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Evaluation of Hyper-lipidemia and Some Related Factors in Employees of a Petrochemical Industry in Assaluyeh

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Abstract

Introduction: In order to evaluate the status of serum fat profile and its related factors in male employees working in a petrochemical industry in Pars Energy Special Economic Zone, during a cross-sectional study, anthropometric and metabolic parameters of 360 of these workers were identified.

Methods: In this cross-sectional study, 360 male employees of a petrochemical industry in the South Pars Special Energy Economic Zone in Assaluyeh were studied in terms of metabolic and anthropometric criteria.

Results: The prevalence of elevated total cholesterol (≤ 200 mg / dl), triglyceride (≤ 200 mg / dl) and low-density lipoprotein (LDL) (≤ 130 mg / dl) were 16.48% and 15.36%, respectively. And 18.5% and the prevalence of cholesterol deficiency with high density lipoprotein (HDL) (>40 dl / mg) was 13.1%. An increase in body mass index (mass 25 m 2 / kg) was observed in 61.3% of workers. Obesity and weight gain based on body mass index were more than normal in 60.61% of people. There was a direct and significant relationship between increased cholesterol and increased triglyceride with increased body mass index (p=0.001 and p=0.0001, respectively). Also, there was a direct relationship between increased cholesterol and increased triglyceride and increased waist circumference. This relationship was significant for increasing cholesterol (p=0.02 and p=0.06, respectively). Increasing low-density cholesterol was also directly and significantly related to increasing waist circumference (P = 0.04). Glucose was observed in 4.75% of workers. Diabetes was directly and significantly associated with increased cholesterol and decreased cholesterol with high-density lipoprotein (p=0.04 and p<0.05, respectively). 57.4% of the subjects were sedentary. With increasing physical activity, a decreasing trend in blood sugar and cholesterol concentration was observed (p=0.1 and p=0.08, respectively). Prevalence of overweight, visceral obesity, increased diastolic blood pressure, diabetes and smoking in more operational workers. But there was no difference between the two operational and administrative groups in terms of serum lipid status and level of physical activity.

Conclusion: The high prevalence of dyslipidemia and other cardiovascular risk factors in the employees of the petrochemical industry under study emphasizes the need for targeted cardiovascular preventive measures in the employees of the petrochemical industry.

Keywords: Cardiovascular Diseases; Hyper-lipidemia; Obesity; Operational staff

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Introduction

Today, dyslipidemic disorders along with hypertension and obesity are the background of atherosclerosis, which will lead to morbidity and mortality in the future [1]. Numerous studies have shown that this process begins with the appearance of fat streaks in the second decade of life, while treatment of these risk factors in childhood can reduce or even improve cardiovascular disorders in the future [2]. Impaired serum fat concentrations such as decreased C-HDL levels and elevated

triglycerides are risk factors for coronary heart disease. Coronary artery disease is the most common cause of death in Iran [3]. The first stage of atherosclerosis, as the main cause of cardiovascular disease, is formed in childhood and develops during the years of a person's life under the influence of genetic and environmental factors, leading to cardiovascular disease and subsequently increase the likelihood. It becomes death [4]. One of the main causes of atherosclerosis in people is the presence of hyperlipidemia [5]. Numerous scientific reasons such as heredity and family history, obesity, inactivity, age, race, etc. play a role in causing hyperlipidemia in people [6]. Fat disorders are very common in the world. Their prevalence varies between 20-50% in populations. The effects of lifestyle on blood lipid profiles have been demonstrated in various studies. Numerous epidemiological studies show that moderate to severe daily physical activity prevents the development of chronic diseases such as coronary artery disease and premature death [7]. As mentioned earlier, inadequate physical activity is one of the main causes of hyperlipidemia and is one of the important factors in the improvement and correction of hyperlipidemia [8]. In a study of NAHANES data, it was shown that there is a significant relationship between the level of physical activity and blood cholesterol parameters in terms of different positions of body mass index and waist circumference [9]. It is noteworthy that several studies on the role of age, race and heredity in the incidence of hyperlipidemia have been confirmed and the effective role of these parameters in the incidence of diseases related to lipid profile and coronary heart disease has been confirmed [10]. In Manter et al. Study of three African, European, and Asian races, a significant relationship was found between physical activity intensity and blood lipid levels in all races, while the relationship between overall physical activity score and blood lipid levels was significant only in African races [11]. Hayes et al.'s study of four European, Indian, Bangladeshi, and Pakistani races in the United Kingdom also found that regular physical activity was higher in Europeans than in South Asians living in Europe, and that other races in the study were more likely to be at risk than Europeans. More common in diabetes and cardiovascular disease. In this study, no significant relationship was found between levels of physical activity and metabolic syndrome and disorders of blood lipid profile including HDL [12]. In the study of Silva et al., A significant relationship was observed between inactivity with lower levels of HDL and higher TG concentrations and it was found that increasing physical activity and avoiding sedentary work in the workplace increases serum HDL concentrations and decreases TG [13]. Another factor influencing the increase in hyperlipidemia profile disorders is the rate of exposure to occupational and psychological stress in the workplace, which has so far been little, addressed, for example, the study of Asadi et al. On a significant population of the workers aimed to investigate the effect of job and psychological stress in the workplace on blood profile. The Oil Industry Health Organization has long been providing industrial medicine services to oil industry employees throughout the country. In these centers, the health of the employees is evaluated regularly and periodically. Over the past years, along with understanding the importance and risk of cardiovascular disease in developing countries, there has been an increasing emphasis on increasing the knowledge of industrial physicians and other health care workers about disorders of fat metabolism and its effect on cardiovascular disease. Because the burden of heart disease in the Iranian oil industry is heavy and the damage caused by it is high [14]. However, we believe that such general monitoring of employee health is not sufficient and to prevent cardiovascular disease and its complications, it is necessary to implement a management program with specific goals. This study was performed to evaluate the status of serum fat profile and other cardiovascular risk factors in employees of a petrochemical industry in Assaluyeh to determine the need for stronger interventions to control serum fat metabolism disorders and other coronary risk factors.

Methods

This study included a cross-sectional study that was performed on 360 male workers in one of the petrochemical companies of the Pars Special Energy Zone Organization in Assaluyeh. Anthropometric data including height, weight, waist circumference and serine and blood pressure as well as lifestyle parameters and their behavioral risk factors were collected through a questionnaire conducted during 1998. Also, general information about cardiovascular diseases and its predisposing factors was given to the workers by the research team. Then fasting blood samples were taken from workers in one of the occupational medicine centers. Laboratory tests of total cholesterol, triglyceride and cholesterol were performed with C-HDL lipoprotein (2) by enzymatic method and the concentration of cholesterol with lipoprotein (C). -3LDL) was calculated by Friedwald formula. In cases where the triglyceride concentration was 400 mg / dL or more, C-LDL was measured directly by enzymatic method. Anthropometric parameters were determined by examination and measurement by standard methods.

Definitions: Hypertension was diagnosed with the criterion of systolic pressure ≥ 140 mm Hg and / or diastolic pressure ≥ 90 mm Hg or history of taking antihypertensive drugs according to JNCVI criteria [15]. Dyslipidemia was defined based on ATPIII: NCEP criteria. Physical activity was also classified into four levels: a: sedentary; B: Mild (daily walk of at least thirty minutes); A: Medium (such as Swedish sports, jogging for at least 30 minutes a day); A: Intense such as swimming, running, cycling to the point of sweating (at least 30 minutes a day). Statistical analysis: Data analysis was performed using SPSS ver 10 software. Pearson test was used to determine the correlation between dyslipidemia and BMI, waist to hip ratio (3WHR) and waist circumference. Spearman test was also used to determine the correlation between dyslipidemia and physical activity. Odds ratio was used to determine the statistical significance of differences in the prevalence of dyslipidemia and other coronary risk factors in workers.

Results and Discussion

In total, data related to 360 male employees working in the studied petrochemical company (95%) were completed. **Table 1** lists the anthropometric and metabolic variables of employees. The most common fat disorder was hyperglycemia (15.36%); The prevalence of elevated total cholesterol was 16.48% and the prevalence of C-LDL (130 /dl / mg) was 18.5%. Decreased HDL

Table 1. Comparison of demographic characteristics of employees in the two groups of day laborers and shift work.

Education	
Diploma	60
Bachelor's degree	210
and higher	100
Body mass index	
Less than 25 m 2 / kg	186
More than 25 m 2 / kg	174
Smoking	
Yes	20(5.5%)
No	340(94.5%)

concentration was observed in 30.1% of employees. Also, the prevalence of very high amounts of fat was: more than or equal to 240 dl / mg cholesterol: 16.48%; C-LDL greater than or equal to 160 dl / mg: 5.18%; Triglyceride greater than or equal to 400 dl / mg: 15.36%. An increase in BMI was observed in 61.61% of subjects. There was a direct and significant relationship between cholesterol increase and triglyceride increase with BMI increase (r=0.2, p=0.001, r=0.2 and p=0.0001, respectively). Diastolic hypertension was present in 26.7% and systolic hypertension in 6.6%. There was a significant relationship between high cholesterol and hypertension both systolic and diastolic (r=0.15, p=0.01, r=0.12 and p=0.04, respectively). Based on the participants 'answers to the questioners' questions about the amount of physical activity in their spare time, 59.4% of the employees were in the sedentary group, 26.7% in the mild group, 15.4% in the moderate group and 2.5% in the intense group. they got. With increasing physical activity, a decreasing trend was observed in blood cholesterol concentration (p=0.1 and p=0.08, respectively). In general, overweight, visceral obesity, hypertension, inactivity, and diabetes were more associated with working in operational units. However, there was no significant difference in the association of dyslipidemia with work in operational or administrative units. The results show the high prevalence of dyslipidemia along with other coronary risk factors in both groups of operational and administrative staff working in the studied petrochemical company. Although there is no significant difference in the prevalence of dyslipidemia among operational and office workers, weight gain and obesity (increase (BMI, visceral obesity (increase in WHR and / or increase in waist circumference)), smoking, diabetes, sedentary lifestyle In the study of Wilson et al., 47.8% of employees had elevated cholesterol, but there was no association between occupational status and dyslipidemia [16] Hibbert [17] showed that hypertension and hypertension were more associated with working collar-blue. In a study of hospitalized patients, colleagues did not find a significant difference between the operational and administrative groups in terms of the risk of non-fatal myocardial infarction [18] Miller et al. Showed in a long-term study that the incidence of myocardial infarction and Overall, there is no significant difference between the administrative and operational groups, however, in most studies, the risk of cardiovascular disease was higher in operational workers [18]. The study of Nakamura et al. Worked workers had more visceral fat and WHR and systolic blood pressure b. They had an altar, also the prevalence of smoking has been higher among operational workers [19]. In Boring et al.'s study, coronary heart disease mortality (CHD) was 30% lower in office workers and the type of occupation was associated with CHD risk. [20] By studying in workers in an aluminum factory, Srievo et al. [21] Pekanen et al. Showed that the risk status of unskilled office workers was more unfavorable and mortality due to cardiovascular diseases was higher in this group [22] In the study of Simon et al. Large industrial factory in in the Czech Republic, operational workers also consumed more tobacco, and hypertension and high cholesterol were more common in those who had operational work [23]. Also, in an angiographic study, it was shown that coronary heart disease was much higher in workers aged 40-60 years who were heavily active than in those who did office work [24]. A demographic study of diabetics in Finland also showed that the mortality rate was higher among operational workers [25]. The issue of whether the type of occupation (administrative / operational) independently increases the risk of coronary heart disease or whether the accumulation of risk factors in operative workers increases the risk of these employees secondarily needs further study. Overall, regardless of occupational status, petrochemical industry workers (both operational / administrative) currently face a high prevalence of dyslipidemia and an unfavorable risk status for coronary heart disease. Recently, it has been shown that the economic costs of cardiovascular diseases in the oil and petrochemical industries are high and account for a large part of the current budget of the Oil Industry Health and Medical Organization. CHD in 1379 AH caused more than 170 patients - years of absence From work and damage to production in the Iranian oil industry [12]. In developing countries, we generally face a lack of preventive measures due to other priorities and significant economic, social and educational problems. However, Iran's oil and petrochemical industry has the advantage that in all its industrial units since its establishment in the long years of industrial medicine. In addition, access to patients and staff is easily accessible and the provision of health services is not costly for staff. Therefore, preventive programs can be implemented more effectively. All employees of oil and petrochemical industries have a special health record and are evaluated annually in terms of lipid and blood sugar concentrations and other metabolic parameters along with monitoring of other occupational diseases [26]. Cholesterol screening in the workplace is an effective way to help employees, in addition to being aware of the concentration of blood lipids, find more motivation to develop the right nutritional behavior. However, due to the heavy burden of coronary heart disease in the oil industry and Iran Petrochemical and the high prevalence of risk factors, the use of a special strategy to monitor and control blood lipids and other coronary risk factors in this industry is a necessity. Numerous studies in recent years have shown that interventions performed in the workplace to control risk factors are very effective in correcting behavior and reducing the incidence of coronary heart disease [27-30]. The first step in this direction is a suitable budget that should be allocated in coordination with the senior managers of Iran's oil industry and their justification by the Oil Industry Health Organization. In the next stage, increasing the knowledge of industrial medicine physicians and other health care workers about dyslipidemia

and other coronary risk factors and proper lifestyles (related to nutrition and physical activity) is very important [31-34]. These individuals should then be provided with appropriate training programs to inform staff about coronary risk factors and their importance [35]. Awareness of risk factors usually leads to efforts to improve the lifestyle of employees [36]. One of the key factors in the success of intervention programs is the existence of a staff guidance committee that increases the sense of ownership and stakeholder and thus the active participation of employees in the prevention of coronary heart disease [37]. Active participation of workers in these programs, in addition to reducing the risk of CHD, will lead to a significant reduction in costs in the workplace [38].

Conclusions

As a result, it can be said that overweight and especially visceral obesity are independent factors that increase coronary risk. On the other hand, due to the high prevalence of obesity and overweight among oil and petrochemical workers, obesity control along with cholesterol correction and Correction of fatty disorders in the workplace should be a priority and it is very important that the coronary heart disease prevention program is continued because coronary heart disease is actually a chronic disease and short-term or short-term measures will not have much effect in reducing the burden of this disease.

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