A study to socio-economic and psychological factors of coronary artery
disease in individual less than 50 years old: a case-control study

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ABSTRACT
Background and goal: previous studies showed that socioeconomic and mental status of individuals is closely associated with the risk of disability and mortality resulting from cardiovascular disease. This study aimed at evaluate the socioeconomic and psychological factors of coronary arteries disease in individual less than 50 years old.

Items and methods: 126 patients less 50 years old with a diagnosis of acute coronary syndrome, hospitalized in CCU wards of teaching hospitals of Zahedan University of medical sciences, and 126 healthy individuals among those visited these hospitals were selected and surveyed in this case-control study. Risk factors information about socio-economic variables, such as educational level, occupational status, income level, place of residence, smoking, physical activity and diet intake variables and psychological status were gathered from both groups, by the help of questionnaire and check list through an interview. The obtained information was analyzed with software SPSS version 22 and statistical tests Student-t, χ² and logistic regression model.

Findings: the average age in the case and control groups were respectively 41.87±6.37 and 41.07±6.92 years. Two groups were significantly different in terms of educational level, income, smoking, body mass index and also diet score average, physical activity, stress, anxiety and depression (p<0.05). Logistic regression model also showed that scores of diet, stress, anxiety and body mass index variables can predict 42.2% of a group membership.

Conclusion: due to difference between variables of educational level, economic status, nutritional status, psychological factors like stress, anxiety and depression in both groups, results of the study showed that socioeconomic and psychological factors can play an important role in development of cardiovascular disease at a younger age than usual; so this requires to implement necessary policies to control and improve these risk factors in order to prevent the early development of disease in young people.

Keywords: socioeconomic factors, psychological factors, cardiovascular diseases, less than 50 years old

INTRODUCTION:
The prevalence of non-communicable diseases including heart coronary artery disease is rapidly rising in many countries due to factors such as increased life expectancy, increased exposure to risk factors and lifestyle changes(1). Cardiovascular disease is the most important cause leading to adult death, disability as well as high costs of the health care system around the world(2). Annually, more than 900 thousands death occur in US due to cardiovascular disease, three quarter of which is associated to heart coronary artery disease (CAD)(3). Cardiovascular disease, especially CAD, are the first and most common cause of death in men and women (4). CAD is usually a disease of old age, however, young adults today are facing with which and unfortunately, age of development of this disease has decreased in recent years (5). In the available documentation it is estimated that about 4 to 10 percent of
patients with CAD are less than 45 years old (6, 7). The average age of the heart disease risk in recent years has risen to 42 years old that it means the age of catching this disease has considerably reduced (8). Since heart disease starts at the young age, it can be said that no one is safe against the cardiovascular diseases risk according to the young population of our country. Risk factors and progression of heart coronary artery disease are proved to be highly related to each other according to result of epidemiologic findings and research carried out over the past 50 years. These risk factors are listed in 5 groups including: underlying diseases (high cholesterol, diabetes, high blood pressure, stress and depression and birth control pills), social factors (educational level, smoking, low physical activity), economic factors (occupation, place of residence, income), family and genetic factors (family history and other risk factors of coronary arteries disease like diabetes and high blood pressure), demographic factors (age, gender, marital status and MBI) (10). Socioeconomic status of individuals is one of the strongest risk factors for the disease prognosis as well as one of factors effective in development of complications and death resulting from cardiovascular disease and due to its significant impact, its definition and measurement is highly important. For example, income indicates houses financing, diet, health cares, and occupation shows responsibilities, amount of physical activity, stress and job involvement (11). Systematic differences in development or prevalence of health problems could be because of socioeconomic inequality in the health section. Socioeconomic status is specified with education level, occupational class and income (12). One of the strongest and most principled predictors of a person death is their socioeconomic status (13). In terms of economic issues, coronary artery disease has been considered as the most important disease in the word up to year 2020 (14). Influence of socioeconomic factors are different in the developed and developing countries, such contradiction is due to different stages of epidemiologic and economic transition in different countries (15). Coronary artery disease is the most important and prominent disorders resulting from socioeconomic inequality in the developed contraries like England, United States and other contraries (16). The prevalence and mortality of coronary artery disease in the developed contraries has decreased since late 1970 (17) while it is increasing in the developing countries. In the developed contraries, rate of reduced coronary artery disease is seen in the higher socioeconomic groups (18). In the modern medicine, researchers in behavioral science emphasizes on the relationship between psychological characteristics, personality traits and behavioral pattern with prevalence and course of heart coronary diseases (19). Since the heart coronary artery disease is the most common cause of death, attempts to control and prevent it can reduce the mortality rate (20). Heart coronary artery disease is going to affect a vast majority of working population in the developing countries in the next years. So it is expected that cardiovascular disease have a heavy financial burden on the developing countries (21). Study results of Poor Reza et al (2009) showed that smoking increased the clogged coronary artery. Type of job, occupational level, fruits and vegetables consumption 7 times a week and body mass index of the surveyed individuals were significantly associated with coronary artery disease (8). In their study, Azari Far et al (2015) concluded that marital status, income, education and occupation were significantly different in patients compared to the healthy ones (22). Study result of Tahmasebian at el. showed a close relation between stress and prevalence and continuation of clogged coronary arteries disease (19). Socioeconomic and psychological factors are the important points in cognition of coronary artery disease cause and its prevention. Identifying the high-risk groups could lead to identification of the target group and focus on the training and prevention measures in it. Since individuals less than 50 years old constitute the labor force of the country and cost of this disease in such range age not only affect their socio economic status and family of theirs as well, but also have a vast impact on the society economy. Also, as the
main modifiable risk factors control of coronary artery disease like hypertension, hyperlipidemia and diabetes is taken into consideration in previous studies and socioeconomic and psychological factors are less studied up to now, this paper is conducted in order to survey socioeconomic and psychological factors in patients less than 50 years old hospitalized in cardiac intensive care units of hospitals of Zahedan University of medical sciences and highlight the importance of paying attention to this aspect of disease for the health policy makers so as to plan and make decision to reduce and adjust the above mentioned risk factors.

**MATERIALS AND METHODS:**

Current study is an analytical case-control carried out in 2016 in teaching hospitals of Zahedan University of medical sciences. Inclusion criteriafor the case groups is hospitalization in the heart ward, CCU, Post CCU, medical diagnose of acute coronary syndrome, age less than 50 years and informed contest for entering the study. Control group were selected from the available healthy people going to the relevant hospitals and clinics after their age and gender were matched with the disease group. Not having a history of cardiovascular disease, lack of using drugs affecting heart and blood pressure, age less than 50 years and informed consent for inclusion in the study were conditions for inclusion in the control group. Sample volume for each group was calculated 126 people (23). Data collection tool was questioner and check list. Questioner included 4 sections. The first section were questions about demography information about age, gender and marital status; the second section were questions about socioeconomic status including education, income, occupation, place of resident, physical activity, smoking; the third section were questions about dietary intake and food habits (DHQ) and forth section consisted of 21 questions (DASS-21). Check list included measurements of height, weight, waist and hip circunferences for calculating body mass index (BMI) and abdominal obesity (WHR). Questioner DHQ was used for determining the high risk food habits and diet. The first four options of the questioner evaluated consumption of meat type, fried food, oil and egg used based on the Likert degree, with total 14 scores. The higher score indicated the greater adherence to the cardiovascular disease diet. The next options shows rate of vegetable, fruit and diary consumption according to the consumption unit. Salt consumption rate was examined based on the agree scale 0 to 10. Food habits questioner DHQ that is planned and made according to the food pyramid in order to the diet evaluation in cardiovascular patients with hypertension and hyperlipidemia, is used in study of Navidian et al. and its content validity and reliability are evaluated with the reliability coefficient of 0.88 by the retest method within two weeks (24). Questioner DASS-21 was used for determining the stress, depression and anxiety that for measuring each symptoms of stress, depression and anxiety 7 questions are used. This questioner is planned as Likert and includes options of never, low, medium and high, the lowest and the most score of each question are respectively 3 and zero. Individuals with a higher rating are with the more stress, depression and anxiety. Validity and reliability of the tool DASS-21 is confirmed in the previous studies. Overall reliability of this questioner is obtained 0.93 by using Cronbach's alpha coefficient in study of Jamshidi et al (25). Physical activity was classified as the suitable activity (150 minute per week), low activity (15 to 149 minutes per week) and without activity. Smoking included smoking, hookah, NAS and being exposed to second-hand smoke. Eligible patients were firstly selected by visiting wards, after the plan confirmation and approval and permission to enter the study environment, and the questioner was filled through the interview and face to face style, when they were assured acknowledge their informed consent. To obtain BMI and WHR, waist and hip circumferences of the research units were measured. Waist circumference in the narrowest area and hip circumference in the thickest area were measured and recorded in the check list by a standard meter and accuracy of 1 centimeter. For measuring the accurate height, meter was
mounted on wall at a distance of 50 centimeter with its zero downward. Then, the research unit leaned against the wall so that the back feet, hips, shoulders and head were touching the wall. Meter number was read with a ruler that was on his head, added with 50 and was recorded as person’s height in the check list. Weight of the research units was measured by a digital scale with accuracy of 100 gr, with the minimal clothes. Then, among the healthy individuals went to hospitals, one person matched to the patient’s age and gender, was selected as soon as possible and the questioner was filled for them similar to patients. Such process continued to complete the sample size. Data collected were entered in the software SPSS version 22. K2 test was used for comparing frequency between two groups, independent t test was used for comparing average of the quantitative variables of stress, anxiety and depression, and stepwise logistic regression model was used for predicting the group membership of the predictor variables.

**FINDINGS:**
Mean and standard deviation of age for the case group was 41.87±6.37 with the age range of 20 to 49 years and for the control group was 41.07±6.92 with the age range of 22 to 49 years which were not significantly different according to matching. Table 1 shows the individual, social and economic factors of both group, including gender, marital status, education, place of resident, income, occupation, physical activity, smoking, body mass index and waist to hip circumference ratio. Marital status, place of resident, occupation, WHR weren’t significantly different in both groups, but important socioeconomic factors like education, income and smoking were significantly different.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Case</th>
<th>Control</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number (percent)</td>
<td>Number (percent)</td>
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<tr>
<td>Gender</td>
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<td>79 (62.7)</td>
<td>76 (52.4)</td>
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<td></td>
<td>Male</td>
<td>47 (37.3)</td>
<td>50 (47.6)</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
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<td>126 (100)</td>
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<tr>
<td>Marital Status</td>
<td>Married</td>
<td>115 (91.3)</td>
<td>109 (86.5)</td>
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<tr>
<td></td>
<td>Single</td>
<td>5 (4)</td>
<td>9 (7.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Widows and divorcees</td>
<td>6 (4.8)</td>
<td>8 (6.3)</td>
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<tr>
<td></td>
<td>Total</td>
<td>126 (100)</td>
<td>126 (100)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Illiterate</td>
<td>42 (33.3)</td>
<td>4 (3.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preliminary and secondary</td>
<td>47 (37.3)</td>
<td>35 (27.8)</td>
<td>0.0001</td>
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<tr>
<td></td>
<td>Upper secondary</td>
<td>37 (29.4)</td>
<td>87 (69)</td>
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</tr>
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<td></td>
<td>Total</td>
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<td>126 (100)</td>
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<tr>
<td>Place of Resident</td>
<td>City</td>
<td>90 (71.4)</td>
<td>84 (66.7)</td>
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<td>Village</td>
<td>36 (28.6)</td>
<td>42 (33.3)</td>
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<tr>
<td></td>
<td>Total</td>
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<td>126 (100)</td>
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<tr>
<td>Income</td>
<td>Appropriate</td>
<td>25 (19.8)</td>
<td>56 (44.4)</td>
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<td></td>
<td>Relatively Appropriate</td>
<td>58 (46)</td>
<td>55 (43.7)</td>
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</tr>
<tr>
<td></td>
<td>Inappropriate</td>
<td>43 (34.2)</td>
<td>15 (11.9)</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>126 (100)</td>
<td>126 (100)</td>
<td></td>
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<tr>
<td>WHR</td>
<td>Abdominal obesity</td>
<td>98 (77.8)</td>
<td>93 (73.8)</td>
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<td>Normal</td>
<td>28 (22.8)</td>
<td>33 (26.2)</td>
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<tr>
<td></td>
<td>Total</td>
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<td>126 (100)</td>
<td></td>
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<tr>
<td>Physical activity</td>
<td>Appropriate</td>
<td>11 (8.7)</td>
<td>3 (2.4)</td>
<td>0.08</td>
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<td>Relatively Appropriate</td>
<td>39 (31)</td>
<td>40 (31.6)</td>
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<td></td>
<td>Inappropriate</td>
<td>76 (60.3)</td>
<td>83 (65.9)</td>
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<tr>
<td></td>
<td>Total</td>
<td>126 (100)</td>
<td>126 (100)</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Self-employed</td>
<td>27 (21.4)</td>
<td>22 (27.6)</td>
<td>0.06</td>
</tr>
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<td></td>
<td>Employed</td>
<td>26 (20.6)</td>
<td>40 (31.7)</td>
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<tr>
<td></td>
<td>Unemployed-housewife</td>
<td>73 (58)</td>
<td>64 (50.7)</td>
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</tbody>
</table>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th><strong>p</strong></th>
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<tbody>
<tr>
<td>Nutriiton</td>
<td>Case</td>
<td>12.07±3.48</td>
</tr>
<tr>
<td>Stress</td>
<td>Control</td>
<td>16.66±4.67</td>
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<tr>
<td>Depression</td>
<td>14.94±4.66</td>
<td>12.22±3.48</td>
</tr>
<tr>
<td>Anxiety</td>
<td>15.2±4.1</td>
<td>12.13±3.45</td>
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** Stepwise logistic regression model was used in order to check predictability of group membership by scores of stress, anxiety, depression, diet, age and body mass index. Result of this test in model 4 showed that scores of diet, stress, anxiety, and body mass index variables can predict 42.2% of the group membership. Age and depression variables were not included in the regression model.

** DISCUSSION:**
Influence of socioeconomic and psychological factors in CAD development in individuals less than 50 years old were studied in the current research. Majority of patient in this study were female. Result of study shows that majority of patients are male (2, 8, 15, 19, 26). CAD is more common in male but it seems that gender pattern of the disease is changed and women are affected as well. In this study, educational statuses of patients were significantly lower than the control group, and this finding is consistent with results of some previous studies (20, 27, 28, 29). People who are more literate and aware are less likely to become ill or involve in its implications. Knowledge about risk factor and consequently, a healthy life style among the more educated people may be partly reason for the lower development of CAD in this group of people. Opposite the result of Lotfi’s result, Singh and Chanda indicated that people with the higher education have a greater chance for catching CAD (30-32); the reason of which could be sensitive position, more stress, special life style and ready meals; and in some studies like Sezavar’s study, there wasn’t any significant relation between education and Myocardial Infarction in individuals less than 45 years old (33). About income, results showed that the risk of CAD is lower in people with the suitable income level and low income considered as a risk factor for CAD. Most of studies confirm this finding (20, 27, 29, 34). To explain the low income level in the patient group it can be said that higher education level improves the individuals’ income and economic situation. Result of study showed that smoking in patients is currently less than the control group and this difference is significant statistically. Result of other studies don’t match with this study. Most of studies’ results indicated that smoking in patients is more than non-patients (15, 8). Studies carried out by PishkarMonfared and Ahmadi shows that tobacco use as cigarette, hookah and NAS is high in Sistan-Baluchistan province (26, 35). As
this study’s results shows, 88% of control group’s individuals use the first or second hand smoke and majority of patients used cigarette, hookah and NAS in the past, but now they have attempted to quit smoking on the advice of the treating physician; and as control group’s individuals are young and middle age, they do not come to this importance that smoking is an important and well-known risk factor in development of non-communicable diseases. Body mass index also was statistically different in both group which is consistent with result of other studies (8, 36). Obesity outbreak epidemic rate is increasing at the global level with more than 1 billion overweight adults and at least 300 million people with excessive obesity and it is expected to be more in the next 20 to 30 years. Obesity is recognized as an independent risk factor for the serious disease like high blood pressure, diabetes type 2 and cardiovascular diseases. Also according to the relationship between obesity and cardiovascular disease, it is believed that obese people are faced with more undesirable consequences after a cardiovascular event compared with those with normal body mass index (BMI) (37). Result of this study indicated that dietary intake of patients has not been suitable and that is consistent with other studies’ result (8). In a study, Rezende et al. examined nutritional status of people over 20 years and results indicated decreased consumption of healthy food and increased consumption of unhealthy food that it has been highly related to morbidity and mortality caused by non-communicable diseases including cardiovascular disease (38). Dehghan’s study result also showed that a diet with a higher quality leads to reduce the risk of recurrent events of cardiovascular disease and diabetes among individuals older than 55 years. So health professionals put great stress on the importance of the healthy eating to reduce substantially the recurrence of cardiovascular disease and ultimately maintain life in the worldwide level (39). A healthy dietary intake includes consumption of more vegetables and fruits and less sugar and fat that is as a protective factor for prevention of CAD. Normally, less attention is paid to screening the nutritional status and intervention for people are at the risk of coronary artery disease than those who have the proved coronary artery disease. Results showed that amount of depression, stress and anxiety in patients was more than the control group and such difference was statistically significant. Depression is an important risk factor for mortality of patient with heart coronary artery disease, especially coronary acute syndrome (40). Most of studies showed that depression is an important risk factor in the increased cardiovascular disease, hospital readmission and mortality caused by the cardiovascular disease (42, 41). Lett et al. believe that depression increases the relative risk of CAD onset in healthy people and mortality risk in patients respectively 1.5 to 2 and 1.5 to 2.5 times more. Evidences indicates that anxiety role as a risk factor has less been determined in CAD development, but independent of depression, anxiety has a negative impact on the prognosis of patients with CAD (43). Eng et al. believe that patients with CAD should be under evaluation and necessary supportin terms of anxiety and depression (44). Study result of Roest et al. showed a relation between anxiety and risk factors of coronary artery disease and it was found that anxiety is an independent risk factor for CAD and heart mortality (45). Psychologists believe that psychological factors such as stress, tension, anxiety, depression and behavioral pattern type A play a role in the heart disease prevalent (46). In his study, Tahmasebian concluded that stress and personality type A is closely associated with CAD prevalence and continuation (19). Prevalence of cardiovascular diseases have high incidence in our society then it suggested preventive measurement must conduct by precise recognition of patients (47). It is necessary to screen patients with heart failure and teach them self-care behaviors (48).

Stress could affect the health through the behavioral and physiologic changes. Those who show high levels of stress, tend more to exhibit behaviors that increase the possibility of being damaged and ill. For instant, stress causes an increase in smoking, alcohol consumption, and
in turn, reduces exercises and leaves adverse effects on diet (49).

Limitations of this study was to find a control group according to the case group and it can also mentioned that it is not certainly possible to say that whether the risk factors in the patients has established before or prior to the disease, and regarding the studied population, results cannot be generalized to the entire community.

CONCLUSION:

As it was shown by this study result, risk factors like education, income level, body mass index, diet, stress and anxiety were significantly higher in patient than healthy population and country health policymakers are also required to pay special attention to promote healthy lifestyle, improve the economic recovery, increase knowledge about main risk factors and psychological factors as the independent risk factors. Meanwhile, considering the importance of this issue, it is recommended to evaluate these factors in a larger community or carry out the Cohort study.

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