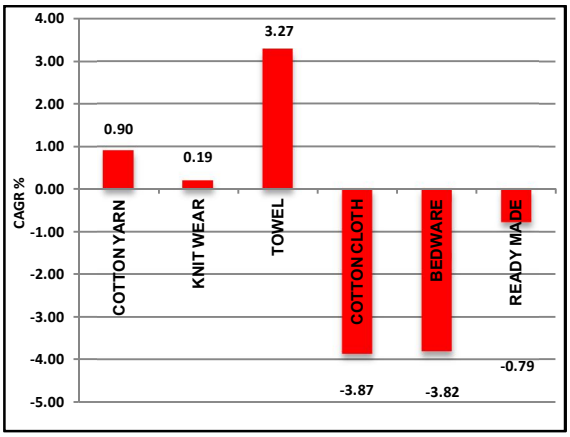

Figure 9. Compound Annual Growth Rate (CAGR) from 2005-2006 to 2009-2010

Towel, Knit-Wear and Cotton Yarn had positive CAGR, on the other hand, Ready-Made Garment Bed-Wear and Cotton Cloth sectors holding a major share 50-60% of the group had negative CAGR. Poor performance of Cotton Cloth, Bed Wear and Ready-Made Garments being a member of high and medium category was a major reason of industry poor performance.

4.9 Machinery Investment

A substantial investment has been made in import of textile machinery from 2001-2002 to 2009-2010 as shown in Figure 10. Textile machinery import is the major component of new investments in the textiles division. The trend in imports of textile machinery depicts the overall mind set of the textile

and clothing entrepreneurs and their future business plans. The foremost investment was made in weaving spinning followed by processing (dyeing, printing and finishing) sector neglecting stitching sector which is major cause of poor performance in readymade garments sector. Moreover, a negative investment trend in machinery is observed from 20005-2006 to 2008-2009 which also contributed in negative growth of complete sector for the same period

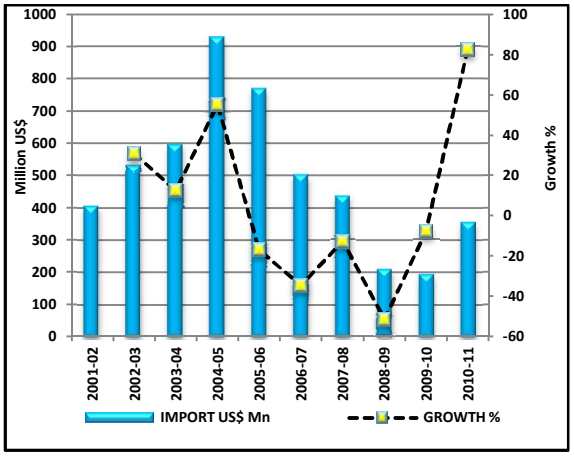

Figure 10. Investment in machinery from 2001-2002 to 2009-2010

5. Findings

The data mined for subsectors was exhaustively analysed. It resulted into following findings.

- Among all six sub-sectors the towel sector was the best performer in export though it had little share.
- All other sub-sectors beard negative growth form 2006-2007 – 2008-2009. It was due to the phase out of traditional quota regime and China's integration into World Trade Organization (WTO) structures. Moreover, the global financial crisis since late 2007 adversely impacted the trade in textiles.
- Cotton Yarn, Knit Wear and Ready-Made garments had shown positive growth of 28%, 1.39% and 0.895% respectively in 2009-2010 and have future positive growth prospects.
- Cotton Cloth and Bed-Wear had serious negative growth and being member of high category seriously affected the overall group export performance.
- There was a major shift in global demand from low value to high value garments.
- Poor export performance in different sectors was due to low product quality, less value added, lack of innovation, low product mix, lack of skilled workers, weak marketing and high production cost and out dated technology.
- The power and gas shortage have worsened capacity utilization and number of units has been shut down or working below effective capacity also caused a forced labour un-employment.
- Power loom sector problems are poor technology, scarcity of quality yarn and lack of institutional financing for its development from unorganized sector to an organized one.
- Lack of design, development and non-adoption of latest manufacturing practices resulted in high waste and low productivity.

6. Recommendations

Based on discussion made in above sections following recommendations are suggested to improve the export performance

- Viable and long term energy resources management strategies be developed to make this sector competitive.
- Environment be created which will encourage foreign investment through strategic alliances with major players by exploiting competitive advantage of raw material and low labour wage.
- Downstream business should be reinforce through investment in technology, improving workers skills, benefiting from low labour cost and transforming Small and Medium units into well-organized high quality, high volume, low cost, innovative and Large Units.
- Spinning industry to diversify its product mix and increase the share of high value-added yarns to fulfill the requirements of garments and made-ups industries.
- Workers training should be institutionalized to meet the market requirements.
- Government should provide financial assistance for new technology installation and up gradation of existing technology.
- Lean manufacturing practices be adopted to eliminate waste to improve productivity and at the same time attain agility and innovation to respond to market diversified and vibrant demands.

7. Conclusions

Present research showed that data exploration techniques could help government in general and industry players in particulars to re-arrange their strategies to meet the challenges of the international market and convert these challenges into

opportunities. It also provides information to investors to identify the sector which have expansion potential and where they could earn reasonably a good return on investment. We acknowledge one limitation to this study. The present study focus is restricted to the Textile and Clothing sector of Pakistan and hence limits its generalizability to the other industrial sectors. More evocative deductions could have been derived from the study by the assessment of diverse industries such as Food and Beverages, other Manufacturing and Service Sector etc, but due to time constraint it was not possible to analyse all other sectors as well. However, such techniques can be used to analyse data available for other sectors and develop investment and expansion strategies for those sectors.

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Optimal Homotopy Asymptotic Method for the Approximate Solution of Generalized Burgers' Huxley Equation

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Abstract: In this paper, the approximate analytical solution of Generalized Burgers'-Huxley equations is obtained using Optimal Homotopy Asymptotic Method. Unlike homotopy perturbation and homotopy analysis methods this method is independent of the small parameter. Using this method one can easily handle the convergence of approximation series and adjustment of convergence regions when required. The method is effective, explicit and easy to implement. Approximate solution of Generalized Burgers'-Huxley equation, and its special cases Burgers'-Huxley equation and Huxley equation are considered using the present approach. The results show excellent accuracy and strength of the proposed method.
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Key words: Optimal Homotopy Asymptotic Method (OHAM) . Generalized Burgers' – Huxley equation.

INTRODUCTION

Nonlinear partial differential equations arise in distinct fields of engineering and science such as chemistry, physics, engineering and finance, and are the key point for the mathematical formulation of continuum models [1, 5, 19-20]. Particularly, the important model of nonlinear partial differential equation is Generalized Burgers'-Huxley equation [3, 5-6, 11, 13-14, 19, 22, 29]. The Burger's–Huxley equation was first studied by Satsuma [24] in 1987, and is given by,

$$u_t + \alpha\, u^{\delta} u_x - u_{xx} = \beta\, u(1-u^{\delta})(u^{\delta}-\gamma),\ x \in \Omega = [a,b],\ t \geq 0, \quad (1)$$

with initial condition,

$$u(x,0) = \left(\frac{\gamma}{2} + \frac{\gamma}{2}\tanh(\omega_1 x)\right)^{\frac{1}{\delta}},\ x \in \Omega,$$

and boundary conditions,

$$u(x,t) = \left(\frac{\gamma}{2} + \frac{\gamma}{2}\tanh(\omega_1 (x - \omega_2 t))\right)^{\frac{1}{\delta}},\ x \in \Gamma, t > 0 \quad (2)$$

where $\omega_1 = \dfrac{-\alpha\,\delta + \delta\sqrt{\alpha^2 + 4\beta(1+\delta)}}{4(1+\delta)}\gamma$,

$\omega_2 = \dfrac{\alpha\,\gamma}{(1+\delta)} - \dfrac{(1+\delta-\gamma)\left(-\alpha + \sqrt{\alpha^2 + 4\beta(1+\delta)}\right)}{2(1+\delta)}$ and

α, β, δ and γ are constants so that $\beta \geq 0$, $\delta > 0$, $\gamma \in (0,1)$ and Γ is boundary of Ω. Eq. (1) is the combine form of Burgers and Huxley equations. When $\alpha = 0$, $\delta = 1$, Eq.(1) reduces into the form of Huxley equation. Huxley equation is used in nerve pulse propagation during nerve fibers and wall motion in liquid crystals [23, 25-28]. When $\beta = 0$, Eq.(1) gives us a well known form of the Burgers' equation [3, 8, 30], which has a certain role in shock wave model, sound waves in viscous medium, boundary layer characteristics and traffic flow, and its detail study was presented by Hon and Mao [8] using multi quadric radial basis function. Several methods for the solution of Generalized Burgers'-Huxley equation have been introduced in the literature including variational iteration method [3], spectral collocation method [5], adomian decomposition method [6], meshless method [14] and finite difference method [22]. In this paper, we use a recently developed method for the solution of Generalized Burgers'-Huxley equation, which is known as Optimal Homotopy Asymptotic Method [17]. This method has been successfully used for the solution of various ordinary and partial differential equations (see [2, 9-10, 12, 17-18, 21]). The main advantage of this method over other perturbation methods is that it is independent of the small parameter. This small parameter plays a very important role in determining the accuracy of the other perturbation methods as well as their validity. The exertion of the small parameter into the equation is the difficulty of perturbation methods. Therefore, it is the small parameter that greatly restricts the application of the perturbation method. Furthermore, the homotopy perturbation

method and homotopy analysis method are special cases of the optimal homotopy asymptotic method.

In the next section, we develop the proposed method for the solution of Generalized Burgers'-Huxley equation.

METHOD OF OHAM

In this section, we present the optimal homotopy asymptotic method for the solution of boundary value problem of the form

$$T\left(u(x,t)\right)+f(x,t)=0,\ x\in\Omega,\ t\geq 0, \qquad (2)$$

$$B\left(u(x,t),\ \frac{\partial u(x,t)}{\partial t}\right)=0,\ \ x\in\Gamma, \qquad (3)$$

where T is a differential operator, B is boundary operator, $u(x,t)$ is the solution of problem (2)-(3), x and t are spatial and temporal independent variables, Γ is the boundary of the Ω and $f(x,t)$ is a known analytic function. Now according to the basic formulation of OHAM, T can be split into two differential operators, say L and N such that

$$L\left(u(x,t)\right)+N\left(u(x,t)\right)+f(x,t)=0,\ \ x\in\Omega,$$

where L is the differential (linear) operator of Eq.(2) so that it is the simplest part of the differential Eq. (2) and its analytical solution is easily available. N is the differential (nonlinear) operator of Eq. (2) so that it is the complicated (remaining) part of differential Eq.(2), whose analytical solution may or may not be easily available. Let (assuming that) $u_0(x,t):\Omega\to R$ is the solution of

$$L\left(u_0(x,t)\right)+f(x,t)=0,\ B\left(u_0(x,t),\frac{\partial u_0(x,t)}{\partial t}\right)=0, \qquad (4)$$

and is continuous function. $u(x,t):\Omega\to R$ is the solution of Eq.(2), which is also continuous. Then according to OHAM, we can define a homotopy $F\left(x,t;p\right):\Omega\times[0,1]\to R$ which satisfies

$$(1-p)\left\{L\left(F(x,t;p)\right)+f(x,t)\right\}-H(p)\left\{T\left(F(x,t;p)\right)+f(x,t)\right\}=0, \qquad (5)$$

where $x\in\Omega$ and $p\in[0,1]$ is the embedding parameter, $H(p)$ is a auxiliary function for Eq.(2) such that $H(p)\neq 0$ for all $p\in(0,1)$ and $H(0)=0$. Obviously, we have at $p=0$, Eq.(5) becomes $L\left(u_0(x,t)\right)+f(x,t)=0$ and at $p=1$, Eq. (5) becomes

$$N\left(u(x,t)\right)+L\left(u(x,t)\right)+f(x,t)=0.$$

Also clearly by definition of homotopy

$$F(x,t;p)=u_0(x,t),\ \text{ at } p=0,$$

$$F(x,t;p)=u(x,t),\ \text{ at } p=1.$$

Thus, we have as p varies from 0 to 1, $F(x,t;p)$ varies (or deforms) from $u_0(x,t)$ to $u(x,t)$, where $u_0(x,t)$ is the solution of problem given in Eq.(4) which is obtained from Eq.(5) and Eq.(3) at $p=0$. Now according to OHAM, one can choose general form of the auxiliary function $H(p)$ for the differential equation such as

$$H(p)=C_1p+C_2p^2+C_3p^3+.....+C_kp^k+.... \qquad (3)$$

where $C_1,C_2,C_3,...,C_k,...$ are constants to be determined later. (4)

We want to approach to approximate solution of (2). For this, we expand $F(x,t;p,C_1,C_2...)$ in Taylor's series with respect to p as

$$F(x,t;p,C_1,C_2,...)=u_0(x,t)+\sum_{k=1}^{\infty}u_k(x,t;C_1,C_2...C_k)p^k. \qquad (6)$$

According to the value of $F(x,t;p,C_1,C_2...)$ in Eq. (6), we expand Eq.(5) and equating the coefficients of like powers of p. Then in addition, we obtained the zeroth-order problem defined in Eq. (4) and the obtained first and second order problems are defined by

$$\begin{aligned}&L(u_1(x,t))=C_1N_0(u_0(x,t)),\\ &B\left(u_1(x,t),\ \frac{\partial u_1(x,t)}{\partial t}\right)=0,\ \text{ and}\\ &L(u_2(x,t))=C_2N_0(u_0(x,t))+C_1N_1\left(u_0(x,t),u_1(x,t)\right)+(1+C_1)L\left(u_1(x,t)\right),\\ &B\left(u_2(x,t),\ \frac{\partial u_2(x,t)}{\partial t}\right)=0,\ \text{respectively.}\end{aligned} \qquad (5)$$

In general, the obtained governing kth -order problem for analytical solution $u_k(x,t)$ is defined by

$$L(u_k(x,t))=L(u_{k-1}(x,t))+C_kN_0(u_0(x,t))+\sum_{j=1}^{k-1}C_j\left[L(u_{k-j}(x,t))+N_{k-j}\left(u_0(x,t),u_1(x,t),...,u_{k-j}(x,t)\right)\right], \qquad (6)$$

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It may be noted that the solution $u_k(x,t),\ k\geq 0$ are governed by the linear equations,

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$$B\left(u_2(x,t),\frac{\partial u_2(x,t)}{\partial t}\right)=0, \text{ respectively.} \qquad (5)$$

In general, the obtained governing kth -order problem for analytical solution $u_k(x,t)$ is defined by

$$L(u_k(x,t))=L(u_{k-1}(x,t))+C_kN_0(u_0(x,t))+\sum_{j=1}^{k-1}C_j\left[L(u_{k-j}(x,t))+N_{k-j}\left(u_0(x,t),u_1(x,t),...,u_{k-j}(x,t)\right)\right], \qquad (6)$$

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$$N\left(F(x,t;p,C_1,C_2,...)\right)=N_0(u_0(x,t))+\sum_{k=1}^{\infty}N_k(u_0,u_1,.....,u_k)p^k.$$

It may be noted that the solution $u_k(x,t),\ k\geq 0$ are governed by the linear equations,

which is the simplest part of the Eq.(3) and with the linear boundary conditions that come from original problem (3), which can be easily solved. Now the interesting result of the above defined homotopy is that the series (6) is convergent at $p = 1$ so that

$$\tilde{u}(x,t;C_1,C_2,...) = u_0(x,t) + \sum_{k\geq 1} u_k(x,t;C_1,C_2,...,C_k).$$

Generally speaking, the solution of the Eq.(3) can be determined approximately in the form:

$$\tilde{u}(x,t;C_1,C_2,...) = u_0(x,t) + \sum_{k=1}^{m} u_k(x,t;C_1,C_2,...,C_k). \quad (8)$$

The residual of Eq. (3) is obtained by substituting Eq. (8) into Eq. (3), we have

$$R(x,t;C_1,C_2,..,) = T(\tilde{u}(x,t;C_1,C_2,...)) + f(x,t). \quad (9)$$

If residual $R(x,t;\ C_1,C_2...) = 0$, then $\tilde{u}(x,t;C_1,C_2,...)$ will be the exact solution of Eq. (3).

Generally, it does not happen, particularly in nonlinear differential equations. To obtain the optimal values of auxiliary constants $C_1,C_2,C_3,...$, there are many methods like Galerkin's Method, Ritz Method, Least Squares Method and Collocation Method for to find the values of $C_1,C_2,C_3,....$

The Least square method in the above announced methods, one can apply as follows:

$$J(C_1,C_2,C_3,...) = \int_0^t \int_\Omega R^2(x,t;C_1,C_2,...)dxdt ,$$

and the values of constants $C_1,C_2,C_3,...$ can be optimally identified from the following conditions

$$\frac{\partial J}{\partial C_1} = \frac{\partial J}{\partial C_2} = \frac{\partial J}{\partial C_3} = ... = 0.$$

For the values of $C_1,C_2,...$, the approximate solution $\tilde{u}(x,t;C_1,C_2,...)$ of Eq.(3) is well determined. The values of $C_1,C_2,C_3,...,C_m$ can be determined in another way (mentioned in [17] at Eq.(15)) as follows: For example, if $h_i \in \Omega,\ i = 1,2,3,...,m$ and substituting h_i into Eq.(9), we obtain the equations

$$R(h_1,C_1,C_2,...,C_m) = R(h_2,C_1,C_2,...,C_m) = ... = R(h_m,C_1,C_2,...,C_m) = 0,$$

at any time *t*.

It can be observed by the application of OHAM that the general auxiliary function $H(p)$ is useful for convergence, which depends upon the values of $C_1,C_2,C_3,...,C_k,...$ can be optimally find by one of the above announced methods and is very useful to minimize the error.

RESULTS

In this section we present the results of algorithm outlined in the previous section. The accuracy of the OHAM is measured in terms of maximum error norm L_∞ defined as:

$$L_\infty = \max_j \left|(u)_j - (\tilde{u})_j\right|,$$

where u and $\tilde{u}$ represent the exact and approximate solutions respectively.

EXAMPLE-1

We consider the Generalized Burgers'-Huxley equation [23] given in (1). The exact solitary wave solution of Eq. (1) is given by [28],

$$u(x,t) = \left(\frac{\gamma}{2} + \frac{\gamma}{2}\tanh(\omega_1(x-\omega_2 t))\right)^{\frac{1}{\delta}}, x \in \Omega, t > 0, \quad (10) \quad (9)$$

where

$$\omega_1 = \frac{-\alpha\,\delta + \delta\sqrt{\alpha^2 + 4\beta(1+\delta)}}{4(1+\delta)}\gamma \text{ and}$$

$$\omega_2 = \frac{\alpha\ \gamma}{(1+\delta)} - \frac{(1+\delta-\gamma)\left(-\alpha + \sqrt{\alpha^2 + 4\beta(1+\delta)}\right)}{2(1+\delta)},$$

α, β, δ and γ are constants so that $\beta \geq 0,\ \delta > 0$, $\gamma \in (0,1)$.

For $\Omega = [0,1]$ and $f(x,t) = 0$, the initial and boundary conditions of the Eq. (1) are given by

$$u(x,0) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1 x)\right)^{1/\delta},$$

$$u(0,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta},$$

$$u(1,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1(1-\omega_2 t))\right)^{1/\delta}.$$

Once again by OHAM formulation, one can choose L and N for Eq. (1) such as

$$L(F(x,t;p)) = \frac{\partial^2}{\partial x^2}F(x,t;p),$$

$$N(F(x,t;p)) = \beta F(x,t;p)\left(1 - F^\delta(x,t;p)\right)\left(F^\delta(x,t;p) - \gamma\right) - \frac{\partial}{\partial t}F(x,t;p) - \alpha F^\delta(x,t;p)\frac{\partial}{\partial x}F(x,t;p),$$

with initial and boundary conditions are

$$F(x,0;p) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1 x)\right)^{1/\delta}, \quad (10)$$

$$F(0,t;p) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta},$$

$$F(1,t;p) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1(1-\omega_2 t))\right)^{1/\delta}.$$

With the help of selected L and N of the Eq. (1), we can generate series of problems and first problem of this series is zeroth-order problem is defined by

$$\frac{\partial^2}{\partial x^2}u_0(x,t) = 0, \quad (11)$$

$$u_0(0,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta}, \quad (12)$$

$$u_0(1,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1(1-\omega_2 t))\right)^{1/\delta}.$$

The solution of Eqs. (11)-(12) is given by

$$u_0(x,t) = \left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta} + x\left(\left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh\left(\omega_1(\omega_2 t - 1)\right)\right)^{1/\delta} - \left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta}\right),$$

The first order problem is defined as

$$\frac{\partial^2}{\partial x^2}u_1(x,t;C_1) = C_1 N_0\left(u_0(x,t)\right) = C_1[\beta\, u_0(x,t)\left(1-{u_0}^{\delta}(x,t)\right)\left({u_0}^{\delta}(x,t)-\gamma\right) - \frac{\partial}{\partial t}u_0(x,t) - \alpha\ {u_0}^{\delta}(x,t)\frac{\partial}{\partial x}u_0(x,t)],$$

$$u_1(0,t) = 0,\ u_1(1,t) = 0.$$

Solving this first order problem, we obtain $u_1(x,\ t;C_1)$.

The second order problem is defined as

$$\frac{\partial^2}{\partial x^2}u_2(x,t;C_1,C_2) = C_2 N_0(u_0(x,t)) + C_1 N_1(u_0,u_1) + (1+C_1)L\left(u_1(x,t;C_1)\right) = C_2[\beta\ u_0(x,t)\left(1-{u_0}^{\delta}(x,t)\right)\left({u_0}^{\delta}(x,t)-\gamma\right) - \frac{\partial}{\partial t}u_0(x,t) - \alpha\ {u_0}^{\delta}(x,t)\frac{\partial}{\partial x}u_0(x,t)] + C_1[\beta\ u_1(x,t;C_1)\left(1-{u_1}^{\delta}(x,t;C_1)\right)\left({u_1}^{\delta}(x,t;C_1)-\gamma\right) - \frac{\partial}{\partial t}u_1(x,t;C_1) - \alpha\ {u_1}^{\delta}(x,t;C_1)\frac{\partial}{\partial x}u_1(x,t;C_1) + (1+C_1)\frac{\partial}{\partial x^2}u_1(x,t;C_1),\ u_2(0,t) = 0,\ \ u_2(1,t) = 0.$$

The solution of the second order problem gives $u_2(x,\ t;C_1,C_2)$.

The second order approximate solution of Eq. (1) is follow:

$$\tilde{u}(x,t;C_1,C_2) = u_0(x,t) + u_1(x,t;C_1) + u_2(x,t;C_1,C_2). \quad (13)$$

For the Residual of Eq.(1), we have

$$R(x,t;C_1,C_2) = \frac{\partial^2}{\partial x^2}\tilde{u}(x,t;C_1,C_2) + \beta\ \tilde{u}(x,t;C_1,C_2)\left(1-\tilde{u}^{\delta}(x,t;C_1,C_2)\right)\left(\tilde{u}^{\delta}(x,t;C_1,C_2)-\gamma\right) - \frac{\partial}{\partial t}\tilde{u}(x,t;C_1,C_2) - \alpha\ \tilde{u}^{\delta}(x,t;C_1,C_2)\frac{\partial}{\partial x}\tilde{u}(x,t;C_1,C_2).$$

To find the constants C_1 and C_2, we use the procedure given in the previous section, which gives the following values: $C_1 = -0.974338377203654$, $C_2 = -0.05859856342204$.

By using these values of auxiliary constants into Eq. (13), we get the second order approximate solution. The absolute errors of the second order approximate solution for various values of the parameter $\alpha, \beta, \gamma, \delta$ are reported in Tables 1 and 2. In Table 1, we have compared the results obtained by OHAM with those given in [11]. It can be noted from Table 1 that the results obtained by the present method are more accurate than those given in [11]. In Fig.1, we have shown exact and OHAM solutions corresponding to $\alpha = 1,\ \beta = 1,\ \gamma = 1,\ \delta = 1$.

Table 1: The absolute error of approximate solution by OHAM with the exact solution of Example-1 for $\alpha = \beta = \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u}\times10^3$	$u\times10^3$	$L_\infty\times10^8$	$L_\infty\times10^7$
				OHAM	ADM [11]
0.05	0.1	0.500003	0.500019	1.60	1.93
	0.5	0.500021	0.500069	4.73	1.93
	0.9	0.500101	0.500119	1.81	1.93
0.1	0.1	0.500009	0.500025	1.60	3.87
	0.5	0.500028	0.500075	4.73	3.87
	0.9	0.500107	0.500125	1.81	3.87
1	0.1	0.500121	0.500137	1.60	38.8
	0.5	0.500140	0.500187	4.73	38.8
	0.9	0.500219	0.500237	1.81	38.8
5	0.1	0.500621	0.500637	1.60	-
	0.5	0.500640	0.500687	4.73	-
	0.9	0.500719	0.500737	1.81	-
50	0.1	0.506240	0.506256	1.60	-
	0.5	0.506259	0.506306	4.73	-
	0.9	0.506338	0.506356	1.81.	-

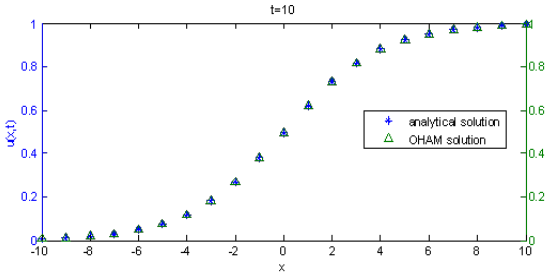

Fig. 1: Approximate and exact solution for Example-1

Table 2: The absolute error of approximate solution by OHAM with the exact solution of Example-1 for $\alpha = 0.001,\ \beta = 0.001,\ \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u}\times10^3$	$u\times10^3$	$L_\infty\times10^8$
0.005	0.1	0.500000	0.500000	2.11
	0.5	0.500003	0.500003	6.24
	0.9	0.500005	0.500005	2.39
0.01	0.1	0.500000	0.500000	2.11
	0.5	0.500003	0.500003	6.24
	0.9	0.500005	0.500005	2.39
5	0.1	0.500002	0.500002	2.11
	0.5	0.500004	0.500004	6.24
	0.9	0.500006	0.500006	2.39
50	0.1	0.500013	0.500013	2.11
	0.5	0.500015	0.500015	6.24
	0.9	0.500017	0.500017	2.39

Table 3: The absolute error of approximate solution by OHAM with the exact solution of Example-2 for $\alpha = 0,\ \beta = \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u} \times 10^3$	$u \times 10^3$	$L_\infty \times 10^8$	$L_\infty \times 10^7$
				OHAM	ADM [11]
0.05	0.1	0.500009	0.500030	2.13	1.88
	0.5	0.500038	0.500101	6.31	1.87
	0.9	0.500147	0.500172	2.41	1.87
0.1	0.1	0.500021	0.500043	2.13	3.75
	0.5	0.500050	0.500113	6.31	3.75
	0.9	0.500160	0.500184	2.41	3.75
1	0.1	0.500246	0.500268	2.13	37.5
	0.5	0.500275	0.500338	6.31	37.5
	0.9	0.500385	0.500409	2.41	37.5
5	0.1	0.501246	0.501267	2.13	-
	0.5	0.501275	0.501338	6.31	-
	0.9	0.501384	0.501408	2.41	-
50	0.1	0.512488	0.512509	2.13	-
	0.5	0.512516	0.512579	6.30	-
	0.9	0.512626	0.512650	2.41	-

EXAMPLE-2

When $\alpha = 0, \delta = 1$, Eq. (1) reduces to the Huxley equation [11-12, 23, 25]. The OHAM results at the selected points of the domain are shown in Table 3 for $\beta = 1$ and $\gamma = 0.001$.

CONCLUSION

In this paper, an optimal homotopy asymptotic method is used for the approximate solution of Generalized Burger's-Huxley equation and its variants Burgers-Huxley equation and Huxley equation. Excellent accuracy is obtained in comparison with exact solution while better accuracy than adomian decomposition method is obtained. The results exhibit that the present method can be applied for the solution of this class of partial differential equations.

In future work we intend to develop an integration of our approaches with formal specification language to develop a linkage with computer modeling. Formal methods are languages based on discrete mathematics used for many applications [31-43].

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$$u_0(0,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta}, \qquad (12)$$

$$u_0(1,t) = \left(\tfrac{\gamma}{2} + \tfrac{\gamma}{2}\tanh(\omega_1(1-\omega_2 t))\right)^{1/\delta}.$$

The solution of Eqs. (11)-(12) is given by

$$u_0(x,t) = \left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta} + x\left(\left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh\left(\omega_1(\omega_2 t - 1)\right)\right)^{1/\delta} - \left(\tfrac{\gamma}{2} - \tfrac{\gamma}{2}\tanh(\omega_1\omega_2 t)\right)^{1/\delta}\right),$$

The first order problem is defined as

$$\frac{\partial^2}{\partial x^2}u_1(x,t;C_1) = C_1 N_0\left(u_0(x,t)\right) = C_1[\beta\, u_0(x,t)\left(1-{u_0}^{\delta}(x,t)\right)\left({u_0}^{\delta}(x,t)-\gamma\right) - \frac{\partial}{\partial t}u_0(x,t) - \alpha\ {u_0}^{\delta}(x,t)\frac{\partial}{\partial x}u_0(x,t)],$$

$$u_1(0,t) = 0,\ u_1(1,t) = 0.$$

Solving this first order problem, we obtain $u_1(x,\ t;C_1)$.

The second order problem is defined as

$$\frac{\partial^2}{\partial x^2}u_2(x,t;C_1,C_2) = C_2 N_0(u_0(x,t)) + C_1 N_1(u_0,u_1) + (1+C_1)L\left(u_1(x,t;C_1)\right) = C_2[\beta\, u_0(x,t)\left(1-{u_0}^{\delta}(x,t)\right)\left({u_0}^{\delta}(x,t)-\gamma\right) - \frac{\partial}{\partial t}u_0(x,t) - \alpha\ {u_0}^{\delta}(x,t)\frac{\partial}{\partial x}u_0(x,t)] + C_1[\beta\, u_1(x,t;C_1)\left(1-{u_1}^{\delta}(x,t;C_1)\right)\left({u_1}^{\delta}(x,t;C_1)-\gamma\right) - \frac{\partial}{\partial t}u_1(x,t;C_1) - \alpha\ {u_1}^{\delta}(x,t;C_1)\frac{\partial}{\partial x}u_1(x,t;C_1)] + (1+C_1)\frac{\partial}{\partial x^2}u_1(x,t;C_1),\ u_2(0,t) = 0,\ \ u_2(1,t) = 0.$$

The solution of the second order problem gives $u_2(x,\ t;C_1,C_2)$.

The second order approximate solution of Eq. (1) is follow:

$$\tilde{u}(x,t;C_1,C_2) = u_0(x,t) + u_1(x,t;C_1) + u_2(x,t;C_1,C_2). \qquad (13)$$

For the Residual of Eq.(1), we have

$$R(x,t;C_1,C_2) = \frac{\partial^2}{\partial x^2}\tilde{u}(x,t;C_1,C_2) + \beta\ \tilde{u}(x,t;C_1,C_2)\left(1-\tilde{u}^{\delta}(x,t;C_1,C_2)\right)\left(\tilde{u}^{\delta}(x,t;C_1,C_2)-\gamma\right) - \frac{\partial}{\partial t}\tilde{u}(x,t;C_1,C_2) - \alpha\ \tilde{u}^{\delta}(x,t;C_1,C_2)\frac{\partial}{\partial x}\tilde{u}(x,t;C_1,C_2).$$

To find the constants C_1 and C_2, we use the procedure given in the previous section, which gives the following values: $C_1 = -0.974338377203654$, $C_2 = -0.05859856342204$.

By using these values of auxiliary constants into Eq. (13), we get the second order approximate solution. The absolute errors of the second order approximate solution for various values of the parameter $\alpha, \beta, \gamma, \delta$ are reported in Tables 1 and 2. In Table 1, we have compared the results obtained by OHAM with those given in [11]. It can be noted from Table 1 that the results obtained by the present method are more accurate than those given in [11]. In Fig.1, we have shown exact and OHAM solutions corresponding to $\alpha = 1,\ \beta = 1,\ \gamma = 1,\ \delta = 1$.

Table 1: The absolute error of approximate solution by OHAM with the exact solution of Example-1 for $\alpha = \beta = \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u} \times 10^3$	$u \times 10^3$	$L_\infty \times 10^8$	$L_\infty \times 10^7$
				OHAM	ADM [11]
0.05	0.1	0.500003	0.500019	1.60	1.93
	0.5	0.500021	0.500069	4.73	1.93
	0.9	0.500101	0.500119	1.81	1.93
0.1	0.1	0.500009	0.500025	1.60	3.87
	0.5	0.500028	0.500075	4.73	3.87
	0.9	0.500107	0.500125	1.81	3.87
1	0.1	0.500121	0.500137	1.60	38.8
	0.5	0.500140	0.500187	4.73	38.8
	0.9	0.500219	0.500237	1.81	38.8
5	0.1	0.500621	0.500637	1.60	-
	0.5	0.500640	0.500687	4.73	-
	0.9	0.500719	0.500737	1.81	-
50	0.1	0.506240	0.506256	1.60	-
	0.5	0.506259	0.506306	4.73	-
	0.9	0.506338	0.506356	1.81.	-

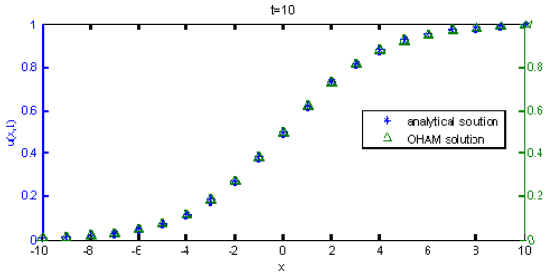

Fig. 1: Approximate and exact solution for Example-1

Table 2: The absolute error of approximate solution by OHAM with the exact solution of Example-1 for $\alpha = 0.001,\ \beta = 0.001,\ \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u} \times 10^3$	$u \times 10^3$	$L_\infty \times 10^8$
0.005	0.1	0.500000	0.500000	2.11
	0.5	0.500003	0.500003	6.24
	0.9	0.500005	0.500005	2.39
0.01	0.1	0.500000	0.500000	2.11
	0.5	0.500003	0.500003	6.24
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	0.5	0.500004	0.500004	6.24
	0.9	0.500006	0.500006	2.39
50	0.1	0.500013	0.500013	2.11
	0.5	0.500015	0.500015	6.24
	0.9	0.500017	0.500017	2.39

Table 3: The absolute error of approximate solution by OHAM with the exact solution of Example-2 for $\alpha = 0,\ \beta = \delta = 1,\ \gamma = 0.001$.

T	X	$\tilde{u} \times 10^3$	$u \times 10^3$	$L_\infty \times 10^8$	$L_\infty \times 10^7$
				OHAM	ADM [11]
0.05	0.1	0.500009	0.500030	2.13	1.88
	0.5	0.500038	0.500101	6.31	1.87
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	0.9	0.500385	0.500409	2.41	37.5
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	0.5	0.501275	0.501338	6.31	-
	0.9	0.501384	0.501408	2.41	-
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	0.5	0.512516	0.512579	6.30	-
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EXAMPLE-2

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On a class of analytic functions defined by Ruscheweyh derivative

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Abstract: The aim of this paper is to introduce a class of analytic functions defined by using generalized janowski functions and Ruscheweyh derivative. The coefficient bound, inclusion result and a radius problem has been discussed in this paper. Several known results have been deducted from our main results as special cases by assigning particular values to the different parameters.
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1. Introduction

Let A be the class of functions of the form

$$f(z) = z + \sum_{n=2}^{\infty} a_n z^n, \qquad (1.1)$$

which are analytic in the open unit disk $E = \{z : |z| < 1\}$. If f and g are analytic in E, we say that f is subordinate to g, written $f \prec g$ or $f(z) \prec g(z)$, if there exists a Schwarz function $w(z)$ in E such that $f(z) = g(w(z))$.

Let $P[A, B]$ be the class of functions h, analytic in E with $h(0) = 1$ and

$$h(z) \prec \frac{1 + Az}{1 + Bz}, \quad -1 \le B < A \le 1.$$

This class was introduced by Janowski [1]. The class $P[A, B]$ is connected with the class P of functions with positive real parts by the relation

$$h \in P[A, B] \Leftrightarrow \frac{(B-1)h - (A-1)}{(B+1)h - (A+1)} \in P. \quad (1.2)$$

Later Polatoğlu [2] defined the class $P[A, B, \alpha]$ as: Let $P[A, B, \alpha]$ be the class of functions p_1, analytic in E with $p_1(0) = 1$ and

$$p_1(z) \prec \frac{1 + \{(1-\alpha)A + \alpha B\} z}{1 + Bz}, \qquad (1.3)$$

where $-1 \le B < A \le 1$, $0 \le \alpha < 1$.

From (1.3), it can easily be seen that, $p_1 \in P[A, B, \alpha]$, if and only if, there exists $h \in P[A, B]$ such that

$$p_1(z) = (1-\alpha)h(z) + \alpha, \quad 0 \le \alpha < 1, \quad z \in E. \quad (1.4)$$

It is also noted that $P[1, -1, 0] \equiv P$, the well-known class of analytic functions in E with positive real part. Noor [3] considered the generalized class $P_k[A, B, \alpha]$ of Janowski functions which is defined as follows.

A function p is said to be in the class $P_k[A, B, \alpha]$, if and only if,

$$p(z) = \left(\frac{k}{4} + \frac{1}{2}\right) p_1(z) - \left(\frac{k}{4} - \frac{1}{2}\right) p_2(z), \quad (1.5)$$

where

$p_1, p_2 \in P[A, B, \alpha]$, $-1 \le B < A \le 1$, $k \ge 2$, and $0 \le \alpha < 1$. It is clear that $P_2[A, B, \alpha] \equiv P[A, B, \alpha]$ and $P_k[1, -1, 0] \equiv P_k$, the well-known class given and studied by Pinchuk [4].

For any two analytic functions

$$f_1(z) = \sum_{n=0}^{\infty} a_n z^n \quad \text{and} \quad f_2(z) = \sum_{n=0}^{\infty} b_n z^n \quad (z \in E),$$

the convolution (Hadamard product) of f_1 and f_2 is defined by

$$\left(f_1 * f_2\right)(z) = \sum_{n=1}^{\infty} a_n b_n z^n. \qquad (1.6)$$

Using Hadamard product, Ruscheweyh [5] introduced a linear operator $D^{\delta} : A \to A$. It is defined as

$$D^{\delta} f(z) = \frac{z}{(1-z)^{\delta+1}} * f(z) = z + \sum_{n=2}^{\infty} \varphi_n(\delta)\, a_n\, z^n, \quad (\delta > -1) \qquad (1.7)$$

with

$$\varphi_n(\delta) = \frac{(\delta+1)_{n-1}}{(n-1)!}, \qquad (1.8)$$

where $(\rho)_n$ is a Pochhammer symbol given as

$$(\rho)_n = \begin{cases} 1, & n = 0, \\ \rho(\rho+1)(\rho+2)\ldots(\rho+n-1), & n \in \mathrm{N}. \end{cases} \qquad (1.9)$$

Moreover, for $\delta \in \mathrm{N}_0 = \{0, 1, 2, \ldots\}$,

$$D^{\delta} f(z) = \frac{z\left(z^{\delta-1} f(z)\right)^{(\delta)}}{\delta!}.$$

The function $D^{\delta} f(z)$ was then called δth order Ruscheweyh derivative of f. For the application of Ruscheweyh derivative, see [6–8]. The following identity can easily be established.

$$(\delta+1) D^{\delta+1} f(z) = \delta D^{\delta} f(z) + z\left(D^{\delta} f(z)\right)'. \qquad (1.10)$$

Now using all these concepts, we define the following class.

Definition 1.1. A function $f \in A$ is in the class $\mathcal{V}_k^{\delta}[A, B, \alpha, b]$, if and only if ,

$$\left(1 - \frac{2}{b} + \frac{2}{b}\frac{D^{\delta+1} f(z)}{D^{\delta} f(z)}\right) \in P_k[A, B, \alpha], \quad z \in E,$$

where $k \geq 2$, $\delta > -1$, $-1 \leq B < A \leq 1$, $0 \leq \alpha < 1$ and $b \in \mathrm{C} - \{0\}$.

Assigning certain values to different parameters, we have different well-known classes of analytic functions as can be seen below.

Special cases

(i) $\mathcal{V}_k^{\delta}[1, -1, \alpha, b] \equiv \mathcal{V}_k(\alpha, b, \delta)$, the well-known class defined by Latha and Nanjunda Rao in [9].

(ii) $\mathcal{V}_2^{1}[A, B, \alpha, 1] \equiv C[A, B, \alpha]$, $\mathcal{V}_2^{0}[A, B, \alpha, 2] \equiv S^*[A, B, \alpha]$, the well-known class defined by Polatoğlu [2].

(iii) $\mathcal{V}_k^{1}[A, B, 0, 1] \equiv V_k[A, B]$, $\mathcal{V}_2^{0}[A, B, 0, 2] \equiv R_k[A, B]$, where $V_k[A, B]$ and $R_k[A, B]$ denote the class of janowski functions with bounded boundary and bounded radius rotations respectively, given by Noor [10].

For the detail on the subject of functions of bounded boundary rotation, Janowski functions and related topics, we refer the work of Noor et.al [11] and Arif et.al [12].

2. Preliminary Results

We need the following results to obtain our main results.

Lemma 2.1. Let $p(z) = 1 + \sum_{n=1}^{\infty} q_n z^n \in P_k[A, B, \alpha]$. Then, for all $n \geq 1$,

$$|q_n| \leq \frac{k(A-B)(1-\alpha)}{2}. \qquad (2.1)$$

This inequality is sharp.

The proof follows from (1.4), (1.5) and the coefficient bound of $h \in P[A, B]$ given by Aouf [13].

Lemma 2.2 [14]. Let $u = u_1 + iu_2$, $v = v_1 + iv_2$ and $\psi(u, v)$ be a complex valued function satisfying the conditions:

(i) $\psi(u, v)$ is continuous in a domain $D \subset \mathbb{C}^2$,

(ii) $(1, 0) \in D$ and $\mathrm{Re}\,\psi(1, 0) > 0$,

(iii) $\mathrm{Re}\,\psi(iu_2, v_1) \leq 0$, whenever $(iu_2, v_1) \in D$ and $v_1 \leq -\frac{1}{2}(1 + u_2^2)$.

If $h(z) = 1 + c_1 z + \cdots$ is a function analytic in E such that $(h(z), zh'(z)) \in D$ and $\mathrm{Re}\,\psi(h(z), zh'(z)) > 0$ for $z \in E$, then $\mathrm{Re}\,h(z) > 0$ in E.

Lemma 2.3. Let $p \in P_k[A, B, 0]$ with $k \geq 2$.

Then, for $|z| = r < 1$,

$$\frac{2-(A-B)kr-2ABr^2}{2\left(1-B^2r^2\right)} \le \operatorname{Re} p(z) \le |p(z)| \le \frac{2+(A-B)kr-2ABr^2}{2\left(1-B^2r^2\right)}. \quad (2.2)$$

The proof is immediate by using (1.5) and the growth result of $h \in P[A,B]$, see [15].

Lemma 2.4. Let $p \in P_k[A,B,0]$ with $k \ge 2$. Then, for $|z| = r < 1$,

$$|zp'(z)| \le \frac{r\left\{\begin{matrix}(A-B)k-4B(A-B)r\\ +B^2(A-B)kr^2\end{matrix}\right\}\operatorname{Re} p(z)}{\left(1-B^2r^2\right)\left(2+(A-B)kr-2ABr^2\right)}. \quad (2.3)$$

The result follows directly by using Lemma 2.3.

3. Main Results

Theorem 3.1. Let $f \in V_k^{\delta}[A,B,\alpha,b]$ with $-1 \le B < A \le 1$, $\delta > -1$, $b \in C - \{0\}$, $0 \le \alpha < 1$. Then

$$|a_n| \le \frac{(\sigma)_{n-1}}{(n-1)!\varphi_n(\delta)}, \quad \forall\, n \ge 2, \quad (3.1)$$

where $\sigma = \dfrac{k|b|(A-B)(1-\alpha)(\delta+1)}{4}$ and $\varphi_n(\delta)$ is given by (1.8).
This result is sharp.

Proof. Set

$$1-\frac{2}{b}+\frac{2}{b}\frac{D^{\delta+1}f(z)}{D^{\delta}f(z)} = p(z), \quad (3.2)$$

so that $p \in P_k[A,B,\alpha]$. Let $p(z) = 1+\sum_{n=1}^{\infty} q_n z^n$. Then (3.2) can be written as

$$2\left(D^{\delta+1}f(z)-D^{\delta}f(z)\right) = bD^{\delta}f(z)\sum_{n=1}^{\infty} q_n z^n,$$

which implies that

$$\frac{2\varphi_n(\delta)(n-1)a_n}{(\delta+1)} = b\left(\begin{matrix}q_{n-1}+\varphi_2(\delta)\ a_2\ q_{n-2}+\\ \cdots+\varphi_{n-1}(\delta)\ a_{n-1}\ q_1\end{matrix}\right).$$

Using Lemma 2.1 , we obtain

$$|a_n| \le \frac{k|b|(A-B)(1-\alpha)(\delta+1)}{4(n-1)\varphi_n(\delta)}\left(\begin{matrix}1+\varphi_2(\delta)\ |a_2|+\cdots\\ +\varphi_{n-1}(\delta)\ |a_{n-1}|\end{matrix}\right) = \frac{\sigma}{(n-1)\varphi_n(\delta)}\left(1+\sum_{i=2}^{n-1}\varphi_i(\delta)\ |a_i|\right).$$

For $n = 2$, $|a_2| \le \dfrac{\sigma}{\varphi_2(\delta)} = \dfrac{(\sigma)2-1}{(2-1)!\varphi_2(\delta)}$.

Therefore (3.1) holds for $n = 2$.
Assume that (3.1) is true for $n = m$ and consider

$$|a_{m+1}| \le \frac{\sigma}{m\,\varphi_{m+1}(\delta)}\left(1+\sum_{i=2}^{m}\varphi_i(\delta)\ |a_i|\right)$$

$$\le \frac{\sigma}{m\,\varphi_{m+1}(\delta)}\left(1+\sum_{i=2}^{m}\frac{(\sigma)_{i-1}}{(i-1)!}\right)$$

$$= \frac{\sigma}{m\,\varphi_{m+1}(\delta)}\left(1+\sum_{i=2}^{m}\sigma\prod_{j=1}^{i-1}\left(1+\frac{\sigma}{j}\right)\right)$$

$$= \frac{\sigma}{m\,\varphi_{m+1}(\delta)}\prod_{j=1}^{m-1}\left(1+\frac{\sigma}{j}\right)$$

$$= \frac{(\sigma)_m}{(m)!\,\varphi_{m+1}(\delta)}.$$

Therefore, the result is true for $n = m+1$. Using mathematical induction, (3.1) holds true for all $n \ge 2$.

This result is sharp for $\delta > -1$, $0 \le \alpha < 1$, $b \in C - \{0\}$ and $k \ge 2$ as can be seen from the functions $f_0(z)$ which are given as

$$1-\frac{2}{b}+\frac{2}{b}\frac{D^{\delta+1}f_0(z)}{D^{\delta}f_0(z)} = (1-\alpha)\left[\begin{matrix}\left(\frac{k}{4}+\frac{1}{2}\right)\frac{1+Az}{1+Bz}\\ -\left(\frac{k}{4}-\frac{1}{2}\right)\frac{1-Az}{1-Bz}\end{matrix}\right]+\alpha.$$

For different values of A, B, α, b and δ, we obtain the following results [16].

Corollary 3.2. If $f \in V_k^0[1,-1,\alpha,2] = R_k(\alpha)$, then

$$|a_n| \le \frac{(k(1-\alpha))_{n-1}}{(n-1)!}, \quad \forall\, n \ge 2.$$

This result is sharp.

Corollary 3.3. If $f \in V_k^1[1,-1,\alpha,1] = V_k(\alpha)$, then

$$|a_n| \le \frac{(k(1-\alpha))_{n-1}}{n!}, \quad \forall\, n \ge 2.$$

This result is sharp.

Theorem 3.4. For real $b > 0$,

$$V_k^{\delta+1}[A,B,\alpha,b] \subseteq V_k^{\delta}[1,-1,\beta,b+1], \quad z \in E,$$

where $\beta\,(0 \le \beta < 1)$ is one of the roots of

$$\begin{aligned} &\lambda_1\lambda_2 b^2(\delta+2)^2(1-\alpha)^2 \\ &-b(\delta+2)(1-\alpha)[\lambda_1(B+1)+\lambda_2(B-1)] \\ &+(B^2-1)=0, \end{aligned} \tag{3.3}$$

where

$$\lambda_1 = \frac{(1-b)+\beta(1+b)}{(1+b)(1-\beta)}[\Delta(B-1)-(A-1)], \tag{3.4}$$

$$\lambda_2 = \frac{(1-b)+\beta(1+b)}{(1+b)(1-\beta)}[\Delta(B+1)-(A+1)] \tag{3.5}$$

and

$$\Delta = 1 - \frac{(1+b)(\delta+1)(1-\beta)}{b(\delta+2)(1-\alpha)}.$$

Proof. Suppose $f \in V_k^{\delta+1}[A,B,\alpha,b]$ and set

$$p(z) = 1 - \frac{2}{b+1} + \frac{2}{b+1}\frac{D^{\delta+1}f(z)}{D^{\delta}f(z)}. \tag{3.6}$$

where p is analytic in E with $p(0)=1$. Then, by simple computations together with (3.6) and (1.10) yield

$$1 - \frac{2}{b} + \frac{2}{b}\frac{D^{\delta+2}f(z)}{D^{\delta+1}f(z)} = (1-\mu_1) + \mu_1\left[p(z) + \frac{\mu_2\, zp'(z)}{p(z)+\mu_3}\right], \tag{3.7}$$

where $\mu_1 = \frac{\delta+1}{\delta+2}\frac{b+1}{b}$, $\mu_2 = \frac{2}{(\delta+1)(b+1)}$, $\mu_3 = \frac{2}{b+1} - 1$.

Since $f \in V_k^{\delta+1}[A,B,\alpha,b]$, it follows that

$$(1-\mu_1) + \mu_1\left[p(z) + \frac{\mu_2\, zp'(z)}{p(z)+\mu_3}\right] \in P_k[A,B,\alpha],$$

or, equivalently

$$\frac{(1-\alpha-\mu_1)}{1-\alpha} + \frac{\mu_1}{1-\alpha}\left[p(z) + \frac{\mu_2\, zp'(z)}{p(z)+\mu_3}\right] \in P_k[A,B]. \tag{3.8}$$

Define

$$\varphi(z) = \frac{1}{(1+\mu_3)}\frac{z}{(1-z)^{\mu_2}} + \frac{\mu_3}{(1+\mu_3)}\frac{z}{(1-z)^{\mu_2+1}},$$

and by using convolution techniques given by Noor [3], we have

$$p(z) + \frac{\mu_2\, zp'(z)}{p(z)+\mu_3} = \left(\frac{k}{4}+\frac{1}{2}\right)\left(p_1(z) + \frac{\mu_2\, zp_1'(z)}{p_1(z)+\mu_3}\right)$$

$$-\left(\frac{k}{4}-\frac{1}{2}\right)\left(p_2(z) + \frac{\mu_2\, zp_2'(z)}{p_2(z)+\mu_3}\right).$$

By using (3.8), we see that

$$\frac{(1-\alpha-\mu_1)}{1-\alpha} + \frac{\mu_1}{1-\alpha}\left[p_i(z) + \frac{\mu_2\, zp_i'(z)}{p_i(z)+\mu_3}\right] \in P[A,B],$$

where $z \in E$, $i = 1,2$.

Now, we want to show that $p_i \in P[A,B,\beta]$, where $\beta\,(0 \le \beta < 1)$ is one of the root of (3.3).

Let

$$p_i(z) = (1-\beta)h_i(z) + \beta, \quad i = 1,2.$$

Then

$$\frac{1-\alpha-\mu_1(1-\beta)}{1-\alpha} + \frac{\mu_1(1-\beta)}{1-\alpha}\left[h_i(z) + \frac{\frac{\mu_2}{(1-\beta)}\, zh_i'(z)}{h_i(z) + \frac{\mu_3+\beta}{(1-\beta)}}\right] \in P[A,B].$$

Using the fact illustrated in (1.2), we have

$$\left\{\begin{array}{l}(B-1)\left[\begin{array}{l}(\lambda+\mu h_i(z))(h_i(z)+\omega_2)\\ +\omega_1\mu z h_i'(z)\end{array}\right]\\ -(A-1)(h_i(z)+\omega_2)\end{array}\right\} \in P,$$

$$\left\{\begin{array}{l}(B+1)\left[\begin{array}{l}(\lambda+\mu h_i(z))(h_i(z)+\omega_2)\\ +\omega_1\mu z h_i'(z)\end{array}\right]\\ -(A+1)(h_i(z)+\omega_2)\end{array}\right\}$$

where $\omega_1 = \frac{\mu_2}{1-\beta}$, $\omega_2 = \frac{\mu_3+\beta}{1-\beta}$, $\lambda = \frac{1-\alpha-\mu_1(1-\beta)}{1-\alpha}$ and $\mu = \frac{\mu_1(1-\beta)}{1-\alpha}$. We now form the functional $\psi(u,v)$ by choosing $u = h_i(z)$, $v = zh_i'(z)$ and note that the first two conditions of Lemma 2.2 are clearly satisfied. We check condition (iii) as follows.

$$\psi(u,v) = \frac{\left\{\begin{array}{l}(B-1)\left[(\lambda+\mu u)(u+\omega_2)+\omega_1\mu v\right]\\ -(A-1)(u+\omega_2)\end{array}\right\}}{\left\{\begin{array}{l}(B+1)\left[(\lambda+\mu u)(u+\omega_2)+\omega_1\mu v\right]\\ -(A+1)(u+\omega_2)\end{array}\right\}}$$

$$= \frac{\left\{\begin{array}{l}\lambda_1+\omega_1\mu(B-1)v\\ +\left[(\lambda+\mu(u+\omega_2))(B-1)-(A-1)\right]u\end{array}\right\}}{\left\{\begin{array}{l}\lambda_2+\omega_1\mu(B+1)v\\ +\left[(\lambda+\mu(u+\omega_2))(B+1)-(A+1)\right]u\end{array}\right\}},$$

where $\lambda_1 = \omega_2\left[\lambda(B-1)-(A-1)\right]$ and $\lambda_2 = \omega_2\left[\lambda(B+1)-(A+1)\right]$. Now

$$\psi(iu_2, v_1) = \frac{\left\{\begin{array}{l}\lambda_1+\mu\left(\omega_1 v_1 - u_2^2\right)(B-1)\\ +\left[(\lambda+\mu\omega_2)(B-1)-(A-1)\right]iu_2\end{array}\right\}}{\left\{\begin{array}{l}\lambda_2+\mu\left(\omega_1 v_1 - u_2^2\right)(B+1)\\ +\left[(\lambda+\mu\omega_2)(B+1)-(A+1)\right]iu_2\end{array}\right\}}.$$

Taking real part of $\psi(iu_2, v_1)$, we have

$$\mathrm{Re}\,\psi(iu_2, v_1) = \frac{\left[-\lambda_1+\mu\left(\omega_1 v_1 - u_2^2\right)(1-B)\right]\left[\lambda_2+\mu\left(\omega_1 v_1 - u_2^2\right)(B+1)\right] - \left[(\lambda+\mu\omega_2)(B-1)-(A-1)\right]\left[(\lambda+\mu\omega_2)(B+1)-(A+1)\right]u_2^2}{-\left[\lambda_2+\mu\left(\omega_1 v_1 + u_2\right)(B+1)\right]^2 - \left[(\lambda+\mu\omega_2)(B+1)-(A+1)\right]^2 u_2^2}.$$

As $\omega_1 > 0$, $\mu > 0$, so applying $v_1 \le -\frac{1}{2}\left(1+u_2^2\right)$ and after a little simplification, we have

$$\mathrm{Re}\,\psi(iu_2, v_1) \le \frac{A_1 + B_1 u_2^2 + C_1 u_2^4}{D_1}, \qquad (3.9)$$

where

$$A_1 = \frac{1}{4}\left[2\lambda_1 - \omega_1\mu(B-1)\right]\left[2\lambda_2 - \omega_1\mu(B+1)\right],$$

$$B_1 = -\frac{1}{2}\mu(\omega_1+2)\left[\begin{array}{l}\lambda_1(B+1)-\omega_1\mu\left(B^2-1\right)\\ +\lambda_2(B-1)\end{array}\right] + (\lambda+\mu\omega_2)^2\left(B^2-1\right) - 2(\lambda+\mu\omega_2)(AB-1) + \left(A^2-1\right),$$

$$C_1 = -\frac{1}{4}\mu^2\left(1-B^2\right)(\omega_1+2)^2,$$

and

$$D_1 = \left[\lambda_2 + \mu(\omega_1 v_1 + u_2)(B+1)\right]^2 + \left[(\lambda+\mu\omega_2)(B+1)-(A+1)\right]^2 u_2^2.$$

The right hand side of (3.9) is negative if $A_1 \le 0$ and $B_1 \le 0$. From $A_1 \le 0$, we have β to be one of the roots of

$$\lambda_1\lambda_2 b^2(\delta+2)^2(1-\alpha)^2 - b(\delta+2)(1-\alpha)\left[\lambda_1(B+1)+\lambda_2(B-1)\right] + \left(B^2-1\right) = 0$$

with $0 \le \beta < 1$ and also for $0 \le \beta < 1$, we have $B_1 \le 0$.

Since all the conditions of Lemma 2.2 are satisfied, it follows that $h_i \in P$, $i = 1, 2$ and consequently $p \in P_k[1, -1, \beta]$. Hence from (3.6),

$$f \in V_k^{\delta}[1, -1, \beta, b+1].$$

By choosing the parameters $A = 1$, $B = -1$, $b = 1$ and $\delta = 0$, we obtain the following known result, proved in [17].

Corollary 3.5. Let $f \in V_k(\alpha)$. Then $f \in R_k(\beta)$, where β is a root of

$$2\beta^2 - (2\alpha-1)\beta - 1 = 0 \text{ with } 0 \le \beta < 1,$$

which is

$$\beta = \frac{1}{4}\left[(2\alpha - 1) + \sqrt{4\alpha^2 - 4\alpha + 9}\right].$$

For $\alpha = 0$, $k = 2$ in Corollary 3.5, we have the following well known result [18].

$$V_2(0) = C \subseteq R_2\left(\frac{1}{2}\right) = S^*\left(\frac{1}{2}\right), \text{ for } z \in E.$$

Theorem 3.6. Let $f \in V_k^{\delta}[A, B, 0, b]$, $\delta > -1$, $b > 0$ (real), $k \geq 2$ and $0 < a = \frac{b(\delta+1)}{2} \leq 1$. Then $D^{\delta} f(z)$ maps $|z| < r_0$ onto a convex domain, where r_0 is the least positive root of the equation

$$a_1 r^4 + a_2 r^3 + a_3 r^2 + a_4 r + 4(2a - 1) = 0 \text{ with } 0 \leq r < 1, \tag{3.10}$$

where

$$a_1 = 4a^2 A^2 B^2 - 4(a-1)^2 B^4,$$

$$a_2 = 2a(2a-1)(B-A)B^2 k,$$

$$a_3 = 8a^2(a-2) + 8a(1-a)AB - a^2(A-B)^2 k^2,$$

and

$$a_4 = 2a(2a-3)(A-B)k.$$

This result is sharp.

Proof. Since $f \in V_k^{\delta}[A, B, 0, b]$, then

$$\frac{D^{\delta+1} f(z)}{D^{\delta} f(z)} = \frac{b(p(z) - 1) + 2}{2}, \tag{3.11}$$

where $p \in P_k[A, B, 0]$. Using the identity (1.10), we have from (3.11),

$$\frac{z\left(D^{\delta} f(z)\right)'}{D^{\delta} f(z)} = \frac{b(p(z) - 1)(\delta + 1) + 2}{2}. \tag{3.12}$$

Logarithmic differentiation of (3.12) yields

$$\frac{\left(z\left(D^{\delta} f(z)\right)'\right)'}{\left(D^{\delta} f(z)\right)'} = ap(z) - a + 1 + \frac{zp'(z)}{p(z) - 1 + \frac{1}{a}},$$

where $a = \frac{b(\delta+1)}{2}$. Then, we have

$$\operatorname{Re}\left(1 + \frac{z\left(D^{\delta} f(z)\right)''}{\left(D^{\delta} f(z)\right)'}\right) \geq a \operatorname{Re} p(z) + (1 - a) - \frac{|zp'(z)|}{\left|p(z) - 1 + \frac{1}{a}\right|},$$

and hence, by using Lemma 2.3 and Lemma 2.4 ,

$$\operatorname{Re}\left(1 + \frac{z\left(D^{\delta} f(z)\right)''}{\left(D^{\delta} f(z)\right)'}\right)$$

$$\geq \operatorname{Re} p(z)\left\{a + \frac{2(1-a)(1-B^2 r^2)}{2 + (A-B)kr - 2ABr^2}\right.$$

$$\left. - \frac{2ar\left\{(A-B)k - 4B(A-B)r + B^2(A-B)kr^2\right\}}{\left(2 + (A-B)kr - 2ABr^2\right)\xi}\right\}$$

$$= \operatorname{Re} p(z)\left\{\frac{a_1 r^4 + a_2 r^3 + a_3 r^2 + a_4 r + 4(2a-1)}{\left(2 + (A-B)kr - 2ABr^2\right)\xi}\right\} > 0,$$

provided

$$T(r) = a_1 r^4 + a_2 r^3 + a_3 r^2 + a_4 r + 4(2a - 1) > 0,$$

where

$$a_1 = 4a^2 A^2 B^2 - 4(a-1)^2 B^4,$$

$$a_2 = 2a(2a-1)(B-A)B^2 k,$$

$$a_3 = 8a^2(a-2) + 8a(1-a)AB - a^2(A-B)^2 k^2,$$

$$a_4 = 2a(2a-3)(A-B)k,$$

and

$$\xi = 2(2a-1) - a(A-B)kr + 2\left(B^2 - a(A+B)B\right)r^2.$$

We have $T(0) > 0$ and $T(1) < 0$. Therefore, $D^{\delta} f(z)$ maps $|z| < r_0$ onto a convex domain, where r_0 is the least positive root of the equation $T(r) = 0$, lying in $(0,1)$.

For $D^{\delta} f_1(z)$ such that

$$\frac{D^{\delta+1} f_1(z)}{D^{\delta} f_1(z)} = \frac{b(p_k(z) - 1) + 2}{2},$$

where $p_k(z) = \frac{2 + (A-B)kz - 2ABz^2}{2(1 - B^2 z^2)}$, we have

$$\frac{\left(z\left(D^{\delta}f_1(z)\right)'\right)'}{\left(D^{\delta}f_1(z)\right)'} = \frac{a_1r^4 + a_2r^3 + a_3r^2 + a_4r + 4(2a-1)}{\left(2+(A-B)kr - 2ABr^2\right)\xi} = 0,$$

for $z = r_0$. Hence this radius r_0 is sharp.

By choosing the parameters $A = 1,\ B = -1,\ k = 2,$ $b = 2$ and $\delta = 0,$ we obtain the following known result, see [18].

Corollary 3.7. Let $f \in S^*$. Then f maps $|z| < r_0$ onto a convex domain, where r_0 is the least positive root of the equation

$$r^4 - 2r^3 - 6r^2 - 2r + 1 = 0 \text{ with } 0 \le r < 1,$$

which is $r_0 = 2 - \sqrt{3}$. This is also sharp.

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Cognitive Function after Coronary Artery Bypass Graft Surgery: A Prospective Study in Northern Iran

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Abstract: Neurocognitive dysfunction is still considered as a well-recognized complication of coronary artery bypass graft (CABG) surgery. Cognitive decline after cardiac surgery is frequent. However, its reported incidence varies widely. The aim of this study was to evaluate cognitive function of patients after CABG surgery in Mazandaran Heart Center, Sari, northern Iran. In a cross-sectional study from September 2011 to April 2012, a total of 161 consecutive cases of elective CABG at Mazandaran Heart Center were included. Cognitive brain function of eligible individuals was evaluated by the Mini Mental State Examination (MMSE) before CABG and at 10-day and 2-month follow-up. The results were analyzed using repeated measures analysis of variance, Pearson's correlation test, and linear regression analysis. Out of 161 patients, 98 were male (60.9 %) and 63 were female (39.1%). The mean age of patients was 58.83 ± 8.02 years. The mean total scores of MMSE before CABG surgery and 10 and 60 days after it were 25.42, 24.89, and 25.48 respectively ($P < 0.001$). Scores of two areas of cognitive function, i.e. orientation (at 10 days and 2 months after surgery) and language-praxis (at 10 days after surgery) decreased significantly in patients ($P < 0.05$). MMSE scores 10 days after CABG surgery were significantly related with age and blood transfusion ($P < 0.05$). This study highlighted the incidence of early (10 days after surgery) cognitive dysfunction in patients undergoing CABG surgery. It also suggested cognitive function to be correlated with age and blood transfusion. Therefore, interventions for prevention or reduction of this complication after CABG are warranted.

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1. Introduction

Coronary artery bypass graft (CABG) surgery is one of the most expensive and frequently performed surgical procedures in the world. It intends to treat ischemic heart disease and reduce angina pectoris (1-3). Despite technological advances in the surgical procedure, anesthesia, and cardiopulmonary bypass (CPB) which resulted in a steady decrease in the mortality and morbidity associated with these procedures over the past four decades, neurocognitive dysfunction is still recognized as a well-recognized complication of CABG (4,5). Cognitive decline is a frequent complication after cardiac surgery whose reported incidence varies widely. Its incidence rate has been estimated as 50-80% at discharge, 20-50% at 6 weeks, and 10-30% at 6 months after operation (5-9). Intraoperative cerebral microembolism and hypoperfusion have been proposed as the two major mechanisms involved in the occurrence of cognitive dysfunction after cardiac surgery (6). Neurocognitive dysfunction after CABG is associated with reduced quality of life and can threaten a patient's independence, work performance and daily living skills after hospital discharge. It can also increase the

demand for healthcare resources (10). In spite of the importance of cognitive dysfunction and its consequences, few studies have been carried out in this regard so far. Therefore, this study was conducted to evaluate cognitive function in patients undergoing CABG surgery in Mazandaran Heart Center, Sari, northern Iran.

2. Material and Methods

In a cross-sectional study from September 2011 to April 2012, a total of 161 consecutive cases of elective CABG at Mazandaran Heart Center entered the study. After the approval of the Ethics Committee of Mazandaran University of Medical Sciences, informed consents were obtained from 161 patients who aged 20-70 years old and were scheduled for elective CABG using CPB (cardiopulmonary bypass). The exclusion criteria were other simultaneous cardiac surgeries (e.g. valve replacement), symptomatic cerebrovascular disease, alcoholism (more than 2 drinks/day), psychiatric illnesses (any clinical diagnosis requiring therapy), drug abuse (any illicit drug abuse in the previous three months), hepatic insufficiency (liver function tests > 1.5 times the upper limit of normal), severe pulmonary insufficiency (requiring home oxygen therapy), renal failure (serum creatinine > 2 mg/dl), reluctance to do cognitive test performance, previous heart surgery, and preoperative left ventricular ejection fraction (LVEF) < 30%. In addition, only patients who completed the 2-month follow-up were included.

All patients received standardized anesthesia. They were premedicated with promethazine (25 mg) and morphine (5 mg) intramuscular injections one hour before entering the operating room. In all cases, anesthesia was based on moderate doses of fentanyl (20-30 µg/kg) and midazolam (0.05-0.15 mg/kg) supplemented with isoflurane (< 1%) or propofol (2.5-4.0 mg/kg/h) during CPB. Muscle relaxation was maintained with cisatracurium. Median sternotomy was performed in all patients and CPB was instituted through cannulation of the ascending aorta and the right atrium. Aortic palpation was used to detect atherosclerosis and, if present, to select an appropriate site for cannulation and clamping. In all patients, a blood based St. Thomas' Hospital cardioplegic solution was used at 12°C for myocardial protection. Distal coronary anastomoses were completed with the proximal aorta cross-clamped and the heart arrested. For proximal aortic anastomoses, the aorta was partially clamped while the heart was beating. The CPB circuit included a roller pump (Stockert Instruments, Munich, Germany), a hollow fiber membrane oxygenator (Medtronic Inc, Minneapolis, MN, USA), and an arterial filter with a 34-µm screen (Medtronic Inc.). Moderate hypothermia (32°C) was used during CPB. During rewarming, the maximum allowed blood temperature (at the heat exchanger) was 37.5°C and the maximum allowed nasopharyngeal temperature was 37°C. The warming rate was approximately 1°C and the core temperature increased per 3-5 minutes during the bypass time. Perfusion was non-pulsatile with indexed flows set at 2.4 L/m/min during cooling and rewarming and at 2.0 L/m/min during stable CPB. The mean arterial blood pressure was maintained between 60 and 80 mmHg. Alpha-stat acid-base management was used for all patients.

Cognitive brain function was evaluated before CABG and at 10-day and two-month follow-up using the Mini Mental State Examination (MMSE) or Folstein test. The test comprised five areas of cognitive functions and was applied individually for each patient by an experienced and well-educated nurse. MMSE was also used to estimate the severity of cognitive impairment at a given point of time and to follow the course of cognitive changes in an individual over time. The five areas of the test were orientation (10 points), registration (3 points), attention and calculation (5 points), recall (3 points), and language and praxis (9 points). The maximum score was 30 and scores greater than or equal to 25 were considered as normal (intact). Scores ≤ 9, 10-20, and 21-24 indicated severe, moderate, and mild cognitive impairment, respectively (11). This test has been previously used by Iranian researchers on patients undergoing CABG surgery (12, 13).

Statistical analyses were performed with SPSS software (Statistical Package for Social Sciences, version 16.0, SSPS Inc., Chicago, IL, USA). Differences between preoperative neurocognitive scores and scores on the 10^{th} and 60^{th} days after the operation were tested by repeated measures analysis of variance. Pearson's correlation test and linear regression analysis were used to evaluate the relationships between variables and MMSE scores 10 days after the surgery. The statistical significance was set at a $P < 0.05$.

3. Results

Out of 161 patients, 98 were male (60.9%) and 63 were female (39.1%). The mean age of patients was 58.83 ± 8.02 years (range: 44-70). The mean LVEF was 48.68 ± 7.37%. In addition, 15 subjects (71.4%) had hypertension and 65 (40.4%) had diabetes mellitus. Other baseline and clinical characteristics are shown in Table 1.

Table 1. Basic and clinical characteristics of patients

Variable	Mean ± SD	95% confidence interval
Body mass index (kg/m^2)	26.1 ± 4.7	18.7-39.3
Serum creatinine (mg/dL)	1.01 ± 0.24	0.60-1.96
Intubation time (hour)	7.33 ± 2.60	4.10-22.00
Cardiopulmonary bypass time (min)	81.5 ± 17.4	44.0-150.0
Cross-clamp time (min)	42.6 ± 10.3	26.0-91.0
Minimum hemoglobin (g/dL)	7.6 ± 1.1	5.1-10.5
Minimum temperature (°C)	30.7 ± 1.5	28.0-34.0
Minimum mean arterial pressure (mmHg)	50.5 ± 6.1	37.0-75.0

The mean total score and scores of all five areas of MMSE at baseline and 10 and 60 days after the surgery are shown in Table 2.

Table 2. The mean total scores and scores of the five areas of Mini Mental State Examination at baseline and 10 and 60 days after coronary artery bypass graft surgery

Test	Baseline	10th day	60th day	P
Orientation (10 points)	8.95	8.78	8.86	**0.045**
Registration (3 points)	2.99	2.97	2.98	0.640
Attention and calculation (5 points)	2.53	2.50	2.54	0.720
Recall (3 points)	2.97	2.95	2.98	0.550
Language and praxis (9 points)	8.19	8.06	8.22	**0.001**
Total (30 points)	25.42	24.89	25.48	**< 0.001**

As shown in Table 2, there were significant differences between the mean total scores of MMSE at baseline and on the 10th and 60th postoperative days (P < 0.0001). Moreover, scores of orientation and language-praxis significantly decreased as time passed (P < 0.05). Pearson correlation coefficient showed statistically significant negative correlations between MMSE scores on the 10th day and age (r = -0.26; P = 0.001) and blood transfusion (r = -0.25; P = 0.001). Based on the adjusted regression model, every one-year increase in age was associated with 0.13 reduction in the MMSE score (on average) (95% confidence interval: -0.21 to -0.05; P = 0.002). On the other hand, every one-unit increase in blood transfusion decreased the MMSE score by 1.14 (95% confidence interval: -1.55 to -0.04; P = 0.03) (Table 3).

Table 3. Linear regression analysis of Mini Mental State Examination (MMSE) scores on the 10th day after coronary artery bypass graft surgery

Linear regression	Crude model			Adjusted Model		
Variable	**B**	**P**	**95% confidence interval**	**B**	***P***	**95% confidence interval**
Age (years)	-1.5	0.001	-0.24 to -0.06	-0.13	0.002	-0.21 to -0.05
Blood transfusion (units)	-1.38	0.001	-2.19 to -0.56	-1.14	0.030	-1.55 to -0.04

Variables were analyzed using mixed linear regression models with MMSE scores on the 10th postoperative day as a random effect with adjustment for age, sex, and blood transfusion.

4. Discussions

The results of this study demonstrated that cognitive function of patients after CABG surgery in our institution had significantly differences before, after 10 days and 2 month after surgery. In fact, the mean total MMSE score apparently decreases 10 days after the surgery. Previous studies have suggested that cognitive dysfunction after CABG occurred in 3-80% of patients (5,8,14). In our study, the mean preoperative total score of MMSE was 25.42 which was categorized as normal cognitive function. Farhudi et al. reported the mean total scores of MMSE before and after surgery as 23.82 and 24.52, respectively (12). The results of our study showed that cognitive function of patients apparently decreases 10 days after CABG surgery. Likewise, Kadoi et al. reported that 7 days after CABG surgery, cognitive impairment occurred in 55% of patients without diabetes mellitus and in 68% of patients with diabetes mellitus (15). Farhoudi et al. compared the impacts of on-pump and off-pump CABG on neurocognitive impairment in low risk patients. Based on MMSE scores, cognitive impairment was detected in 21.2% of the cases in the on-pump group and 23.1% of the off-pump (16). In a retrospective, descriptive, cross-sectional study, Hassani et al. evaluated the documents of 514 patients with neurologic complication after open heart surgery. They found that cognitive disorders had developed in 12 patients (2.33%) (17). Adverse neurological outcomes of cardiac surgery are the result of damage to the brain, spinal cord, or peripheral nerves. Central nervous system injury ranges in severity from subtle changes in personality, behavior, and cognitive function to fatal brain injury (18). Taban et al. used MMSE to compare cognitive dysfunction in elderly patients before and after surgeries. As they reported, cognitive dysfunction occurred in 29.1% of the participants (19). Boodhwani et al. indicated that 59% of patients developed cognitive deficits after CABG surgery (20).

The reported incidence of cognitive decline varies widely (9). This variability is partly caused by methodological problems since a multitude of definitions of cognitive decline are used and a large number of neuropsychological tests exist to assess various cognitive domains (21). In this study, we found a statistically significant inverse correlation between age and cognitive function 10 days after CABG surgery. Kadoi et al. suggested that age was associated with cognitive impairment at 7 days after CABG surgery (15). Other studies by Ganavati et al.[13] and Taban et al. showed that scores of cognitive function decreased with aging (19).

On the other hand, we found a statistically significant inverse correlation between blood transfusion and cognitive function 10 days after CABG surgery. In a study on CABG patients in three Finnish hospitals, Mikkola et al. indicated that transfusion of blood products after CABG had a strong, dose-dependent association with the risk of stroke after surgery (22). Stone et al. showed that transfusion of more than three units of red blood cells after CABG was strongly associated with subsequent mortality (23). Similarly, Bahrainwala et al. (24) and Whitson et al. (25) showed that the use of blood products to restore coagulation and correct anemia may contribute to the development of neurological events after cardiac operation. The present study had some limitations. First, we only used one neuropsychological test (MMSE) to assess cognitive function. Second, MMSE is a simple screening tool which might not be reliable in detection of delicate cognitive impairments. Therefore, in further investigations, a more rigorous set of neuropsychological tests is required.

In conclusion, this study highlighted early (10 days after surgery) cognitive dysfunction after CABG surgery. It also suggested cognitive function to be associated with age and blood transfusion. Therefore, interventions for prevention or reduction of this complication after CABG are warranted.

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Analysis of Factors Influencing Farm Households' Adoption of Maize Technical Package in Western Cameroon

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Abstract: The low productivity of farms in sub-Saharan Africa including Cameroon is due among other things to the low adoption rates of innovations generated by agricultural research. This paper is a case study of the adoption of the technical package (improved varieties of seeds, fertilizers, pesticides, monocropping) extended for maize in western Cameroon. Data sampled farmers were analyzed using a Logit model. Results showed that the size of maize land areas, market orientation of production, contact with extension services, land tenure are factors that significantly determine the likelihood of a farmer to adopt the technical package. It was concluded that agricultural research and extension should adapt their technological innovations to the various needs of farmers.
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Keywords: agricultural innovation, adoption process, maize, Cameroon.

1. Introduction

The Cameroonian agriculture is the mainstay of the economy, providing employment for many rural and urban residents. The centrality of the agricultural sector is well understood from the fact that majority of the population live in rural areas. Over the years, a major concern of policy makers is the low resource productivity of the farmers, thereby warranting investment in research and technology innovations. This is a necessary, though not sufficient condition for ensuring rapid agricultural productivity. However, the hypothesis of agricultural productivity enhancement through agricultural innovations cannot be easily discarded, despite numerous constraints befalling the Cameroonian agricultural sector.

Numerous studies had analyzed the contribution of technological changes to agricultural productivity in developing countries (Feder *et al*. 1985; Feder and Umali, 1993; Datt and Ravallion,1998; Nkamleu, 2004; FARA, 2006; World Bank, 2007; Arega *et al*. 2009; Ali-Olubandwa *et al*. 2010). In these studies, it had been shown that the state of the technology and the efficiency with which the factors of production are used are the main determinants of increased agricultural production. Hence, the overall and sustained interest in the analysis of adoption processes for rapid agricultural transformation can be empirically and humanly justified.

It should be further emphasized that although agriculture is a dominant sector in most of the economies of sub-Saharan Africa (World Bank 2008, Mokwunye on 2010, Enete and Onyekuru on 2011), low farm resource productivity is clearly evident (World Bank, 2008). One of the reasons for low productivity is the low rate of adopting technological innovations (Nkamleu, 2004; World Bank, 2008). This is the case for the maize cultivation in Cameroon, where the low yields - (less than 2 t/ha in peasant culture, approximately 2.5 t/ha in semi-intensive culture, and 4.5 t/ha in large farms (Minader, 2006) - are due to low adoption of the technical package in the form of improved seeds varieties, chemical fertilizers, pesticides etc. that are extended by the country's agricultural departments. Indeed, a good understanding of the reasons for low adoption of this technical package is important for the search for alternatives means of boosting maize production in the process of ensuring rapid agricultural productivity.

Rogers (2003) defined the diffusion of an innovation as the process by which an innovation is passed on over time through some communication channels to the members of a social system. Innovations spread within a group or within a community by imitation, conformity or through a social training (Young, 2007). As for the adoption, it refers to the decision to resort to an innovation and to continue to use it (Van den Ban *et al*. 1994). The diffusion and adoption of innovations (agricultural innovations in particular) depend on several factors. Among these are the socioeconomic characteristics of adopters, the information they received and how were able to use them, the structure and nature of their

interactions with members of their social network, the characteristics of the innovations and how they are perceived by those who want to adopt them (Ryan and Gross, 1943; Ryan, 1948; Gross, 1949; Marsh and Coleman, 1955; Jones, 1963; Fliegel and Kivlin, 1966; Van Den Ban, 1984; Valente and Davis, 1999; Caswell *et al*. 2001; Sunding and Zilberman, 2001; Wejnert, 2002; Rogers, 2003; Young, 2007; Monge *et al*., 2008; Matthews-Njoku *et al*., 2009; Oleas *et al*., 2010).

In general farmers discuss of their activity with their peers within farmers' organizations (PO) and within groups of mutual aid. There they share their experiences and new technologies and techniques of production. Their involvements in these organizations generally have positive impacts on adoption of agricultural innovations, but it also depends on the types of innovations and the kinds of organizations in which they participate (Jagger and Pender, 2003). Therefore, a farmer adopts an innovation only if it meets her production objectives and goals (Griliches, 1957). Therefore, the goal of this paper is to identify by means of primary data factors that determine the decision of a farmer to adopt technical packages for maize cultivation.

2. Materials and Methods

Data Collection

The data used are those of a survey that was had in March, 2010. According to the report of the 2009 agricultural campaign made by the departmental delegation of the agricultural studies and statistics, an average of 98 % of the agricultural population of this department cultivated maize that year. The survey was made in collaboration with the services of the regional and district delegations of the Ministry of Agriculture and Rural Development. A sample of 52 farmers was randomly chosen. The data collected from these farmers include socio-economic characteristics, farm characteristics and adoption of the technical packages.

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Specification of Adoption Model

The adoption of an innovation can be modeled as a choice between two alternatives: to adopt or not to adopt the innovation (Caswell *et al*. 2001). The choice of an individual 'i' is then represented by a latent variable y_i^* which is the difference between the utility the adoption provides him/her and the utility the non-adoption brings to him/her. The value (positive or negative) of this difference of utility depends on a set of explanatory variables x_i :

$$y_i^* = x_i\beta + \varepsilon_i \qquad \forall i = 1,\ldots,n \quad .1$$

Where β is a vector of parameters, disturbances ε_i is the independently and identically distributed error term (McFadden, 1984). According to the survey guide on the adoption of agricultural technologies of the CIMMYT (1993), the most used model for the identification of variables that affect adoption of an agricultural innovation is the Logit model, the logistic function of which is most likely to explain the adoption process of these innovations.

A simple Logit model has then been used in order to specify the relationship between the probability of adopting technical package and the determinants of this probability. The choice of each investigated farmer is represented by a discrete variable y_i, the values of which are 1 if the technical package was adopted by the farmer, and 0 if it was not. The relationship between the difference of utility (y^*_i) and the choice of the farmer (y_i) is modeled as follows:

$$y_i = f\left(y_i^*\right) = \begin{cases} 1 \; si \;\; y_i^* > 0 \\ 0 \; si \;\; y_i^* \leq 0 \end{cases} \quad .2$$

Under the hypothesis of rationality (Richefort, 2009), a farmer will choose to adopt the popularized technical package if it brings more benefits. The dependent variable "technical package" takes the value 1 if the investigated farmer resorts jointly to all of the elements of the popularized technical package regardless to the order of adoption or the used quantities. Otherwise its value is 0. The variables that are likely to explain the adoption of agricultural innovations on which our estimations are based are: the gender, the number of years of experience in cultivating corn, the educational attainment, the main orientation of the production, the access mode to the land, the proportion of the surface cultivated with corn, the existence of a source of income that differs from agricultural activities, the enrolment in a farmers' organization (FO) and the interaction with services of agricultural popularization.

Table 1: Description of the Variables Used in the Adoption Model

Variables	Description
Dependent Variable	
Technical Package	Technical Package (1 if the technical package is adopted, 0 otherwise)
Explanatory Variables	
Gender	Gender (1= Male, 0= female)
Maize cultivation Experience	number of years of experience in growing corn (here, between 1 et 43 years)
Educational Attainment	Years of education
Products Orientation	Principal orientation of the production (1= Auto-consumption, 0= Trade)
Land areas	Surface cultivated with corn (measured in hectares)
Estate	Access Mode to land (1= Property, 0= Renting)
Source of Income	Other than agriculture (1= Yes, 0= No)
Membership	Member of a Farmers' Organization (1= Yes, 0= No)
Popularization	Connections with services of de agricultural popularization (1= Yes, 0= No)

The estimation of the unknown parameters of the model was made by means of the software Stata 9.0.

3. Results and Discussion

Characteristics of the Farmers of the Sample and of their Farms

The results show that 58 % of the farmers were male. As the culture is in Cameroon, the males are the ones that are customarily eligible to own lands. Most women received the pieces of land they were cultivating through their husbands. Only 2 women out of the 22 that were sampled inherited their pieces of land. The age range of the farmers was 17 to 68 years, while the average age was 45 years. Those who were 45 years old or above constituted 79% of the sample, and most of them were women. Young men were rather interested in non-agricultural activities (small shops, public transportation etc.). This is why they massively move to cities, abandoning agricultural activities to women and older men. Almost all the sampled farmers (92%) were educated.

Maize has a great importance in the food custom and in the social life of the people of the region. All the farmers had cultivated maize for many years. The average number of years of experience is 14. The results showed that 54% of the farmers had grown maize for at least 10 years, and 92 % allocated at least 50% of their total farm size to grow maize. However, most of the cultivated land areas were between 0.5 and 2 hectares (65%). The agricultural tools are rudimentary, and the techniques are most often inherited from their forefathers.

Maize is mainly cultivated for home consumption, but a part of the production is sold in order to provide for occasional needs (healthcare, social events, needs that rise at the beginning of an agricultural season, the beginning of a school year). For 46 % of the surveyed, the major part of their production was intended for sale.

The land tenure is apprehended by the access mode to the land. About 90 % of the farmers owned their land through inheritance, donation or purchase. Others, especially foreigners, rented the lands. The surveyed farmers get their means of subsistence from farming, but also from livestock, from small-scale trade, from a paid work or from other activities that generate incomes. However, the trade of agricultural products is the main source of income for 81% of them.

All farmers in the sample noted that they discussed with their friends and family circles on their constraints of production, the solutions experimented, the effects of new technologies and techniques of production. Furthermore, approximately 48% were in touch with services of agricultural extension and they were participating in some organized trainings. However, only 9 of them (a rate of adoption of 17 %) adopted the full technical package. The others used it only partially.

Explanatory Factors of the Adoption of the Popularized Technical Package

Four variables explain in a significant way the adoption of the technical package by the surveyed farmers, namely the proportion of surface cultivated with maize, the main orientation of the production, the contact with extension officers, and the access to the land.

Table 2: Results of the Estimation of the Logit Model

Variables	Coef	Std. Err	z	P>|z|
Gender	.9299048	1.884804	0.49	0.622
Corn exp.	-.0539945	.074784	-0.72	0.470
Educ. level	-.1045823	.7033214	-0.15	0.882
Pro. Orient.	-4.728085	1.477564	-3.20	0.001*
Corn surface	1.382693	.3657958	3.78	0.000*
Land	-3.406163	2.008765	-1.70	0.090***
Income source	3.17621	2.452951	1.29	0.195
Organizations	.0979133	1.71419	0.06	0.954
popularisation	5.208021	2.127657	2.45	0.014**
_cons	-7.183604	3.757451	-1.91	0.056

Legend: * significance at 1 %, ** significance at 5 %, *** significance at 10 %.

The model produced a good fit as shown by the statistical significance of the Wald Chi Square ($p<0.01$). Since the numerical value of the coefficients of the Logit model as shown in table 2 have no direct interpretation, the effect of the explanatory variables on the probability to adopt the technical package is appreciated through calculation of the marginal effects that are presented in table 3.

Table 3: Marginal Effects of the logistic parameters

Y = Pr (technicpack) (predict)	.00164234
Variable	dy/dx
Gender*	.001471
Corn experience	-.0000885
Educational attainment	-.0001715
Product orientation*	-.0203651
Corn Surface	.0022671
Land*	-.0333272
Source of income*	.0177932
Organizations*	.000157
Popularization*	.0238557

(*) dy/dx is for discrete change of dummy variable from 0 to 1

The results in table 3 shows that although the probability to adopt technical package increased with increase in land area cultivated to maize, other things held constant, the increase of this surface by one hectare adds only 0.2% to the probability to adopt the technical package. The market orientation of the production has on the other hand a greater influence on the probability to adopt the technical package; it increases it by 2 %. So, if a farmer from the sample switches from auto-consumption as the main orientation of his/her production to a more market orientated production, the probability to adopt the technical package comes closer to 1.However, when the cultivated lands are rented, the probability of adopting the technical package increases up to about 3.3%. Indeed, farmers who rent the lands have to pay a financial counterpart or cede a part of their products to the owners. This makes them very anxious and willing to make a good harvest. Therefore, they are more inclined to adopt technologies and techniques of high performance production. The calculation of the marginal effects also shows that for a farmer who is in touch with agents of popularization or who participates in demonstrations organized by them, the probability to adopt the popularized technical package is closer to1than for his peers. Indeed, the fact that a farmer is in touch with agents of popularization is shown by an increase of about 2,4 % of the probability to adopt the technical package.

4. Conclusion

From the results, it is evident that both home-consumption as the main reason for production and the fact that the farmer own the cultivated lands have a negative effect on adoption of maize technical package, whereas the maize land areas and the contact with extension agents increased it. Although it is necessary to make a survey with a more representative sample before generalizing the results obtained above, this preliminary study can already lead us to the following conclusions: The popularized technical package is adopted by less than 20 % of the farmers of the sample, and this may be the sign of its inadequacy to the local context of production and/or to the needs of the farmers. However, the majority of the farmers adopted 1, 2 or 3 out of the 4 elements of the popularized technical package. The choice of these elements, taken individually or combined, responds to strategic and specific needs. Current research and services of agricultural should take it into account and propose popularization according to the various contexts: not a standard technical

package, but various alternatives responding the specific needs of the farmers and corresponding to the characteristics of their lands. This "contextualization" of the research and of the agricultural popularization will also help to give value to peasant knowledge and expertise.

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Serum Vascular Endothelial Growth Factor AND ANGIOSTATIN as Potential Markers in Patients with Hepatocellular Carcinoma

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Abstract: Objective: to evaluate the prognostic role of serum VEGF and angiostatin levels in patients with HCC. **Patients and methods:** Between April 2010 and April 2012, 40 patients diagnosed with HCC, presented to the Departments of Gastroenterology and clinical oncology, Assiut Univ. Hospital were recruited in this study. The control group consisted of 40 healthy individuals and another group of 40 cirrhotic patients with no evidence of HCC attending the Gastroenterology clinic of our hospital were included. Serum samples were prospectively collected from all groups for estimation of α-FP, VEGF, and angiostatin levels using ELISA technique. Patients with HCC were managed according to the BCLC strategy. All patients were reviewed in the Gastroenterology and oncology clinics at least every 1 to 2 months. **Results:** The mean serum VEGF concentrations (632.3±5.1 pg/mL) were significantly higher in patients with HCC than in liver cirrhosis patients and healthy controls (mean value148.0±23.32 pg/mL, and 45.0±6.4 pg/mL, respectively) ($P < 0.05$). In addition, HCC patients showed increased serum VEGF concentrations with increased BCLC score (Odd's Ratio1.05 - 95% confidence interval 1.11–3.9). On multivariate analysis, serum VEGF level was an independent prognostic factor (hazard ratio 1.86 (95 per cent confidence interval 1.10 to 3.92); $P = 0.032$). We also found that angiostatin levels were significantly lower in HCC patients compared with patients with liver cirrhosis and control subjects ($P <0.05$). Furthermore, there was no significant correlation between serum angiostatin levels and VEGF levels. We did not find any correlation between angiostatin serum levels and overall survival. **Conclusion:** this study demonstrated that serum VEGF level is a prognostic marker for HCC that can help guidance in clinical decision-making regarding therapy and outcome. Our study also showed that angiostatin is potential diagnostic marker that may aid in early detection of HCC. However, further studies should be performed.

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Keywords: VEGF, angiostatin, hepertocellular carcinoma

1. Introduction:

The incidence of HCC is predicted to increase over the next several decades as survival in patients with predisposing diseases, such as cirrhosis, is expected to increase over time (1). Because of this, there has been great interest in evaluating factors that influence prognosis in HCC. The most widely studied prognostic factors are related to pathological characteristics of the neoplasm, including tumor size, grade, stage and vascular invasion (2-5). A variety of other potential serum prognostic markers, however, remain to be further characterized (2).

Angiogenesis, defined as the formation of new blood vessels from existing vasculature, is an important process regulating the growth and development of malignancies including HCC. The extensive hypervascularity associated with HCC is thought to be driven in part by the pro-angiogenic factor known as vascular endothelial growth factor (VEGF) (6,7). Furthermore, the invasiveness of certain HCC lesions has recently been linked to high levels of VEGF, leading several authors to conclude that an important relationship between VEGF and prognosis exists for HCC (8, 9). The three most commonly used methods of measuring VEGF are serum-based VEGF quantitation using enzyme-linked immunosorbent assay, tissue-based semi-quantitative VEGF immunohistochemistry and tissue-based mRNA measurement (6). However, immunohistochemistry has a limitation because it requires a tumor specimen. On the other hand, the measurement of VEGF in blood does not require a tumor specimen thus it is applicable to every cancer patient (1).

There is a natural balance between promotors of angiogenesis such as VEGF and inhibitors of angiogenesis such as angiostatin (10). Today it is widely accepted that angiostatin is produced by stromal cells of the primary tumor. However, the origin of circulating angiostatin in cancer patients and its prognostic significance are not yet clear (11).

The aim of this study was to evaluate the prognostic role of serum VEGF and angiostatin levels in patients with HCC.

2. Patients and Methods

In this study, 40 patients were diagnosed with HCC were included and presented to the Departments of Gastroenterology and clinical oncology, Assiut Univ. Hospital in period Between April 2010 and April 2012, . The study protocol was approved by the Ethics Committee of our institution. All patients provided a written informed consent.

They met the following inclusion Criteria:

1) Diagnosis of localized or metastatic hepatocellular carcinoma (HCC) by biopsy and/or imaging studies.
2) Age: 18 and over.
3) Performance status: ECOG 0-2.
4) Severity of liver disease was assessed by Child-Pugh classification [13]Table (A).
5) The stage and management were defined according to the Barcelona-Clinic Liver Cancer Group diagnostic and treatment strategy (BCLC) [14]. Sorafenib was not given due to financial reasons, instead, best supportive care was prescribed Table (B).
6) Patients with other types of malignancy, advanced organ failure, active infection and advanced medical co-morbidity were excluded from the study.

Table (A): Child-Pugh scoring system to assess severity of liver disease:

	Points		
	1	2	3
Encephalopathy (grade)	none	1-2	3-4
Ascites	Absent	Slight or Controlled By diuretics	At least Moderate Despite Diuretic Treatment
Bilirubin (mg/di)	<2	2-3	>3
Albumin (g/di)	>3.5	2.8-3.5	<2.8
Prothrombin time (seconds) prolonged	<4	4-6	>6
Or/INR	<1.7	1.7-2.3	>2.3
For primary biliary Clcirrhosis, Primary Sclerosing Cholangitis or other Cholestatic liver Bilirubin (mg/dl)	<4	4-10	>10

Table (B): Barcelona clinic liver cancer (BCLC)-classification

Tumor Stage	General State of Heath	Tumour-Characteristics	Child-Stage
0 Very early	Good	Single nodule<2cm	A & B
A Early	Good	Single nodule <5 cm, 3 nodules< 3 cm	A & B
B Intermediate	Good	Large, multiple nodules	A & B
C Advanced	Reduced	Vascular invasion, extrahepatic secondaries	A & B
D Terminal	Severely	Any form	C

Control group

The control group consisted of 40 healthy individuals with no apparent evidence of active disease or medical disorders.

As most HCC patients in this study were expected to have underlying liver cirrhosis, another group of 40 cirrhotic patients with no evidence of HCC attending the Gastroenterology clinic of our hospital was included.

Work up: all patients had undergone

1) Detailed history and full clinical examination.
2) Routine laboratory investigations: complete blood count, liver function tests, prothrombin time and kidney function tests using standard methodologies.
3) Viral markers: HBs antigen by ELISA (Monolisa, Biorad, USA) and HCV antibody by 4th generation ELISA, antigen antibody (Biorad, USA) and confirmed by detection of HCV RNA by PCR
4) **HCV RT-PCR: RNA extraction** was performed by the kit supplied by Qiagen (Viral RNA Mini Kit Lot No. 11233766). **HCVRNA amplification** (RT-nested PCR amplification) was done by the reagent supplied by (Promega) **first amplification mix** containing (10 ul 10x-buffer, 2 ul MgSO4, 2 ul primer I, 2 ul primer 2, 1 ul dNTPs mix 10 umol, 1 ul RT, 1 ul Taq DNA polymerase and 24 ul RNAse free water). Amplification cycles profile were (48 °C 45 min. and 95 °C 5 min one cycle), (95 °C 5 min., 60 °C 45 sec. &72°C 2 min ,5cycles), (95 °C 5 min.,60 °C 45 sec. & 72°C 2 min, 30 cycles) and (72 °C 2min., 5 cycles), **second amplification mix** containing (5ul 5x-buffer, 2 ul Mgcl 6mmol, 2 ul primer 3, 2ul primer 4, 1ul dNTPs mix, 10 umol, 0.5ul Taq DNA polymerase & 32.3 ul RNAse free water). Amplification cycles profile were (95°C 5min one cycle), (95°C 5 min., 60°C 45 sec & 72°C 2 min, 5 cycles), (95°C 5 min., 60°C 45 sec.& 72°C 2 min, 30 cycles) and (72°C 2 min , 5 cycles). **Detection** was done by 2% agarose gel electropheresis in TAE buffer, positive bandswere detected at 150 bp in comparison to PCR ladder.
5) Estimation of serum α-fetoprotein level (α-FP), using commercially available ELISA kits (Quantikine Human α-FP Immunoassay; R & D Systems, Minneapolis, MN).
6) Sonographic examination and triphasic study of the liver by CT scan.
7) X-ray of the chest and bone scan to detect metastasis.
8) Liver biopsy from HCC patients. Ultrasound-guided core needle biopsies were obtained from the hepatic tumors and immediately fixed in 10%

formalin and sent to the pathologist for histopathological examination. The tumor was graded as well differentiated HCC (grade I), moderately differentiated (grade II) and poorly differentiated (grade III-IV) according to Edmondson and Steiner (15).

All patients were reviewed in the Gastroenterology and oncology clinics at least every 1 to 2 months.

Measurement of Serum VEGF and Angiostatin Levels

Serum samples were prospectively collected from all groups. Venous blood samples were drawn into a serum separator tube and centrifuged at 3,000 rpm for 10 minutes, then stored at −80°C until VEGF and Angiostatin levels were determined.

Serum levels of angiostatin were quantified by sandwich enzyme-linked immunosorbent assay (ELISA) using Duo-Set ELISA kit. Serum VEGF levels were quantitatively measured by an enzyme-linked immunosorbent assay kit designed to measure human VEGF concentration in serum (Quantikine Human VEGF Immunoassay; R & D Systems, Minneapolis, MN). This assay has been shown to be reliable and reproducible in previous studies (16). Briefly, 100 µL recombinant human VEGF standard and serum sample was serially diluted and pipetted into a microtiter plate coated with murine monoclonal antibody specific for human VEGF and incubated for 2 hours at room temperature. Any VEGF present was bound by the immobilized antibody. After washing away any unbound substances, a horseradish peroxidase-linked polyclonal antibody specific for VEGF was added to each well to sandwich the VEGF. After further washings to remove any unbound antibody–enzyme reagent, tetramethylbenzidine was added. The intensity of color developed, which was in proportion to the amount of VEGF bound, was measured by reading absorbance at 450 nm. Each measurement was made in duplicate, and the VEGF level was determined from a standard curve generated for each set of samples assayed. The sensitivity of the assay was 9 pg/mL, and the coefficients of variation of intraassay and interassay determinations were in the range given by the manufacturer (4.5–6.7% and 6.2–8.8%, respectively).

Statistical Methods

The nonparametric 2-sided Wilcoxon rank-sum test (Mann–Whitney *U* test) for paired group comparisons was applied for statistical analysis. Univariate overall survival analyses were performed using Kaplan-Meier and univariate Cox analysis. For multivariate analysis, the Cox proportional hazards regression model was used. In all tests, a *P* value of at least .05 was considered statistically significant. All statistical analyses were done with the SPSS software package, version 18.0 (SPSS, Inc., Chicago, IL).

3. Results

Patients' characteristics were summarized in Table 1. The liver functions of patients were summarized in Table 2. There was a significant increase in serum concentration of α-fetoprotein in HCC patients as compared to patients with liver cirrhosis and the control group (Table 3).

Similarly, a significant increase in serum VEGF was found in HCC patients as compared with patients with liver cirrhosis and control subjects (632.3±5.1, 148.0±23.32, 45.0±6.4 respectively), (Table 3). In addition, HCC patients showed increased serum VEGF concentration with increased BCLC score (Tables 4,5). Moreover, serum VEGF level was positively correlated with serum α-fetoprotein (Table 6). Significant positive correlations between serum VEGF and serum activities of ALT and AST were found in HCC patients, (Table 6).

In this study, we used the median level of serum VEGF as a cut-off value. On correlation with survival data of patients with HCC, it was found that high level of serum VEGF was correlated with poor overall survival. On multivariate analysis, serum VEGF level was an independent prognostic factor (hazard ratio 1.86 (95 per cent confidence interval 1.10 to 3.92); $P = 0.032$).

As shown in Table 3, angiostatin levels were significantly lower in HCC patients compared with patients with liver cirrhosis and control subjects ($P < 0.05$). In contrast to VEGF, we did not find any significant correlation between serum angiostatin levels, BCLC score and serum α-fetoprotein levels, (Table 4, 5). Furthermore, there was no significant correlation between serum angiostatin levels and VEGF levels. We did not find any correlation between angiostatin serum levels and overall survival

Tab. 1 Patients characteristics

	HCC (n=40)	Cirrhosis (n=40)
Age: (mean ±SD)	52.36 ± 13.7	50.83 ± 17.9
Sex: Male/female	40/0	40/0
Hepatitis serology: positive for		
HBV	19 (47.5%)	7(17.5%)
HCV	14(35%)	20(50%)
Both	7(17.5%)	13(32.5%)
Child-Pugh score		
A	5(12.5%)	8(16.7%)
B	25(62.5%)	20(50%)
C	10(25%)	12(33.3%)
BCLC		
A	10(25%)	
B	20(50%)	
C	6(15%)	
D	4(10%)	

Treatment		
Surgical resection	3(7.5%)	
TACE	25(62.5%)	
Radiofrequency	5(12.5%)	
Supportive care	7(17.5%)	

[n] number of patients; BCLC…Barcelona-Clinic Liver Cancer Group diagnostic and treatment strategy.

Tab. 2: Liver function tests of patients with cirrhosis and HCC as compared with the control subjects (mean±SE).

	Control group (n=40)	Cirrhotic group (n=40)	HCC group (n=40)
ALT (U/ml)	10.2±1.7	54.4±13.3[*]	61.5±5.3[*#]
AST (U/ml)	9.5±1.5	77.7±9.13[*]	94.06±11.4[*#]
Total bilirubin (mg/dl)	0.56±.01	4.4±0.4[*]	7.6±0.06[#]
Albumin (g/dl)	4.70±0.47	2.20±0.40[*]	2.80±1.3[*]
ALP (U/l)	27.3±0.85	75.0±6.6[*]	182.4±10.5[*#]
γGT (U/l)	16.5±1.0	42.6±8.9[*]	194.9±26.8[*#]

[n] number of patients;
[*]significant difference as compared with the control group at $p<0.05$;
[#]significant difference as compared with the cirrhotic group at $p<0.05$.

Tab. 3: Serum concentration of α-fetoprotein, VEGF and Angiostatin in cirrhotic and HCC patients as compared with the control group (mean±SE).

	Control group (n=40)	Cirrhotic group (n=40)	HCC group (n=40)
α-fetoprotein (ng/ml)	2.7±0.4	20.4±5.3[*]	346.09±15.8[*#]
VEGF (pg/ml)	45.0±6.4	148.0±23.32[*]	632.3±5.1[*#]
Angiostatin	171.4±19.0	153.5±17.4	19.2±8.4[*#]

[n] number of patients;
[*]significant difference as compared with the control group at $p<0.05$;
[#]significant difference as compared with the cirrhotic group at $p<0.05$.

Tab. 4: Serum concentration of VEGF in HCC patients in relation to BCLC staging (mean±SE).

	A (n=10)	B (n=20)	C & D (n=10)
VEGF (pg/ml)	501.23±1.5	586.68±6.07[*]	635.23±7.25[#]

[n] number of patients;
[*]significant difference as compared with BCLC A group at $p<0.05$;
[#]significant difference as compared with BCLC B group at $p<0.05$.

Tab. 5: Multivariate analysis of serum concentration of α-fetoprotein, VEGF and Angiostatinin HCC patients in relation to BCLC staging.

Variable	B	Odd's Ratio	95% CI
VEGF (pg/ml)	3.1	1.05[*]	1.11–3.9
A-fetoprotein (ng/ml)	2.8	0.59	0.72–5.3
Angiostatin	2.7	0.034	0.84-4.3

[*]significant at $p<0.05$.

Tab. 6: Correlation between serum VEGF with the measured parameters in cirrhotic and HCC patients.

	VEGF	
Parameters	**Cirrhotic patients**	**HCC patients**
ALT	−0.07	0.47[*]
AST	0.33[*]	0.42[*]
Total bilirubin	0.27[*]	0.10
Albumin	0.05	−0.31[*]
Alkaline phosphatase	0.16	−0.09
Γ-glutamyl transferase	0.33	−0.4
α-fetoprotein	0.12[*]	0.59[*]

[*]significant difference at $p<0.05$.

4. Discussion

In most solid malignancies, tumor stage at presentation determines prognosis and plan of management. However, most patients with HCC have two diseases, liver cirrhosis or HCC, and complex interactions between the two have major implications for prognosis and treatment choice (17). Therefore, there has been great interest in identifying prognostic markers for patients with HCC as these markers can help guide clinical decision-making regarding therapy and outcomes. Various studies have evaluated the prognostic value of VEGF levels in HCC. Its overall test performance remains unclear. Conflicting data, however, have emerged regarding the ability of VEGF to predict disease progression and overall survival (OS) in HCC. This may be related to differences in the methods of measuring and reporting quantitative VEGF measurements (18).

In their metanalysis, Schoenleber *et al.* (18) reported that serum-based studies tended to be of slightly higher methodological quality than tissue-based studies although this was not statistically significant. In addition, data from the serum VEGF studies appear to be generalisable to all patients with HCC, as the included populations were treated using a variety of curative therapies. Although tissue studies only included surgically treated patients, serum studies included patients treated with surgical or medical management, chemoembolisation, or radiofrequency ablation. When VEGF levels for both surgically and non-surgically treated groups were examined, no

difference was found between groups. This suggests that choice of therapy was not potentially associated with serum VEGF levels (18).

In this study, we evaluated a possible prognostic value of serum VEGF in patients with HCC and the correlation of its high levels with α-fetoprotein and OS. We found a significant increase in serum concentration of α-fetoprotein in HCC patients as compared to patients with liver cirrhosis and the control group. Similar results were obtained by many studies [19-22]. Some reports have indicated that α-fetoprotein has limited utility of differentiating HCC from benign hepatic disorders for its high false-positive and false-negative rates, and patients with acute exacerbation of viral hepatitis but no HCC may also have markedly increased α-fetoprotein levels [23].

Therefore, we aimed to measure the serum concentration VEGF in patients with liver cirrhosis and HCC to evaluate its activity as tumor marker for liver malignancies.

We found a significant increase in serum VEGF in HCC patients as compared with patients with liver cirrhosis and control subjects. These results coincided with those recorded by other studies [24-28]. Moreover, serum VEGF level was positively correlated with serum α-fetoprotein. In their study, Corradini *et al.* (29) found that serum AFP concentration correlated positively ($r=0.755$; $P< 0.01$) with serum VEGF-A in the HCC patients with serum AFP above 20 ng/ml, but not in those with serum AFP below 20 ng/ml (27). In another study by Gadelhak *et al.* (30), there was no association between either p53 Abs or VEGF and AFP concentrations in the HCC patients. However, a greater incidence of VEGF and accumulation of p53 Abs expression was detected in positive cases for AFP where VEGF was detected in 85.3% and p53 Abs was detected in 83.3% of positive cases for AFP concentration divided by the platelet count (30).

In addition, significant positive correlations between serum VEGF and serum activities of ALT and AST in HCC patients were found. Moreover, serum VEGF increased significantly with increasing stage of BCLC and correlated with poor OS, coinciding with similar studies (24-28, 31, 32).

Our results revealed significantly higher angiostatin concentration in samples of healthy controls and patients with liver cirrhosis as compared with HCC patients. This is in agreement with that reported by Szarvas *et al.* (11), although their study was on bladder cancer patients. One possible explanation is that tumor cells produce substances that inhibit angiostatin production. This change in the balance of proangiogenic and antiangiogenic factors may contribute to an "angiogenic switch," which may provide a systemic proangiogenic milieu supporting tumor-induced angiogenesis. However, the process leading to downregulation of circulating angiostatin levels is uncertain, (11).

In conclusion, this study demonstrated that serum VEGF level is a prognostic marker for HCC that can help guide clinical decision-making regarding therapy and outcomes. Our study also showed that angiostatin is potential diagnostic marker that may aid in early detection of HCC. However, further studies should be performed.

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