

A Study of The Relationship between Stress and Ergonomics in Shahrood's Gas Company

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Abstract: In today's world, science has solved a major part of problems in different work systems. In the same direction there are sciences and technologies which study different aspects of health for human. One of them is ergonomics also known as human factors engineering. Ergonomics acts in four major branches, namely; occupational biomechanics, engineering psychology, anthropometry, and physiology. On the other hand job stress is the stress a specific individual undergoes in a specific job. In this definition there are many points: how experienced is the person (experienced or freshman), how powerful he acts towards existing situations and what kind of personality does they show in the workplace. Whereas there is definitely a relationship between job stress and ergonomics, regarding the principles of ergonomics could really decrease stress and also whereas in all Gas Companies all over the country there are ergonomic equipment but staff don't know how to use them, the researcher has tried to study this problem in Shahrood's Gas Company. Hypotheses: there is a relationship between ergonomics and stress. Occupational biomechanics (physical interaction between human and mechanical system around him, such as tables, chairs) and stress are related. Engineering psychology (noise, light) and stress are related. Anthropometric (body dimensions, including hands and feet) and stress are related. Physiological function (fatigue, work, and static and dynamic regimes' Work - Rest ") and stress are related. Sample size and population are identical and both equal 48 people. Data gathering tool are the stress questionnaire developed by Mr. Refiq Hassani and an ergonomics questionnaire developed by the author. Both questionnaires were assessed by the cronbach's alpha to determine the reliability which for those questionnaires were 0.86 and 0.72 respectively. Kendall's tau correlation coefficient was used as the deductive statistical tool to analyze the data. In 5% level, Kendall tau's test results show that there is no relationship between ergonomics and stress. Occupational biomechanics (physical interaction between human and mechanical system around him, such as tables, chairs) and stress are not related. Engineering psychology (noise, light) and stress are not related. Anthropometric (body dimensions, including hands and feet) and stress are not related.

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Introduction

Stress

Reviewing the literature about stress, first fore step could be giving a precise definition of stress. There is no popular definition which is generally agreed on but what follows is a set of definitions given by scholars:

1. Kennan 1930 used the term "stress" as a reference to a physiological reaction to bothering or threatening situations. (Kenan 1930: 14)
2. Celia 1983 considers stress as a physiological respond which leads to general syndromes of compromise. It happens in all human beings and consists of three stages namely; caution, resistance, and breakdown. (Celia 1983:3)
3. Lazarus and Flakeman 1984 have developed the most agreeable view on stress which is an interactional view and is considered as the psychological theory about stress. (Lazarus and Flakeman 1984: 6).
4. They define stress as the relationship between the person and the environment in a situation in which the person realizes that the pressure is more than they could handle.
5. Bravin and Campbell 1994 stress believe that stress is a kind of stimulus which is buried on the person from outside and causes physical and mental disorders. (Bravin and Campbell 1994:22)
6. Curtis (2000) has argued, Stress is a condition that occurs when People are faced with events that are threatening their physical or mental health. (Curtis 2000 Quoted by Fathi Ashtiani 1385:4)
7. Lotanz, (2007) says, stress is an adaptive response to a foreign location errors of physical, emotional, or behavioral disorders. (Lotanz, 2007:21)
8. Kimney (2002) argues that humans respond to a stressful event, based on an assessment of how it will respond to different physiological ways. He speculates that the body responds to what happens

- in the brain rather than peripheral events. (Quoted by Sieban fard 1381:18).
9. Joyce Merlin believes that now everyone has accepted this fact. Companies with quality management at the top of their objectives, use ergonomics as business tool. Successful companies though, plan ergonomics, safety, quality control, and manufacturing as a combined mixture to achieve maximum benefit. (Taheri 1378:10)
 10. Karask 1979 supposes that there are two features in the workplace to predict stress and pressure including job demands and job authorities. Job demands consists of the level of the endeavor and the attention one pays to the requirements of the job. It involves mental aspects of the job (karask and neol 1390). In his opinion jobs with higher demands and less control are more stressful, and jobs with higher pressure which is not considered with the control are stressful (Karask 1990: 28)
 11. Herzberg et al announced their results too: basically two parameters matter in stimulus namely survival (healthcare and keeping the current situation) and motivators (stimulus). (Javadin 1380:186).
 12. McGregor's X and Y theory: the first time in 1957 in his book entitled: "human aspects of the organizations" McGregor discussed the relationship between the perception of the employees and their behaviors. He categorized people in two categories namely X theory (inactive elemental human) and Y theory (active elemental human). (Seyed javadin 1380:207)

So the concept of stress in different modes is considered. Some researchers define stress as environmental conditions. (For example, job stress, stress related to competition and the stress of raising a child). According to this view, the stress arises of dealing with foreign individuals or groups. In another approach, the stress response in challenging situations and considers threatening. According to this view, the physical and psychological stress responses to the individual or group challenging situations. In this approach, the stress response is not intended only as a stimulus, but as a result of the exchange and interaction of individual and environmental stress. So the approach to conflict, stress and cognitive intervention are defined as the communication. This definition reflects the relationship between the individual and the environment which is perceived dangerous by them. According to Folkman, stress is not specified for someone or some situation. It also is not a motivator or stimulus. But stress is a dynamic relationship (constant mutual change) between the individual and the environment which affects both of them. Lazarus suggests that people aren't victims of stress by

themselves, but it's the assessment of the situation (primary assessment) or the quality of their assessment of their abilities against the problem (secondary assessment) which determines the nature of the stress. The assessment affects the relationship between the individual and the environment. (Lazarus and Folkman 1984, quoted by Micheanbam 1985:11)

There is an amount of stress amongst people with jobs and these stress amps up the mental pressure in different ways. Job changes like organizational changes, changes in wages and salaries, job promotions, increase and decrease in human resources and social changes are amongst the subjects and which amp up the pressure on the person and make his mind busy and worried (Robins 1374:3). This worry differs in different jobs.

However, some jobs are more or less different; there is evidence of these kind of stress during a profession. Family Doctors Association in America estimates that about 3.2 of the people who are examined in their workplaces have indicators of the stress. Tip Gauss's (1977, quoted by Attar 1374:86) researches show that about 65% of the managers in the US think that their jobs are more stressful than other jobs. Corns (1973, quoted by the same) names some other stressing factors such as frequent travels, long-hour jobs, facing changes and problems in job and having to compensate for the mistakes related to the job. Coron Harz (1970, Quoted by Attar) found a meaningful relationship between bad job situations high velocity in working, high workloads, long hours of working and reducing mental health and job satisfaction. Also the quality of using the mind more and more smoking cigarettes causes heart and mental diseases. People who are forced to talk a lot with telephone, office employees and people who are forced to participate in long meetings smoke more than other people.

Margolis (1974) showed that the stress caused by high workloads results in some indicators of stress and mental diseases. Indicators like absence in job, sluggishness, not paying attention to the job and job stimulus is more in these kind of people. Role ambiguity and the conflict between roles are amongst the factors of job stress. Job ambiguity happens when the person doesn't know much about his job. Job conflict happens when the person is faced with requests that they don't like at all (Copper 1987:23). Job ambiguity results in lack of job satisfaction and also reduction of mental and physical health, BP, and high heart beat rate and increases mental disease indicators. Margolis and Cruz (1975, quoted by Attar 1374:64) found a meaningful relationship between depression, lack of self-confidence, lack of happiness in life and quitting the job. Beer and Mattson 1980 Quoted by Attar 1374:33 found out that role ambiguity is

associated with physical complaints and mental indicators.

The level of responsibility and the way people communicate with their colleagues and bosses, noise, light and job shift are amongst the factors which affect mental health and job satisfaction. (Copper 1373:52) Understanding the hurtful mental problems and their effects on the level of employees' job, studying and understanding the ways of facing them can help people getting along with stress (Malakoti et al 1373:12).

Stress resources

About the factors affecting one could say that organizational, individual, workplace and physiological stressors are the strongest predictors of stress and the reduction of mental power in employees.

As mentioned above sometimes job is affected by organizational stressors like lack of benefits, promotions and executive policies, organizational changes and managerial behaviors, and it is affected by workplace stressors including: job situation, brutality in the workplace, lack of social support, lack of job security, colleagues, changes and high level of accordance, or it could be affected by individual stressors like lack of clarity in roles and tasks, lack of job satisfaction, lack of role satisfaction, discrimination, bureaucracy and high workloads. These variables are the strongest predictors of stress and reduction of the employees' power. (Sotode 1388:18).

Obviously bad work situations not only affect satisfactory but also the level of stress. Now it has been proved that work situations like lighting, technology, noise, music, job hours, break time, weekly vacations, climate, the colors and decorations used in the workplace all in all affect the individual performance. (Sotode 1388:18)

Finally physiological stressors which can predict stress include: changes in work hours, noise, lighting, computer and tired eyes, carpal tunnel syndrome, body figures during the work, heat, ventilation, dust and sex. (Sotode 1388:18).

Workplace design also can be a predictor in job stress. So that one could say that exploitation problems, stress and job satisfaction and security are directly associated. A desired workplace is a kind of workplace which not only doesn't hurt one's health but also helps it. A good design in workplace could lead to improvements in exploitation and reduction of absence and economic benefits. To design a desired workplace, first one should consider physical dimensions of the employees and then they should try to embody at least 90% of them in their design. (Eshnavi 1989:76). Regarding this there is a principle: regarding the access and power weakest and smallest people are considered and for doors and spaces needed in the building biggest people are considered. Changing the designs and considering ergonomics are way easier when the

designs are still on the paper and not built yet. Workplace must be designed for the real work and optimized ergonomics should be embodied in it so that everyone could easily regulate it into their desired situation. One of the most important objectives of designing workplaces is to gain approval of the employees. Beyli suggests the three factors affecting the structure and the shape of the workplace orderly as the followings:

1. Accessibility and extra space
2. The situation of the user and the places for the indicators (in a factory, office or laboratory) or the vision (in a vehicle).
3. Physical state of the employee (stood or sat) and body support device (chair or bench). (Eshnavi 1989:76)

If the workplace is designed for the workers' comfort and welfare it can motivate them to do a better job. Factors affecting industrial workplaces include: human, plants, job and workplace. There also factors affecting workplace like: social, mental, physical, physiological, organizational, technological, and ergonomic factors. These factors are to be considered in designing. (Eshnavi 1989:77).

Ergonomics

The main definition of the ergonomics which is approved by the National Ergonomics Association is: ergonomics or the human factors of scientific principles is related to understanding of the interaction between human and other elements of a system and also the profession which includes theories, principles and data and methods to design in accordance with optimization of workers' comfort and the performance and the performance of the whole system (Akbari 2004:21). The term "Ergonomics" is made up of two Greece words; ergo meaning work and Nomos meaning rule. In the United States, engineering of human factors is believed to have the same meaning as Ergonomics. In Europe, it goes with work physiology and biomechanics and designing the work station. Meanwhile human factors of the Americans comes from empirical physiology and focuses on the human performance and designing organizations. (Ahmadi 1386:18).

Ergonomics is the science of studying people during the job to understand the complicated relationships between people and physical and psychological aspects of workplace, job demands and work methods. Ergonomics or human factors' engineering is a mixed science which tries to design tools, devices, workplaces and jobs considering mental and physical abilities and strains of human beings. (Samadi 1385:79) Ergonomics is a multidiscipline science which is active in four major fields namely: psychological engineering, job physiologic, job biomechanics and anthropometry. (Naini 1379:10)

Background

To find out about the backgrounds of this study in Iran or other countries we explored National Library, Scientific Documents Centre and central library of Tehran University but there were no sign of such a research except one. However there are some researches that are similar to ours in some levels. In this part of the study, researcher wishes to collect and report similar researches as much as possible and to use their results to answer the questions in this study.

In a study entitled “the effects of ergonomics in the workplace on quality management”, Mostafavi Dehzoï and Mohamad Mehdi (1387) concluded that working regardless of ergonomics may burden costs on management and employees and reduce efficiency. On the other hand in the past few years, studies have shown that ergonomics play an important role in reducing muscular-skeletal disorders, increasing yield, improving the quality, work life, security and overall efficiency of the organization and ergonomic experts also improved systems by optimizing the balance between human-machine and the environment. He elaborates that ergonomics has gone further than just a device and changed to a strategy to improve the yield, making the appropriate job, preventing job-related accidents and diseases and improving the performance and yield of human. So there is no more such thing as ergonomics regardless of organizational considerations and managerial systems. Then we tried to study the ergonomic factors affecting quality and yield system including: job physiology, job biomechanics, engineering psychology and anthropometry. Then total quality management based on ISO 9000 is introduced as the initiative of pioneer organizations. In the same direction, knowing the aspects of ergonomics, we study the effects on implanting a total quality management system based on ISO 9001:2008 and necessitate their use in total quality management based on ISO 9001:2008.

Morteza PourSharifi Ravari 1386 studies the relationship between job environment and ergonomics and elaborates that lack of ergonomics in the workplace burdens costs on the employer and employee both and also reduces efficiency and increase stress amongst employees. Meanwhile ergonomics and its appropriate use in the workplace results in reduction of the health and security problems and increases efficiency. However not enough attention has been paid to this matter. The main objective of this study is to analyze the role of ergonomics and its relationship with job stress. The results of this study showed that there is significant relationship between ergonomics in the workplace and job stress ($p \leq 0.05$). There is significant relationship between job physiologic and engineering psychology with job stress ($p \leq 0.05$). But there was no meaningful relationship between biomechanics and

anthropometry with job stress ($0.05 \leq p$). In this paper first a brief introduction was given in the literature of the study including: definitions, braches, and objectives of ergonomics, stressors, and the consequences of stress. Then hypotheses, methodology, methods of the analyses, tests used, conclusion and considerations are presented.

In a study in car industry, Mohamd FAM Et Al 1385 realized that job stress is directly and significantly related to unsecure behaviors and accidents. HematJo studied the relationship between the knowledge about ergonomics and job-related injuries in nurses and he concluded that these two factors are inversely related to each other. MosadeqRad also, found out that using ergonomic considerations and safe equipment play an important role in employees' efficiency and reducing job-related injuries. Sharee studied the relationship between ergonomics and the quality of the services. The results showed that there is a relationship in between. The results of PourAhmad also implied that there is a negative relationship between job stress and mental health. (Quoted by PourSharifi and Ravi 1386:3) In a study entitled “stress and burdensomeness of the men and women in senior roles”, Toss Lendberg et al 1999 studied the mental and physical reaction to stress by 21 male and 21 female managers of senior roles. The results showed that both women and men experienced their jobs as to be challenging. However all data suggested a better situation for men rather than women. Also due to the less salaries and household chores, women were more stressed out than men. (Lendberg, 1999:28)

Iron and Steel Trade Confederation published a report about Job Safety and health in steel industries in England which was about stressors associated with the job. In this report it was included that: there is strong evidence that mental aspects, long working hours, job sluggishness, lack of control on the workload and lack of social support in job and lack of time to improvements for job skills affect mental and physical health of the workers. (Morio 2:200).

$$\begin{cases} H_0 : \rho = 0 \\ H_1 : \rho \neq 0 \end{cases}$$

Random 2000 studied the individual assessment of the employees of the danger probability and real danger probability in a study entitled “perceived danger, perceived safety, and job stress among employees who were and weren't injured in on-sea oil installation”. The results were the followings: The results show that individual assessment of the employees is consistent with the real danger probability and also injured employees feel more in danger therefore they were not satisfied with the safety cautions and the action for preventing more accidents

and before the accident they were more stressed. (Random 2000:7)

White 2003 found the following results in a study entitled “safety and health actions in the workplace all around the northern America” Half of the workers (45% in Canada and 53% in America) were trained in the fields of health and safety. 69% in Canada and 70% in America felt these trainings were comprehensive. More than 60% of them (26% in Canada and 63% in America) said that they received a good observe regarding the matter of health and safety. A quarter of them implied that employers don’t report the accidents. Nearly 50% in Canada and 58% in America were informed about the rules supporting their health and safety in the workplace (White9:2003).Random 2000 in the above mentioned study concluded the followings: Individual assessment of the employees is in consistency with the real danger probability and also injured employees feel more in danger. Injured employees feel more in danger therefore they were not satisfied with the safety cautions and the action for preventing more accidents and before the accident they were more stressed because they have experienced the danger before.

Regarding the fact that human is a sociable creature and needs to communicate so that all the

satisfaction form their talents and abilities come into action, it’s important for human to learn about the things that result in promotion of the social skills. On the other hand for human to communicate it’s necessary to be in the society. Obviously the belief that a person will perform shamefully results in the constant fear and anxiety of the social situations. This may lead to the person less getting involved in society which needs more and more trainings to reduce social anxiety. We should have in mind that people who suffer social anxiety disorder generally escape form fearful situations in public and rarely endure social and performance situations and facing these situations they burden an extreme anxiety (Reginold, Herbert, Franklin 2003:639)

Population and Sample

The population and the sample are of the same size; 48 people. The tools used are the questionnaire about job stress developed by Mr. Refiq Hassani and the self-made questionnaire about ergonomics.

Reliability

Considering the Cronbach’s Alpha we could say that the questions in the questionnaire are highly creditable.

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Table 1. Creditability of the tools for the research and parameters

Factor	Number of person to check the reliability	Number of questions	Cronbach's alpha coefficient
Job Stress	30	31	0.76
Ergonomics	30	26	0.82
Engineering Psychology	30	10	0.73
job physiology	30	5	0.75
Anthropometry	30	6	0.85
job biomechanics	30	5	0.77

Findings

First hypothesis: there is a relationship between ergonomics and stress.

To analyze this hypothesis, Tau Kendall test was used.

X: ergonomics principles

Y: stress

What follows is the suppositions of the test:

The correlation coefficient between X and Y in

Tau Kendall test

In table 2(in end of article in index) because the level of meaningfulness is more than 0.05, then it is proved that two variables are independent and there is no meaningful relationship between them. The first hypothesis is rejected.

Second hypothesis: there is a relationship between job biomechanics (physical interaction between the human and the mechanical systems around such as bench, table...) and stress

X: biomechanics

Y: stress

In table 3 (in end of article in index) because the level of meaningfulness is more than 0.05, then it is proved that two variables are independent and there is no meaningful relationship between them. Hypothesis rejected.

Third hypothesis: there is a relationship between engineering psychology (noise, lighting) and stress.

X: engineering psychology

Y: stress

In table 4 (in end of article in index) because the level of meaningfulness is more than 0.05, then it is proved that two variables are independent and there is no meaningful relationship between them. Third hypothesis is rejected too.

Fourth hypothesis: there is a relationship between anthropometry (body dimension such as hands and feet) and stress.

X: anthropometry

Y: stress

In table 5 (in end of article in index) because the level of meaningfulness is more than 0.05, then it is proved that two variables are independent and there is no meaningful relationship between them. Fourth hypothesis is rejected too.

Fifth hypothesis: there is a relationship between job physiology (fatigue, static and dynamic works and work-rest regimes) and stress.

X: job physiology

Y: stress

In table 6 (in end of article in index) because the level of meaningfulness is more than 0.05, then it is proved that two variables are independent and there is no meaningful relationship between them. Fifth hypothesis is rejected too.

Discussion

Globalization and setting new economic rules amps up the pressure on workers (Morio 2000-2). Maybe the changes and revolutions which lead to universal competition and evolving technologies are the key factors. The nature of jobs is changing very quickly and more than any other time, now job stress has to be taken seriously as a threat for workers health and as a result for the health of the whole society. Considering that now thousands of organizations are running their business. We have reasons to believe that this number is rising. So lack of the needed dynamicity is not a mere theoretical subject but a matter of concern in economics, culture and industry.

If this matter is not take into account properly, a big number of industries and services will face difficulties in their way and won't be able to gain benefits they want. On the other hand, a proper understanding of the factors affecting ergonomics and using them may lead organizations to step into the appropriate way with the appropriate velocity. Regarding the high costs of stress, its effects on disease and health, and also its effects on the quality of the goods and services in the organizations, there is no other way but to regulate organizations to reduce stress and normalize the processes. Considering the fact that main hypotheses as well as secondary ones were rejected following conclusions are to be developed:

1. Respondents were not thoroughly informed of the objectives of the questions.
2. Lack of positive view in respondents.
3. Lack of eagerness in respondents.
4. Lack of knowledge in researcher due to lack of access to new information and/or their skills.
5. Lack of familiarity in respondents with the concepts used in the questionnaire which researcher tried to

solve by being present when respondents were filling the questionnaire and answering the questions.

6. Because the questionnaire were distributed among different roles, results differed and hypotheses were rejected.

7. Assessing a psychological variable like stress against a non-psychological variable led to unacceptance of the hypotheses.

8. Implantation of ergonomic principles did not result in satisfaction of the workers yet other factors like job promotion and motivating were more meaningful in reducing stress.

9. Implantation of ergonomic principles did not does not necessarily mean that workers were familiar with them and act according to them properly.

10. There was a lack of training for the workers and they were not aware of the importance of ergonomics.

11. Lack of references and books to answer questions concerning ergonomics more clearly.

Suggestions to organizations

Considering the high level of stress from the educational point of view, following suggestions are made by the author:

1. Lower expectations to the level of ones abilities and individual and organizational goals are to be directed to the same way.
2. Supply enough resources to the workers.
3. There must be a balance between one's tasks and abilities. If we ask someone to do more than he can they can be mentally or physically tired through time.
4. Setting rational indexes to assess performance.
5. Give the workers an appropriate amount of time for the tasks.
6. Use workers abilities and skills.
7. Job stroll can motivate workers.
8. Don't ask workers to do two tasks at the same time.
9. Consider the quality and not the quantity of the work done.

Suggestions for the future researchers:

1. Regarding the fact that this study was conducted in the Gas Company of Shahrood with complete training and equipment concerning ergonomics we suggest that future researchers conduct studies in other companies in which there is training or equipment concerning ergonomics.
2. Comparative assessments between different organizations and analysis of the results
3. Future researchers analyze stress and ergonomics from a different aspect and introduce different indexes
4. Regarding the fact that this study was not meant to reduce stress future studies could be based on reductions in stress and the results could be assessed then.

Index

Table 2: Tau Kendall correlation test

Stress	Principles of Ergonomics						Tau Kendall correlation	Number of person	sig
	Options	Strongly disagree	disagree	Somewhat	agree	Strongly agree			
	Disagree	0	0	1	0	0	-0.01	48	0.89
	Somewhat	0	0	9	2	1			
	Agree	1	2	22	9	1			
	Options								

Table 3: Tau Kendall correlation test

Stress	job biomechanics						Tau Kendall correlation	Number of person	sig
	Options	Strongly disagree	disagree	Somewhat	agree	Strongly agree			
	Disagree	0	0	1	0	0	-0.00	48	0.98
	Somewhat	0	6	3	3	0			
	Agree	2	14	10	7	2			
	Options								

Table4: Tau Kendall correlation test

Stress	Engineering Psychology				Tau Kendall correlation	Number of person	sig
	Options	Disagree	Somewhat	agree			
	Disagree	1	0	0	0.01	48	0.95
	Somewhat	0	6	6			
	Agree	0	21	14			
	Options						

Table5: Tau Kendall correlation test

Stress	Anthropometry				Tau Kendall correlation	Number of person	sig
	Options	Disagree	Somewhat	agree			
	Disagree	1	0	0	-0.02	48	0.87
	Somewhat	6	5	1			
	Agree	19	14	1			
	Options						

Table6: Tau Kendall correlation test

Stress	job physiology					Tau Kendall correlation	Number of person	sig
	Options	Strongly disagree	disagree	Somewhat	agree			
	Disagree	0	1	0	0	0.01	48	0.74
	Somewhat	0	4	4	3			
	Agree	2	9	13	7			
	Options							

References

- Purshrifly and ravi: <http://www.migna.ir/ravanshenasi/ravansanati/1669-1389>
- S, Shamlou, "Mental Health", Tehran - Growth, 1380 - Fourteenth Edition
- Lazarus, RS, Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer
- Kryts: "health psychology" - Anthony J. Kryts - translated by Dr. Ali Fathi-Ashtiani - Hadi Azimati Ashtiani, 1385
- Kmny quoted by sayeban farc, Z. (1381) "Stress in the workplace". Journal of tadbir - No. 117 - Head of Iran aban
- Taheri, Shahnam - (1378), "ergometer and Voting" - Tehran - Arvin
- Mayknbam: Mayknbam, Donald, (1376), "stress inoculation training, translation" S. Mobini, Tehran, growth Publications
- Hlandr, Martin (1375), "human factors engineering and manufacturing industry (Ergonomics)" Translation Choobineh A. - Shiraz. rahbord journal.
- Muryy: (1984), "The Stress Of Life". New York: MC Grow-HLL,
- Shahnam Taheri: (1376) - ergometer and Voting - Tehran, Arvin.
- S. Jvady - SR (1385), "Fundamentals and Applications for Human Resource Management Personnel Branch", Tehran, Iran, at school
- Alvani - SM - "General Management" - Tehran - Publishing Nei 1379
- Astvra Benjamin (1377), "Stress", translated Parirokh Attorney Tehran, growth Publications.
- Amini, A. (1388), "A study on the causal factors of micro and macro ergonomic disaster in Bhopal", International Conference on Ergonomics,.
- Birashk and colleagues (1386), "compared the personality factors and events. Stress and social support in patients with coronary heart disease and non-patients", Journal of Contemporary Psychology, Volume II, No. 3, pp. 48-41

16. Pour Shahbaz, A. (1372), "the relationship between stress and personality type assessment in patients with leukemia", MS Thesis, Tehran University of Medical Sciences.
17. joze Canaan, M., Mortazavi, B, Khans, A.; Asilian, H., "Ergonomics, Safety and Productivity", First International Conference on Ergonomics, 1388.
18. Hafez nia. Mohammad Reza (1388) "Introduction to Research Methods. Humanities", Tehran University of humanities studies and writing books (side)
19. Ghadamgahi Hosseini, J. (1376) The quality of social relationships and coping with stress in coronary heart disease, MS thesis, University of
20. Heidari Mahmoud, Rafie Emami, M., "Evaluation of ergonomic problems employed in one of the libraries and documentation centers in the country", the International Ergonomics Conference, Tehran, Iran, 1388.
21. khaki, GR(1388) "Method approach to writing a thesis". agah Publishing
22. Dmystr, Weber, "Ergonomics for beginners", translated by A. M. Ghasemi, Third Printing, Publishing Center, Tehran, 1387.
23. Robbins, Stephen, "Fundamentals of Organizational Behavior", translated by Muhammad Ali Parsayyan and aarabi, Thirteenth Edition, Cultural Research Bureau, Tehran, 1385.
24. Robbins, Stephen (1374). "Managing organizational behavior". Translation: Muhammad Ali Parsayyan and aarabi. Tehran: Publications of the Institute of Business Studies and Research.
25. Seyedi, M., S., Elham, siavashi.; "ergonomic "A" to "Y" ", Journal of Medical Engineering and Laboratory Equipment, Year 7, No. 84, 1387.
26. Schafer, Martin (1370). Stress. Translation: P. Blvrchy. Tehran: Publications Pazhmk.
27. Shahriar Ahmadi, M., "psychology, human factors (ergonomics)", the Zrbaf Publications, Tehran, 1386.
28. Sadeghi Naeini, H., "ergonomic design of the cargo handling systems for manual", asana Publications, Tehran, 1379.
29. Sadra Abrqhoui, N., Hosseini descent, Hassan; "anthropometry in Iran, Iran", First International Conference on Ergonomics.
30. Samadi, S., "ergonomic, four publications", Tehran,1385. Attar, H. (1374). "Investigate the relationship between job stress, job satisfaction and mental health staff in an industrial complex". Psychology Master's thesis. Tehran Psychiatric Institute.
31. Fadavi, Arifa, "ergonomics and productivity", tadbir, 86, mehr, 56-60, 1377.
32. Fontana, David (1371). "What is Stress". Translation: bahman Najjarian. Journal of medicine and therapy, since I, No. 66-56.
33. Cooper, Curry L. (1373). "Stress: how to recognize and cope". S hot Qrachh Mehdi Shariat Zadeh and Nahid. Tehran: Publication of roshd.
34. Malakouti, SK; Bakhshany, Noor Mohammad, venereal, T. (1373). "The relationship between job stress and depression and anxiety in hospitals Knarknan University of Medical Sciences". Journal, the first year. No. 2 and 3, 86-76. Sotoudeh, Hossein-Ali, 1388 work-related stress management and ergonomic perspective, Journal of Health Department of Health Golden Horizon Zabol University of Medical Sciences
35. Mirsepasi, N. (1375): Human,"resource management and labor relations, strategic vision", Shervin Publications, Tehran.
36. Varmarzyar, S., Safari, A., Yunesi, M.," Evaluation of working postures and musculoskeletal disorders among employees of pharmaceutical packaging using RULA methodology and questionnaire BODY MAP, International Ergonomics Conference, Tehran, 1388.
37. Waahhabi, Hosseinzadeh,," job security approach and its role in maintaining the safety and health of employees in the organization", Journal of management strategy, Issue, 1385.
38. Ader, C. H. & Cohen, N. (1993). Stress and Coping Psychology, 34 Developmental, 35-28
39. Brown, J. and Campbell, E.A. (1994), Stress and Policing, John Wiley, Chichester
40. Bremner ·Douglas, (2002) Does Stress Damage the Brain, www.amazoon.com
41. Holahan, C.J. & Moss, R.H.(1997).Life stressors, personal and social resources and depression. Journal of Abnormal psychology Feb. Vol.100, Lssuel. Pages: 31-38.
42. Michenbaum, D. (1985). Stress inoculation training. NY. Pergamon
43. vance,b,miller,s,humphreys ,s,humphreys,s. reynold.f.(1989).stress and manifestation of occupational stress as reported by fulltime teachers working in a big school.journal of american indian education, .28
44. issac,a. friedman,n.(1995)..student behavior patterns contributing to teacher burnout journal of educational research289-88,281 ,