«Original Articles »

Job design impact on plasma lipid level, depression, job burnout, employee fatigue and workload in workers from Isfahan province Gas Distribution Company

Hamid Reza Oreyzi Samani[1], Fatemeh Ahmadi[2*]

1- Professor Assistant of Industrial/ Organizational Psychology, Faculty of Education and Psychology, University of Isfahan, Iran.

2-Master student of Industrial/ Organizational Psychology, Faculty of Education and psychology,University of Isfahan, Iran.

⋆*Corresponding author:*
Fateme Ahmadi; Master student of Industrial/ Organizational psychology, Faculty of education and psychology, University of Isfahan, Iran.
Tel: 09373569566
Email: ahmadi.sara64@gmail.com

Abstract

Background: How to do the job and its design is a variable that influences the job related stress. Fatigue and job burnout are the most common side effects due to the stress at workplace. In addition, recent evidences are linked the relationship between psychological stress and exhaustion with a variety of physical symptoms and diseases like high blood pressure, elevated blood cholesterol and cardiovascular diseases. The aim of the current research was to investigate the relation between compose of job-burnout, fatigue, depression and job overload as psychological variables with cholesterol and triglyceride increments and investigate moderator role of demand-control imbalance.

Material and methods: Statistical populations for this study were personal of Isfahan Gas Distributor Company in 2011. The instruments were Burnout Questionnaire of Maslach, Fatigue Questionnaire of Shirom, Overload Questionnaire of Shirom, The Epidemiologic Studies Depression Scale (CES-D) and demand control Questionnaire of Karasek. Plasma lipid was measured as dependent variable.

Results: Findings indicated that there were significant differences among all psychological variables (except for depersonalization) between the two appropriate and inappropriate job design groups and medical variables. It was also observed a higher level of serum lipid in the inappropriate job design group.

Conclusion: The high demand developed personal emotional exhaustion which in turn caused increased the blood serum lipid. However, the control on the job acted as a supportive shield preventing the individual against the developing of job burnout.

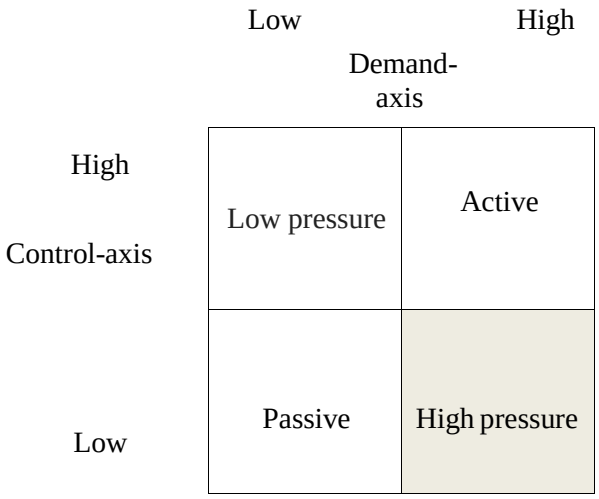
Keywords: burnout, cardiovascular diseases, depression, fatigue, job design, lipid serum.

►*Please cite this paper as:*
Oreyzi HR, Ahmadi F. Job design impact on plasma lipid level, depression, job burnout, employee fatigue and workload in workers from Isfahan province Gas Distribution Company. Jentashapir J Health Res2014;5(1): 495-507

Received: 15.09.2012 **Accepted: 16.02.2013**

Introduction

Today, at least one-third of human life is spent at work place and the many social relations are formed during working hours. Each individual's professional career is often fraught with challenges and obstacles that can be a source of tension and stress (1). Psychological stress on the job can be considered due to the sum of job-related stress situations which causing a variety of consequences and complications with the physical, emotional, and behavioral known effects (2). The most common side effects of stress at work are accounted for tiredness (fatigue), psychological problems, job burnout, reduced performance and problems with the sleeping (3). In addition, the approved studies have shown that the jobs with high stresses play an important role in causing heart Cardiac Vascular Disease (CVD) and its risk factors (4, 5). How to do the job and its designing is a variable that have affects on the psychological pressure resulted from the job; For example, if a person have been given a lot of tasks to carry out, but s/he have not his own independence to chose the method and timing to fulfill the given jobs, it follows that s/he will suffers from psychological pressures resulted from the job. As a result, it can be said that the job designing has the practical importance for organizations. It has also a profound impact on the careers performance and considering the aspects of the designing of the job in the personal consequences produce a major insight into the job outcomes. A question that arises is whether job design and stress related cardiovascular variables *i.e.,* cholesterol and triglycerides are related to the issue? Although, this subject has raised the motivation to carry out the numerous studies on the relationship between mental health and job design, but with less consideration on the physical health issues specially its relation to the serum lipid levels. Control model of the Job Demand Control (JDC) of the Karasek & Theoroll (1990) has been proposed to examine this relationship (6). This pattern can predict the incidence and producing of the coronary heart disease (7, 8). According to this theory, the demand and the job control are considered to be the two most important elements of the job (9). When the job demand is high, but the job control of the individuals is low, the job itself will be a source of stress. In reviewing the approved researches; demand, the contact method and the individuals communications, the level of individual autonomy given to the person (individual control over the work), as well as the level of received support are the factors have been identified that are associated with the level of the individual health. The jobs that people do not have their own decision-making autonomy and do not receive the social support from others in the workplace, will lead to the psychological stress and job burnout (10, 11). People based on the requested applications and the controlling the jobs that are in accordance with the chart (1) can be divided into four categories.



Risk factors for psychological stress and physical illness

Chart 1 (12)

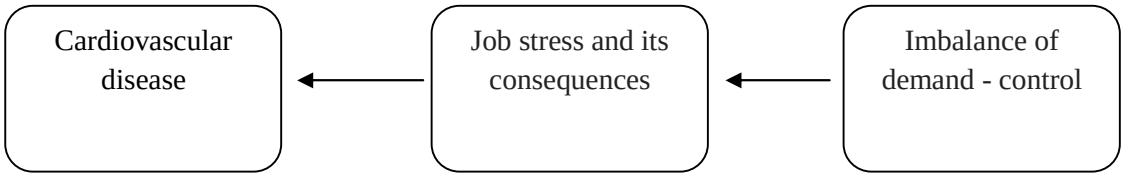


Chart 2: the inappropriate job design affect on the creation of psychological stress and heart diseases

The job overload such as psychological job stress probably originated from the wrong job design and in turn could jeopardize the individual health (13). The job overload in the researches is considered as the predictor of job burnout, fatigue and physical and mental illnesses (14). The relationship of these three variables is presented in the chart (2).

Job characteristics such as; job overload, role conflict, role ambiguity, and lack of the social support as well as the experience of injustice in the workplace can lead to job burnout incident among the workers (15). The job burnout causes that the individual both psychological and physical health may be in peril (16). The most studies for definition of the job burnout refer to Maslash and Jackson's view (1993) (17). Based on the Maslash and Jackson's view the job burnout psychological syndrome consist of three components of emotional exhaustion, depersonalization and decreased personal sense of achievement success which occur among the workers of the jobs social services (18).

Emotional exhaustion refers to drained feeling and reaches to the bottom for the emotional and physical resources, while the depersonalization refers to negative responses, extremely insensitive or indifferent to the various aspects of the job. However, the decreased personal performance refers to degrade and reduce the feelings of competitiveness or productivity at work (19).

Shuffleboard and Banks (2003) have classified five signs of the job burnout: Emotional (*e.g.*, crying, low mood or anger), cognitive (*e.g.*, feeling miserable, lack of attention and impaired memory), physical (*e.g.*, fatigue, sickness), behavioral (*e.g.*, absenteeism, defective performance), and motivation (*e.g.*, lack of enthusiasm) (20). The majority of the

researches for the job burnout have been carried out among the teachers (21, 22) and nurses (23) and their relationship with psychological variables, however, the present study has the innovation at the domestic; first the relation of job burnout and the lipid variables were examined, and the second that it was carried out among the gas company employees. With increasing the job burnout, the psychological and physical health of the individual falls (24). The relationship between job burnout and absenteeism caused by illness has been also reported by Ahola (2008) and Maslash (2001) (25, 26). During the recent years, the psychological stress and job burnout were linked with symptoms and various physical ailments like high blood pressure, increased blood cholesterol level and cardiovascular diseases (27). Pelfrene and his colleagues (2002) in their study found that the stress factor of demand for job influences on the men blood pressure and the total cholesterol (TC). These two factors also play an important role in cardiovascular reactivity (28). The results from numerous studies have also identified that the elevated levels of total cholesterol and triglyceride (TG) are known as the independent predictors of cardiovascular disease (29, 30).

In the Leynin and colleagues (2003) study, they found that, not only the imbalance in demand - control could be involved in diabetes prevalence, but also the lack of control alone is a risky factor in the occurrence of diabetes (31). Researchers are accounting the numerous factors, such as cases of anxiety and depression, social stress and conflict as high risk factors in prevalence of the abnormal coronary contraction, malignant disorders of heart rate and as a result, the heart failure (32). Tohidi and colleagues (2009) found that the serum lipid abnormalities contribute a significant role in increasing the risk factor for cardiovascular events in patients with the diabetes (33) and Hadaegh *et. al.*, (2005) accounted the serum levels of total cholesterol as a reasonable selection for measurement to predict the cardiovascular disease events for the short term in developing countries (34). Tiredness as the feeling of mental weakness is the burnout and shortage of the energy which is characterized by decreased energy and high excitability (35). The job tiredness as the relatively constant feelings is the lack of interest and difficulty in the focus on the undertaken activities, resulting in that the person try to keep or return the attention through performing a lot of conscious efforts (36). The job burnout shows the symptoms of the disease earlier than the fatigue and with the change in work or task is improved, while those who are suffering from fatigue, it can be improved and the treatment can be achieved by recognition of the behavior (37). Studies show that fatigue increases 2 to 3 times the risk of cardiovascular disease (38, 39). There is also a negative relationship between fatigue and the health of cardiovascular patients. Nasri (2004) indicated that psychological stress increases the vulnerability of the individual to develop symptoms of chronic fatigue syndrome and plays an important role (40).

According to the results from conducted researches in this context, and given that nowadays, special attention has been performed on the role of psychological and social factors on health and disease, the present research attempted to prove the existence of a correlation between the components of psychological well-being, including job burnout, fatigue, depression, and job overload with increased cholesterol and triglycerides and also to investigate the modulatory role of the lack of claiming for the control-demand. The argument hypotheses presented in this study were accounted as:

1-There is a difference between psychological variables in both appropriate job design and inappropriate job design.

2-The blood lipids serum levels (blood fats) in the inappropriate job design is

higher than the lipid level in the appropriate job design.

Following the above two hypothesis that compared the difference between the two groups the modulator role of the job designing has been discussed in terms of the relationship between psychological variable (first hypothesis) and blood lipid levels (second hypothesis) in hypothesis 3.

3-The negative relationship of psychological variables (burnout, depression, fatigue and job overload) with blood serum lipid levels in inappropriate job design is positive and significant, however, the relationship of these variables with the blood serum lipid level in appropriate job design is negative and the difference between these two relationships is statistically significant.

Material and methods

This study was proposed as a causal after the event incidence (ex post facto), and its statistical population was selected from the Esfahan Distributor Gas Industry workers in 2011. For the sampling size with respect to the subgroup analysis and eight main variables in every table box, the number of required samples for each table box was determined at 32, and in total, 128 samples were randomly selected. Farahani and Oreyzi (2008) recommended that to investigate the modulatory relationship of the causal designs after the incidence in every box at least 4 samples per box are required, for each variable, as a result, for ' n ' box, ' 4n ' samples should be considered (41). To execute the study all contributors from the Gas Distributor Industry were assured for the confidentiality of the obtained results as well as the employees were contributed in the annual medical tests. In the meantime that the study was carried out simultaneously with the annual medical tests the questionnaires tools were also disseminated between the workers in the on-site testing method.

The random sample method was applied among the patrons. In medical tests, pre - medical test was applied to determine who should be attending during the day. The simple randomly method was assigned to select the individuals based on their archive from among the persons who referred to traditional medicine. At the same time, who were randomly tested for medical examinations were identified to be contributed in this study. The statistical population of this study was the workers from the Esfahan Gas Distribution Industry in 2011. Employees mean age was 39.44 with standard deviation of 4.49. The mean duration of employment was documented as 14.65 with standard deviation of 5.37, respectively.

Inclusion criteria for the study subjects were having at least 3 years of experience. The subjects who experienced less than 3 years were excluded. Exclusion criteria for the subjects were having a history of cardiovascular diseases and cholesterol levels of higher than 220 mg/dl as well as triglyceride more than 200 mg/dl before starting the job in the organizations. The selected contributors were identified through reviewing of their medical file records.

Statistical methods for the first and second hypothesis of the study were as first, the multivariate analysis of variance as the omnibus test (Wilks' Lambda), and second, the one-way analysis of variance. For the third hypothesis using the Fisher's Z transformation formula the below equation was applied to compare the relationships (42).

$$Z_{r1-r2} = \frac{Z_{r1} - Z_{r2}}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}$$

In the gas company, at the beginning of selecting the workers the industrial medical screening tests were applied to the workers and if the criteria came to be negative, their employment was ruled out. In the current study the subjects were informed about the intention of study and they have been admitted at the health center of workplace for testing between the hours of 7 to 9 in the morning after fasting for 12 to 14 hours. The selected subjects were examined for the systolic and diastolic blood pressures.

Furthermore, a venous blood sample for measurement of serum concentrations of cholesterol and triglycerides levels was obtained using an automatic analyzer. Afterward, in order to collect the psychological variables information and to evaluate the job designs, the intended questionnaires were applied. Among the studied samples a number of 40 specimens were selected for re-testing reliability for which the selected subjects answered again to the psychological questionnaires week after the first visit. Another 40 members of the other three types of reliability were used; the results of all four types of reliability and validity coefficients are reported in Table 2.

The applied questionnaires were categorized as followed:

The job designed questionnaires: To measure the components of demand and control in the job design, the Wall, Jackson and Mullarkey's questionnaire (1995), was used. The reliability and validity of the job designed questionnaires were approved in the Wall, Jackson and Mullarkey's study (1995) (43).

The job burnout questionnaire: The Maslach and Jackson's job burnout questionnaire (1993) was applied. The questionnaire consists of three components of the personal performance, emotional exhaustion and the depersonalization dimension.

The reliability of the questionnaire for the sub-scales was documented in numerous studies and was determined more than 0.7. The validity coefficient of the questionnaire through correlation of a question which generally measuring the concept is presented in the Table 2 (Column 5).

Fatigue questionnaire: Contains three questions (Shirom, 1989) which was translated in this study for the first time (44).

Work overload questionnaire: Contains 5 questions (Shirom, 1981) which was translated for the first time in the present study (45).

The Center for Epidemiological Studies-Depression Scale (CES-D) questionnaire:

With 20 questions that measure depression and a score above 16 indicates an acute depression.

Since the questionnaires of the fatigue and job overload were translated and used for the first time in Iran, in order to obtain the valid and reliable scales, the researchers developed a preliminary sample method of the population to analyze the obtained results and achieved the results in terms of the reliability and validity of the applied questionnaires. The reliabilities of the other questionnaires are presented in Table 2.

Furthermore, to examine the current study, the investigated subjects have been separated into two groups based on the designed questionnaire and the Karasek method. A group shows control and inappropriate demand which in fact to structure this group the subjects were selected in the way that the control variable was lower than the median and the demand variable was a little higher than the median in order to select the subjects. Other subjects were considered in the group of control and appropriate demand. According to Table 1, the amounts of 25% of people were placed in the inappropriate and the remaining were placed in the appropriate group.

Table 1: The frequency distribution of studied groups

%	Frequency	
25	32	Control and inappropriate demand
75	96	Control and appropriate demand
100.0	128	Total

Table 2: Applied descriptive indicators and psychometric variables in the study

Gutman index	test-retest and reliability	Coefficient bisection	Coefficient Validity	Chronbach' alpha Reliability	Average	Variable name	Variable dimension
0.69	0.84	0.71	0.61	0.72	15.08	Product responsibility	Demand
0.72	0.82	0.73	0.53	0.74	16.45	Problem solution	
0.72	0.81	0.74	0.59	0.71	13.26	Surveillance	
0.73	0.82	0.75	0.63	0.79	44.79	Total	
0.74	0.79	0.72	0.67	0.69	18.08	Method	Control
0.79	0.81	0.84	0.56	0.82	13.39	Time	
0.79	0.83	0.81	0.59	0.84	31.47	Total	
-	-	-	0.61	-	175.25	Cholesterol	Medical
-	-	-	0.57	-	159.28	Triglyceride	
0.74	0.80	0.73	0.69	0.76	13.31	Emotional exhaustion	Psychological
0.76	0.79	0.75	0.58	0.72	5.25	Depersonalizing	
0.77	0.77	0.77	0.54	0.74	12.65	Decreased individual performance	
0.75	0.75	0.74	0.65	0.71	7.79	Depression	
0.77	0.78	0.75	0.59	0.77	8.88	Fatigue	
0.73	0.73	0.76	0.65	0.75	12.25	Job overload	

Table 3: Comparing the two groups with appropriate and inappropriate job design in terms of the cholesterol, triglycerides, and psychological variables

F	df_2	df_1	Integrated variance	inappropriate job design group				Appropriate job design group				Variable	
				Number	Variance	Standard deviation	Mean	Number	Variance	Standard deviation	Mean		
5.52*	126	1	3.10	42	82.26	9.07	16.42	96	73.27	8.56	12.28	Emotional exhaustion	Psychological variable
2.34	126	1	0.74	42	19.18	4.38	6.24	96	17.72	4.21	4.92	Depersonalization	
5.59*	126	1	2.57	42	92.93	9.62	16.43	96	52.70	7.26	12.43	Dcreased personal performance	
7.84*	126	1	2.69	42	57.40	7.75	9.23	96	68.23	8.26	4.46	Depression	
39.44**	126	1	0.26	42	9.06	4.01	11.24	96	5.11	2.26	8.10	Fatigue	
37.33**	126	1	0.14	42	1.58	1.26	14.9	96	۳/۳۵	1.83	11.7	Job loaded	
28.30**	126	1	5.96	42	171.61	13.01	191.09	96	137.36	11.72	178.11	Cholesterol	Medical variable
427.66**	126	1	1.54	32	53.00	7.28	172.21	96	32.38	5.69	146.35	Triglyceride	

0.01<P ❊❊= 0.05<P❊=

Table 4: Cholesterol and triglycerides associated with psychological variables in the both appropriate and inappropriate design jobs

Inappropriate job design group				Appropriate job design group		Variable relationship	
Zr1-r2	Sr1-r2	Zr	R	Zr	R		
2.632*	4.701	0.347*	0.334*	-0.213*	-0.21*	Emutional exhaustion	Cholesterol
1.043	4.701	-0.085	-0.085	0.137	0.136	Depersonalization	
0.794	4.701	0.117	0.117	-0.052	-0.052	Decreased	
0.087	4.701	0.0924	0.0924	0.0735	0.0735	Depression	
2.261*	4.701	0.304*	0.294*	-0.177	-0.176	Fatigue	
2.256*	4.701	0.324*	0.313*	-0.155	-0.154	Job overload	
0.254	4.701	0.147	0.146	0.093	0.093	Emotional exhaustion	Triglyceride
0.794	4.701	-0.097	0.097	0.071	0.072	Depersonalization	
2.181*	4.701	0.304*	0.235*	0.171	-0.169	Decreased personal performance	
0.230	4.701	0.093	-0.0936	0.044	0.044	Depression	
0.108	4.701	0.139	0.139	0.116	0.115	Fatigue	
1.21	4.701	0.146	0.145	-0.112	-0.112	Job overload	

0.05<P ❊=

Table 4 compares the relationship between cholesterol and psychological variables in that appropriate and inappropriate job design groups.

Results

As can be seen the descriptive indicators and psychometric variables are given in Table 2. Wilks' Lambada was applied for the analysis of the multivariate of F statistic. All F values in the level of P < 0.001 were significant. Following the correction of Bonferroni – Holem the differences were still significant. Following the application of multivariate analysis of F-test variance which is an omnibus test for differences, the one way ANOVA test was applied to evaluate the differences between the appropriate and inappropriate job designs groups in medical and psychological variables. The results are given in Table 2.

According to the findings in Table 3, the differences between appropriate and inappropriate job design in variables of emotional exhaustion, decreased personal performance, depression, fatigue and job overload were significant, however, for the depersonalization dimension the difference was not significance. The situation in all these groups was advantageous to appropriate job design group. In the cholesterol and triglycerides variables condition also was advantageous to appropriate job design group and there was not a significant difference between this group with the inappropriate job design group.

To examine the modulatory role of job design in terms of the relationship between psychological variables and the two medical variables of cholesterol and triglycerides which can be applied either through the modulatory regression analysis method or the method of transforming into the sub-category and Fisher's z conversion. Given that the better statistical power of the later method, the method was used and the results are reported in Table 4 (In the modulatory regression there was an interaction between the Cholesterol C and job design D:

Bc × D = 0.67 which in the level of P < 0.001 was significant. In addition, between triglycerides T and job design there was interaction. B_T × D = 0.54 that in the level of P < 0.001 was significant).

'Zr_1' and ' Zr_2' have been obtained through conversion of the correlation coefficients of Fisher Z. For small values the difference was insignificant and with enlargement of the ' r ' consequently the ' Zr ' would have increased considerably. As can be seen the results in Table 4 indicating that the relationship between cholesterol levels in the inappropriate job design group with the emotional exhaustion, fatigue and the job overload were positive, however, triglycerides had a positive and significant relationship with personal performance. In addition, there was a significant difference between the two groups of the appropriate and inappropriate job design.

Discussion

The present study intended to investigate the relationship between psychological variables factors with cholesterol and triglycerides in both appropriate and inappropriate job design groups. The results of this study showed that among all the psychological variables (except the variable of depersonalization) in both appropriate and inappropriate job design groups and also between medical variables of the two groups there was a different. These findings could be clarified based on the theory of Karasek and Teorol (1990). According to this theory, when the demand is high but the person has little control over his job, the person would be under the stress causing the decreased personal performance and consequently feeling exhaustion. The exhaustion feeling will also cause physically impair in the personal system. In fact, the high demand from the individual will cause emotional exhaustion. If the job is designed inappropriately it will lead to the increased of blood serum levels, psychological problems, depression, job burnout and the feeling of job overload. Therefore, it is recommended that the organizations'

managers based on the related principals design the jobs in a way that will create a balance between the demand and the control.

Given that the studies have shown that control in the job for the workers can be accounted as a protective shield and has a supportive action against the job burnout (46, 47), therefore, it must be bear in mind that the control factor should be increased for the workers that demand for the doing the tasks is high in order to improve their psychological and physical health.

The importance of the control role can also be explained based on the theory of the Hubfal's resources maintenance (1989) (48). According to this theory, the individuals are looking to achieve and maintain the resources that are valuable to them. There are varieties of resources including material resources, social and etc.

According to the maintenance resources theory, when people are losing their sources and there are not capable of finding the new resources they will be under the stress. Therefore, it can be said that the job demands could cause personal tension. In another word, applying the control component in the appropriate job design can act as a resource in order to avoid the personal psychological trauma.

As a result, it can be implied that the increasing of the control component in the jobs, the decreasing psychological stress and the negative associated effects, including; fatigue, depression and exhaustion. Furthermore, the increasing component control will also bring the job satisfaction to the workers. Thus, the workers would have a better feeling towards their jobs. In other words, control on work and balance between demand and control act as a psychological resource and causes fewer depression side effects influencing people's health and subsequently, improve the personal physical and psychological health. Therefore, those who had an inappropriate job design were experiencing a greater job burnout, fatigue and overload. In addition, a higher level of cholesterol and triglycerides was reported for this group of the workers. The findings obtained from the current study were aligned with the results from Karasek, Bakker, Marxer, Ahlbom and Theorel (1981); Melamed, Kushnir and Shirom (1992); Appels and Mulder (1989); Willenz (2005); Stansfeld and Candy (2006); Kivimaki, Theorell, Westerlund, Vahtera and Alfredsson (2008). However, in appropriate job design group, the control component acted as a protective shield and prevented the job negative effects and the workers have reported a lower level of the job burnout, exhaustion, and consequently, lower cholesterol and triglyceride levels in their blood serum (50, 51, 52, 53, 54, 55). In the case of de-characterizing it can be said about the character of those who are suffering from depersonalization, they felt that they generally were apart from their jobs. They found a very negative attitude towards the job and had a pessimistic feeling towards the people who are around (56). They were cynical enough to the job as well as the colleagues around and given a sense of control on the job couldn't reduce their negative feeling; because they are negative about everything around them. Therefore, giving the control component to them may also be included as a sense of pessimism and thus will not have a positive effect on their character. As a result, for these individuals, treatment should be the first ponder ways.

One of the most important findings in the current study was the interaction role of the medical and psychological variables. The cholesterol indicated a greater relationship with the emotional exhaustion, fatigue and job overload, however, the triglyceride showed a higher connection with the decreased personal performance. Furthermore, the psychological variables were specifically more related to a particular part of the blood serum lipid (Although they showed a relationship with the both cholesterol and lipid levels, but

with one had more relation). In terms of the given patients' medical profiles this point was very interesting because it could show a way to rectify the individuals difficulties, for example, if someone had high cholesterol level an intervention was designed to reduce his or her emotional exhaustion or if had a high level of triglyceride the attention was focused on the personal performance. This issue confirmed the relationship between the experts in two level of industrial and medical psychology.

Acknowledgments

The researchers have to be thanked to all employees from the Esfahan Gas Distributor Company, who sincerely cooperated in implementing this study.

References

1-Cooper C (ed). The stress check. New York: Prentice Hall; 1981.
2-Rod M, Ashil NJ, Carruthers G. The relationship between job demand stressors, service recovery performance and job outcomes in a state-owned enterprise. Retailing and Consumer services 2008; 15: 22-3.1.
3-Kompier M. The psychosocial work environment and health- What do we know and where should we go? Scan J Work Environ Health 2002; 28: 1-4.
4-Belkic KL, Landsbergis PA, Schnall PL, Baker D. Is job strain a major source of cardiovascular disease risk? Scand J Work Environ Health 2004; 30: 85–128.
5-Backe EM, Seidler A. The role of psychosocial stress at work for the development of cardiovascular diseases: a systematic review. Arch Occup Environ Health 2012; 85: 67-79.
6-Karasek R, Theorel T. Healthy work – stress, productivity and the reconstruction of working life. Harper Collins, 1990; 1-38.
7-Bosma H, Peter R, Siegrist J, Marmot M. Two alternative job stress models and the risk of coronary heart disease. Am J Public Health 1998; 88: 68–74.
8-VanDer Doef M, Maes S. The job Demand – Control (-Support) Model and psychological well-being: a review of 20 years of empirical research. Work & Stress 1999; 13: 87-114.
9-Payne R. Demands, support, constraints and psychological health. In: Mackay C, Cox T (eds), Response to stress occupational aspects. London: IPC Science & Technological Press; 1979: 85-105.
10-Bakker AB, Schauffli WB. Professional burnout: Study among general meditation. J Organ Behav 2000; 21: 425-441.
11-Jahanbakhsh S, Oreizy HR, Molavi H, Nouri A. The relationship between job control and stress level and mental health in Isfahan company employees, J Isfahan Medical Uni 2010; 27(103): 855-840. (Persian].
12-Park J. Work stress and job performance. Statistics Canada 2007; 5-17.
13-Abd Razak AZA, Yunus NKY, Nasurdin AM. The impact of work overload and job involvement on work-family conflict among Malaysian doctors. Labuan J of Muamalat and Society 2011; 5: 1-10.
14-Nirel NM, Goldwage MA, Feigenberg ZM, Abadi BA. Stress, work overload, burnout and satisfaction among paramedics in israel. Prehospital Disast Med 2008; 23(6): 537-546.
15-Schaufeli WB, Bakker AB. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. J Organ Behav 2004; 25: 293–315.
16-Maslach C, Leiter MP. Early predictors of job burnout and engagement. J Appl Psychol 2008; 93: 498–512.
17-Maslach C, Jackson SE. Maslach burnout inventory manual 2nd ed. Consulting Psychologist Press 1993; 99-113.
18-Edward D, Burnard P, Coyle D, Fothergirl A, Haningan B. Stress and burnout in ommunity mental health nursing: a review of the literature. J Psychiatric and Mental Health Nursing 2000; 7-14.
19-Lonstra B, Brouwers A, Tomic w. Feelings of existential fulfillment and burnout among secondary school teachers; Teachers and Teaching Education 2009; 25: 752-757.
20-Shaufeli WB, Buunk BP. Burnout: an pverview of 25 years of research and theorizing. In: Schabracq MJ, Winnubst JAM, Cooper CL (eds). The handbook of work and health psychology. New York: John Wiley and Sons; 2003; 383-425.
21-Malinauskas R, Malinauskiene V, Dumciene. Burnout and perceived stress among University Coachers in Lithuania. J Occup Health. 2010; 52: 302-307.
22-Kovacs G. Stressors leading to teacher burnout in adult education and ways of prevention helping the language teacher. Aarms 2010; 9(1): 117-123.
23-Taylor B, Barling J. Indentifying sources and effects of carer fatigue and burnout for mental health nurses: A qualitative approach. J Mental Health Nursing 2004; 13: 117-125.

24-Skaalvik EM, Skaalvik S. Does school context matter? Relation with teacher burnout and job satisfaction. J Teaching and Teacher Education 2009; 25: 518-524.
25-Ahola K, Kivimaki M, Honkonen T, Virtanen M, Koskinen S, et al. Occupational burnout and medically certified sickness absence: the population-based sample of Finnish employees. J. Psychosom. Res 2008; 64: 185–193.
26-Maslach C, Schaufeli WB, Leiter MP. Job burnout. Annual Review Psychology 2001; 52: 397-422.
27-Honkonen T, Ahola K, Pertovaara M, Isometsa E, Kalimo R, Nykyri E, Aromaa A, Lonnqvist J. The association between burnout and physical illness in the general population—results from the Finnish Health 2000 Study. J Psychosom Res 2006; 61: 59–66.
28-Pelfrene E, De Backer G, Mark R, De Smart P, Kornitzer M. Job stress and cardiovascular risk factors: Result from the BELSTRESS study. Arch Public Health 2002; 60: 245-268
29-Chandola T, Britton A, Brunner E, Hemingway H, Malik M, et al. Work stress and coronary heart disease: what are the mechanisms? Eur Heart J 2008; 29:640–648
30-Ballanyne CH, Osslon A, Thomas R, Michele F, Mercuti MD, et al. Influence of Low High-Density Lipoprotein Cholesterol and Elevated Triglyceride on Coronary Heart Disease Events and Response to Simvastatin Therapy in 4S. Clinical Investigation and Reports. J the American Heart Association 2001; 104: 3046-3051.
31-Leynin f, Moreau m, Pelfrene E, Clays E. De Backer G, et al. Job Stress and prevalence of diabetes: result from the belstress sudy. Arch Public Health 2003; 61: 75-90.
32-Chandola T, Britton A, Brunner E, Hemingway H, Malik, D, et al. Work stress and coronary heart disease: what are the mechanisms? Eur Heart Journal 2008; 29: 640–648.
33-Tohidi M, Hatami M, Hadaegh F, Safarkhani M, Harati R, et al. Using of Lipids in cardiovascular occurrence prediction in Type 2 Diabetics adults: Study of sugar and lipid in Tehran. J diabetics and lipids of Iran. Special issue for risk factors of debate and cardiovascular diseases 2010; 88-89. [In Persian].
34-Hadaegh F, Harati H, Ghanbariyan A, Aziziyan F. Cardiovascular prediction in short time in more than 30 years old people with plasma lipid scales; Journal of diabetics and lipid of Iran 2005; 4(4): 63-53. [In Persian].
35-Berrios GE. Feeling of fatigue and psycholopathology: A conceptual history. Comprehensive psychiatry 1990; 31: 140-151.
36-Hans G, De Clerck LS. In the mind or in the brain? Scientific evidence for central sensitisation in chronic fatigue syndrome. Eur J Clin Invest 2012; 42: 203–212
37-Figley RC. Compassion Fatigue: Psychotherapists Chronic, Lack of self care. JCLP/In Session: Psychotherapy in practice 2002; 58(11): 1433-1441.
38-Berrios GE. Feeling of fatigue and psycholopathology: A conceptual history. Comprehensive psychiatry 1990; 31: 140-151.
39-Fisher C. Boredom at work: A neglected concept. Human Pelation. 1993; 46: 395-417.
40-Nasri S. epidemiology of fatigue syndrome and it's relation between psychiatry problems in nurses.; Thought and behavior 2004; 9(4): 33-25 (Persian].
41-Farahani H, Oreyzi HR. Modern methods of research in the humanities. Tehran: Jahad daneshgahi; 2008 [in Persian].
42-Glass GV, Stanley JC. Statistical methods in education and psychology. Prentice-Hall: Englewood Cliffs, N.J; 1970.
43-Wall TD, Jackson PR, Mullarkey D. Work design. Handbook of Industrial and Organizational Psychology. San Francisco: Jossey-Bass; 1995.
44-Shirom A. Burnout in work organizations. In: Cooper CL, Robertson I (Eds). International Review of Industrial and Organizational Psychology. Chichester, UK: Wiley 1989; 25−48.
45-Shirom A, Westman M, Shamai O, Carel RS. Effects of work overload and burnout on cholesterol and triglycerides levels: The moderating effects of emotional reactivity among male and female employees. J Occup Health Psychology 1997; 2: 275-288.
46-Xanthopulou D, Bakker A, Dollard MF, Taris TW, Schreurs P. When do job demands particularly predict burnout? The moderating role of job resources. J Management Psychology 2007; 22(8): 766-786.
47-Turner N, Chmiel N, Walls M. Railing for safety: job demands, job control, and safety citizenship role definition. J Occup Health Psychology 2005; 10: 504–512.
48-Hobfoll SE. Conservation of resources: A new attempt at conceptualizing stress. American Psychologist 1989; 44: 513-524.
49-Hobfoll SE, Shirom A. Conservation of resources theory: applications to stress and management in the workplace. In: Golembiewski RT (ed). Handbook of organizational behavior. New York: Marcel Dekker 2001; 55-80.
50-Karasek R, Bakker D, Marxer F, Ahlbom A, Theorel T. Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedish men. Public Health 1981; 71(7): 694–705.

51-Melamed S, Kushnir T, Shirom A. Burnout and risk factors for cardiovascular disease. Behav Medicine 1992; 18: 53-61.
52-Appels A, Mulder P. Fatigue and heart disease: The association between vital exhaustion and past, present and future coronary heart disease. J Psychosomatic Research 1989; 33: 727-738.
53-Willenz P. Mental stress raises cholesterol levels in healthy adults. American Psychological Association 2005; 13: 45-67.
54-Stansfeld S, Candy B. Psychosocial work environment and mental health – a metaanalytic review. Scandinavian J Work Envir Health 2006; 32: 443–462.
55-Kivimaki M, Theorell T, Westerlund H, Vahtera J, Alfredsson L. Job strain and ischemic disease: does the inclusion of older employees in the cohort dilute the association? The WOLF Stockholm study. J Epidemiol Commun Health 2008; 62(4):372–374.
56-Awa WL, Plaumann M, Walter U. Burnout prevention: A review of intervention programs. Patient Education and Counseling 2010; 78: 184-190.