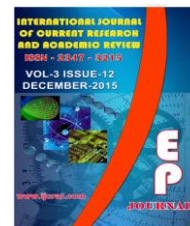




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Relation of Socio-economical Factors with Coronary Artery Disease (CAD)

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A B S T R A C T

Cardiovascular disease (CVD) is one of the most common causes of death in the world. In recent years the role of social and economical factors in the incidence and progration of coronary artery disease(CAD), especially CAD, have been considered more than ever. The purpose of this study was to assess the socio-economical factors affecting the CADas a step towards resolving some problems of patients and reduce health costs. In this case-control study, 250 patients with CAD who were admitted in Afshar or Sadoughi hospitals in Yazd were compared with 250 healthy individual. The two groups were matched for age and sex. Economic and social factors in the two groups were collected using a questionnaire. Chi-square and logistic regression was performed to compare variables between the two groups. The mean age of the case and control groups were 58.1 and 47.2 year respectively. Among the important socio-economic factors, marital status, income, occupation and literacy status showed significant differences between the case and control groups ($P<0.05$). From investigated socio-economic factors, both education and monthly household income deference between the case and control groups were significant often the regression model analysis. In our study, CAD patients compared with healthy control group have unfavorable social and economic conditions. Due to these epidemiological models of heart disease in Iran, unlike the epidemiologic pattern of this disease in some developed countries, low-income peoples also suffer from CAD and more and more attention is need to prevent CVD, especially in the vulnerable peoples.

Introduction

Researches in developed countries in 1960s showed that the most important factor that leads to disability and mortality has been

changed from infectious diseases to chronic and degenerative diseases like Cardiovascular disease (CVD) (1). Currently

the CVD is one of the most common causes of mortality in the world and its prevalence in developing countries is increasing(2). While in 1990 about 30 percent of the deaths were caused by heart diseases, it is expected that until 2020 these diseases cause 40% of deaths in the worldwide (3). coronary artery disease (CAD) is one of the main causes of death in old age so that it causes up to 80% of mortality at the age above 65 (4).This disease is created by deficiency in the blood supply and enough oxygen supply to heart tissues(5).

Based on the conducted studies the risk factors of the CVD can be classified into 5 categories of the background diseases (hypercholesterolemia, diabetes mellitus, hypertension, stress and depression and contraceptive pills), social factors (literacy and education, smoking, low physical activity), economical factors (job, residence, income level), genetic and familial factors (familial history of CVD and other CVD risk factors such as hypertension and diabetes mellitus)and demographic (age, sex, marital status and BMI) (6). Socio-economic status of individuals is one of the most powerful risk factors of the disease prediction of affliction and also one of the effective factors in the amount of the effects and mortality resulting from CVD and its significant impact causes that its definition and measurement have very importance (7).Socio-economic inequalities in health can be defined as systematic differences in the prevalence or incidence of hygenic problems among people with different socio-economic status that has been determined by the levels of education and differently income and occupational class (8).Although these factors are usually related together some extent,but this relationship is not linear and each of them reflects a different individual.For example the income reflects the power of making

expenditure, dwelling, diet and medical care and job represents responsibilities, amount of physical activity, stress and occupational confrontations (7).

Socio-economic differences cause the differences in rate of affliction and also the effects and mortality and it is a major concern for public health authorities and the existing pattern is effective in the public health planning on a large scale (9).CAD is one of the clearest examples of the difference in disease incidence and prevalence with the different socioeconomic conditions that have been observed in developed countries like the United Kingdom, United States of America and other countries (10).In a review conducted in West Europe, a north-south gradient about the relationship between the socio-economic status and different occupational groups exposed to developing CADhas been proven.In the United Kingdom, Ireland, Finland, Sweden, Norway and Denmark this relationship was strong, but in France, Switzerland and the Mediterranean countries, that was not significant (11).Research in socio-economic and hygienic status has become a priority for the National Institute of Health and European Science Foundation.

Incidence and mortality from CADs have been decreased in developed countries since the late 1970s,while in developing countries that is increasing (12). In UK the reduction of the rate of CAD was more in the higher socio-economic groups (13).In other western european countries and the United States of America the similar observations have indicated a lower reduction in mortality resulting from the CADs among the lower socio-economic groups (14).

CAD is the most common cause of mortality and any effort for preventing of this disease

cause to reduce the mortality. The socio-economical factors are one of the most important cases in knowing the disease cause and its prevention. Identifying at-risk groups can lead to identify the target group and focus on the educational and preventing measures in this group. It seems that the pattern of affliction in different socio-economic groups is unlike in different countries and also this pattern is changing in the countries during time. So far few case-control studies have been done in our country for investigating the pattern of social and economic factors in cardiovascular patients, so we decided to investigate the impact of socio-economic factors on CAD in the city of Yazd.

Materials and Methods

As a case-control study; the data collected by the available sampling method from two Afshar and Shahid Sadougi hospitals of Yazd. To determine the sample size, the similar studies were used, so that by considering the alpha of 0.05 and power of the test of 80 percent 250 individuals in each group was determined. The inclusion criteria for case group were included the men and women of the age group over 25 years old who were living in Yazd; based on the specified criteria of WHO including the typical and clinical symptoms of heart attack (MI) or angina pectoris, they had an increase in the serum enzymes and typical changes of ECG and the abnormal angiography (15). Inclusion criteria for the control group were included 250 individuals who had not the previous history of this disease and in terms of coronary artery angiography were normal and in terms of the age and gender were matched with case group (individual matching). The exclusion criteria of study for both case and control groups were the non-indigenous individuals, pregnant women and individuals suffering from the chronic

debilitating systemic diseases (including renal or liver diseases and cancers). After selecting the case and control groups, the questionnaire were distributed after the introduction of plan and obtaining the written informed consent of individuals under study.

The questionnaire were included the information about the demographic factors and socio-economic factors such as literacy, occupation, income, number of household, marital status, place of residence, previous history of heart diseases, diabetes mellitus, hypertension, hypercholesterolemia and familial history of heart diseases and also some paraclinical findings such as total cholesterol, FBS, LDL, HDL, TG. Information related to the demographic and socio-economic factors as well as the information related to the factors associated with the history of heart diseases were collected through face-to-face interview and the information related to paraclinical findings collected from patient records. In illiterate people the data were collected by researcher through face-to-face interview.

Data was analysed with SPSS16 software. Chi-square and logistic regression was performed to compare variables between the two groups. P value less than <0.05 reported as significant.

Results and Discussion

The age range of participants in the study were between 25 and 98 years and the average age of the participants 52.69 years. The average age of individuals of case group was 58.1 ± 15.6 and the average age of the individuals of control group was 47.19 ± 13.4 years.

In Table 1, the demographic information and frequency of the important socio-economic

factors related to the case and control groups have been shown. As it can be seen, k2 test at error level of 5% for variables of marital status, income, occupation and education were significant.

CVD is a multi-factoral disease and various factors play a role in its progration. Due to the significance of some factors, in order to investigate the role of other causes and adjust the impact of other main known risk factors for atherosclerosis, the logistic regression test was performed. The impact of two factors of education and family's monthly income were still significant.

In Table 2, the role of these factors after adjusting other risk factors has been shown. By increasing the level of education and family's monthly income the probability of CAD decreased.

This study is oriented to the impact of socio-economic factors on the increase of probability of affliction to CAD. Our study showed that by increasing the education level and family's monthly income the probability of CAD is reduced. In a cohort study by K. Falkstedt on 49,000 people there was an inverse relationship between socio-economic position in adolescence and the incidence of CAD in middle age (RR=1.47) (16). Also in a study by Peter et al. on data obtained from Framingham's study, after congruence of other factors, it was determined that the low socio-economic position increases the risk of afflicting CAD (HR=1.53) (17).This inverse relationship between socio-economic conditions and the prevalence of CAD was observed in our study as well.

Table.1 Frequency Distribution of Socio-Economic Variables in Group of Case and Control

| | | Case | | Control | | Significance (P-value) |
|----------------|----------------------------------|--------|---------|---------|---------|------------------------|
| | | Number | Percent | Number | Percent | |
| Marital Status | Married | 228 | 91.2 | 224 | 89.6 | <0.001 |
| | Single | 4 | 1.6 | 18 | 7.2 | |
| | Widowed–Divorced | 18 | 7.2 | 8 | 3.2 | |
| Religion | Islam | 247 | 98.8 | 245 | 98 | 0.47 |
| | Zoroasterean | 3 | 1.2 | 5 | 2 | |
| Family Size | Less than2 people | 50 | 20 | 41 | 16.4 | 0.02 |
| | 3 to5 people | 154 | 61.2 | 171 | 68.4 | |
| | More than 6 people | 46 | 18.4 | 38 | 15.2 | |
| Income | Less than 500 thousand Tomans | 126 | 50.4 | 61 | 24.4 | <0.001 |
| | 500 thousand to 1 million Tomans | 108 | 43.2 | 125 | 50 | |
| | More than 1million Tomans | 16 | 4.4 | 64 | 25.6 | |
| Job | Government employee | 65 | 26 | 111 | 44.4 | <0.001 |
| | Non-government job | 53 | 21.2 | 74 | 29.6 | |
| | Unemployed | 132 | 52.8 | 65 | 26 | |
| Education | Under Diploma | 177 | 70.5 | 69 | 27.6 | <0.001 |
| | Diploma–high school education | 38 | 15.2 | 86 | 34.4 | |
| | Undergraduate and above | 35 | 14 | 95 | 38 | |

Table.2 Significant Social-Economic Factors Adjusted after Correction with Other Factors (Logistic Regression Test)

| Risk factor | Variable class | Confidence interval (CI 95%) | | Adjusted odds ratio (OR) | Significance (P-value) |
|----------------|--------------------------------------|------------------------------|---------|--------------------------|------------------------|
| | | Minimum | Maximum | | |
| Education | Under graduate and above | 1 | 1 | 1 | 1 |
| | <i>Diploma-high school education</i> | 0.44 | 1.88 | 0.9 | 0.81 |
| | Under Diploma | 2.06 | 8.4 | 1.4 | <0.001 |
| Monthly Income | More than 1 million Tomans | 1 | 1 | 1 | 1 |
| | 500 thousand to 1 million Tomans | 1.74 | 9.0 | 3.9 | 0.001 |
| | Less than 500 thousand Tomans | 1.73 | 11.2 | 4.4 | 0.002 |

In the present study there was found a significant relationship between income and affliction to CAD, so that individuals with lower income were exposed to CAD more than those with higher income. In the study by Kivimaki also there was observed a significant relationship between income and CAD and the groups with low income were exposed to the risk of CAD 2.2 times more than the groups with higher income (18). Also in the study by Harris, there was a significant relationship between low income level and probability of CAD(19).But in a study conducted by Lotfi et al. it was determined that individuals with higher monthly income are exposed to the risk of afflicting CAD; this difference could be conditioned by difference in life conditions, study population, number of sample size and type of professional activity of individuals (20).

Another important socio-economic factor that was significant in our study was the level of literacy, so that by increasing the level of education the probability of affliction to CAD decreases and in education of under diploma this amounts were 4/1 fold. In the study of Jannati et al. the individuals who had less education were more prone to CAD (8). Also in the case-control study of Pourreza et al. the diploma education and down increases the

probability to the extent of 3/9 fold(21). In Harris' study also the individuals who had the high school education or less were exposed to the CAD more than others (19). But In the study of Lotfi et al. the individuals who had university education were exposed to afflict the CAD whose cause can be the individuals' life style, being different the epidemiological pattern of CAD and high education level in the population under study (20).In the study of Carlos there was an inverse relationship between the level of education and income on the the serum cholesterol level, systolic blood pressure, physical activity and body mass index.This means that with increasing level of education and income, in other words with increasing the socio-economic status the important risk factors of heart disease were declining (22).

In this study there was not observed any significant relationship in the number of household in the cases and control groups, but in the study of Lotfi et al. the risk of CAD were higher in families with a population more than 9 individuals (20).

Conclusion

Patients with ischemic heart diseases require a costly medical care and delay in receiving the services will cause irreversible effects

(23). Early disability of these patients also imposes the additional costs on the social security system of society. Just in America the costs of CVDs have been estimated about 274 billion dollars in 1998 (24). Studies conducted on the early onset of CAD in Iran represent the prevalence of 5 to 10 percent of CADs in individuals below 45 years in Iran. This statistic in Yazd has been reported about 11% (25). The combination of reduction of the age of CAD with the low social-economic status in the society can lead to a noticeable increase of medical costs and social problems. All of these cases sound the alarm for more attention to the epidemic of CADs in Iranian society. This should be considered in public health macro policies so that through the correct identification of the target group, increasing community education and public and group teaching with a greater focus on high risk groups and consideration of social and economical factors in developing CAD, we can have a role for preventing CAD.

The importance of subject makes necessary the further research in different parts of the country. In our study also the important factors such as smoking, physical activity, diet were not assessed which we propose to be considered in other studies.

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