Original article

Association of social support and coping strategies with acute coronary syndrome: A case–control study

Hamidreza Roohafza (MD) a, Mohammad Talaei (MD, MPH) b, Zahra Pourmoghaddas (MD) c, Fereshteh Rajabi (MD) a, Masoumeh Sadeghi (MD) d,*

a Mental Health Department, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
b Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
c Islamic Azad University, Najafabad Branch, Isfahan, Iran
d Cardiac Rehabilitation Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

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KEYWORDS
Acute coronary syndrome; Chronic stable angina; Coping strategies; Social support

Summary

Background: Psychological factors have been recently proposed as cardiovascular risk factors. This study was designed to evaluate the association of lifelong coping strategies and social support with progression of chronic stable angina (CSA) to acute coronary syndrome (ACS).

Methods and materials: Coping strategies and social support of patients based on a stress management questionnaire and Norback social support questionnaire were evaluated in a case–control study. Seventy eight hospitalized patients with ACS and 146 patients with CSA were included as the case and control groups, respectively. Positive angiographic findings were defined as the criteria for CSA. Logistic regression analysis was used to examine the aforementioned association.

Results: The mean age of 224 participants was 55 ± 10.4 years and 69.6% of them were male. After adjusting for age, sex, and traditional coronary artery disease risk factors, acute life event [odds ratio (OR): 1.09, 1.05–1.13 95%CI], maladaptive coping strategies (OR: 5.81, 1.93–17.49 95%CI), adaptive coping strategies (OR: 0.21, 0.05–0.94 95%CI), total functional support (OR: 0.49, 0.26–0.97 95%CI), and total network support (OR: 0.27, 0.15–0.53 95%CI) were significantly associated with ACS.

Conclusion: Improvement in social support and adaptive coping strategies should be considered in patients with chronic ischemic heart disease (IHD) to reduce the risk of ACS.

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* Corresponding author at: Cardiac Rehabilitation Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Khoram Street, PO BOX 81465-1148, Isfahan, Iran. Tel.: +98 311 3359797; fax: +98 311 3373435.
E-mail address: m_sadeghi@crc.mui.ac.ir (M. Sadeghi).

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Introduction

Acute coronary syndrome (ACS) is a result of atherosclerotic plaque rupture [1,2]. Smoking, diabetes mellitus, dyslipidemia, and hypertension are well known as the risk factors of producing the plaque, but some ACS patients do not show these risk factors [3]. Consequently, the other affecting factors of this process have been receiving attention. Association of psychological disorders with ACS and its metabolic risk factors has been suggested in many studies [4]. Coping strategies and social support are two psychological factors which have been evaluated in patients with coronary involvement [5].

Coping strategies as a part of a person’s character assist them to react to different stressful life events. Individuals try to use problem- or emotion-focused strategies to modify the situation, and/or regulate their emotions respectively. Coping strategies are generally divided into adaptive and maladaptive coping strategies. Reactions like rumination, aggression, and passive avoidance have been considered as maladaptive coping strategies, and adaptive coping strategies include learning new skills, seeking help, and venting anger [5,6]. Since ACS is a traumatic event [7,8], patients have to cope with this occurrence, so some researchers have evaluated the outcomes of coping strategies after ACS and showed patients with maladaptive behavior have more disability. For instance, it was shown that one month after myocardial infarction, women used more maladaptive evasive coping strategies which led to lower quality of life [5]. One of the most powerful forces which helps individuals to cope with ACS successfully has been known as social support which refers to tangible or emotional aids that were given to people [9]. Association of social support with cardiac patient’s disabilities was evaluated in many surveys, and revealed that this psychological factor could to some extent predict the survival of cardiac patients [10,11].

Previous studies have mainly evaluated these two psychological factors in ACS outcomes but since coping strategies were used in many aspects of stressful life events and people also face many aspects of social support during their life, therefore, these two psychological factors may influence the processes which prevent ACS. However, few researchers have evaluated coping strategies and social support from this point of view. The present study was designed to compare the use of coping strategies and social support between patients with acute coronary events and those with chronic stable angina (CSA) without events.

Methods

The methodology of data collecting, sampling strategies, inclusion and exclusion criteria and all of the other details of method were explained by Roohafza et al. in 2010 within the context of the case—control study [4] and will be discussed here briefly. Seventy eight consecutive participants with ACS were recruited as the case group consisting of 50 (63.9%) patients with acute myocardial infarction (AMI) and 28 (36.1%) with unstable angina pectoris (UA). The diagnoses of AMI and UA were based on American College of Cardiology/American Heart Association guidelines [12,13]. The control group consisted of 146 patients with no history of ACS but positive angiographic findings. Positive angiography result was defined as more than 75% occlusion in at least 1 main epicardial coronary artery. It was calculated that 83 subjects in each group would be required to detect a minimum difference of one (effect size = 1) for stressor counts between 2 groups with 90% power ((beta] = 0.1) at the two-tailed 0.025 level of significance ([alpha] = 0.05) and SD of 2 in both groups. It was decided to increase the control group size to compensate for the lack of 5 samples in the case group, increase the power of the study, and have a better fitted model. All the cases and control participants were <65 years, and had stable hemodynamic as well as the ability of reading and writing, participants had no history of ACS, accepted to participate in the interviews, and completed the informed consent form. The present study was approved by the Bioethical Committee of the Isfahan Provincial University of Medical Sciences.

Measurements

After the first 24 h of hospital admission and confirmation of the diagnosis in the case group and confirmation of CSA by positive angiography in the control subjects, all the patients in cases and control groups were interviewed during their hospitalization in 2 separate sessions. At the time of interview, they were in good hemodynamic state. In the first session of interview, the stressful life event questionnaire and the stress management questionnaire were completed and in the next session the Norbeck social support questionnaire was completed. The interviews were conducted by trained nurses and supervised by a psychiatrist. Demographic factors such as age, sex, marital status (married, unmarried), insurance status, income level [high income ≥ 2,000,000 Rials (Iranian currency), low income ≤ 2,000,000 Rials], educational level (illiterate, school years ≤ 12 years, college graduate) were determined. At the time of admission systolic and diastolic blood pressures of patients were measured by standard method. After 12 h of fasting a blood sample of participants was taken to measure fasting plasma glucose, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, and triglyceride by standard methods [14–17]. Also patient height, weight, and body mass index [18] were measured during their hospitalization.

Stressful life events

A valid and reliable stressful life event questionnaire [19] including 46 stressors arranged in 11 domains was used. The domains consisted of home life, financial problems, social relations, personal conflicts, job conflicts, educational concerns, job security, loss and separation, sexual life, daily life, and health concerns. The occurrence of the mentioned stressors in the period of six months prior to ACS or angiography was questioned. The answer was assessed based on 6-point Likert scales (0 = never, 1 = very mild, 2 = mild, 3 = moderate, 4 = severe, 5 = very severe). The higher score showed higher stress level. The reliability assessments of the questionnaire were reported by Cronbach’s alpha coefficient (α = 0.92) [18].
Coping strategies

A multicomponent self-administered stress management questionnaire [20] was used to assess the coping strategies. The questionnaire detects adaptive and maladaptive cognitive and behavioral coping strategy. The reliability of the questionnaire was determined using Cronbach’s alpha coefficient ($\alpha = 0.78$). This inventory questionnaire includes 30 items which assess 20 adaptive skills such as positive self-instructions, seeking social support, situation control, humor, using relaxation methods, and referring to a consultant; and 10 maladaptive skills such as passive avoidance, drug abuse, more sleep, more smoking. Never, sometimes, and often are the answers of each question which determine the frequency of using each strategy. For adaptive and maladaptive skills two separate scores were reported. For the final scoring, the number of items marked often is divided by the sum of items marked often and sometimes and is expressed as the percent for adaptive and maladaptive skills separately.

Social support

Norbeck Social Support Questionnaire (NSSQ) [21] which includes items about an individual’s social network and the types of relationship within this network was used. The English version of the NSSQ was translated into Persian language using forward-backward translation method. The reliability of the questionnaire was 89% (Cronbach’s $\alpha = 0.89$). During the interview, patients were asked to list people who support them or the people who are the most important individual for them. According to each provider, they were asked to answer each of the items on a 5-point intensity scale indicating the extent to which the provider gave support as described by that item. At the end, variables which calculated and got score are Total Functional Support (combining affect, affirmation, and aid subscales) and Total Network Support (combining number in network, duration of relationships, and frequency of contact).

Statistical analysis

All data were entered into a database using EPI info™ and were analyzed by SPSS (SPSS Inc., Chicago, IL, USA; Version 15). All statistical tests were two-sided, and $p$-values less than 0.05 were considered as statistically significant. The average values are reported as mean $\pm$ standard deviation (SD).

In the statistical analysis Chi-square test was used for categorical variables and Student’s $t$-test for continuous variables. Logistic regression analysis was carried out to examine the association between psychological variables and the occurrence of ACS. Independent variables included social support, coping strategies, and stressful life event in separate models. Dependent variable was occurrence of ACS. The models were adjusted for age, sex, and five traditional risk factors of coronary artery disease and odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. Socioeconomic status variables did not confound these associations.

Results

This study consisted of 224 individuals of whom 156 (69.65%) were male. The mean age of participants was $55 \pm 10.4$ years. The case and the control groups included 78 and 146 patients, respectively. Participants’ characteristics are summarized in Table 1. Hypertension and dyslipidemia were significantly higher in the case group. There were no other significant differences between the two groups in the rest of the characteristics.

Acute life event score and maladaptive coping strategies score were significantly higher in ACS group (Fig. 1). In contrast, scores of adaptive coping strategies, total functional support, and total network support were significantly higher in the CSA group.

As presented in Table 2, acute life event, maladaptive coping strategies, adaptive coping strategies, total functional support, and total network support were significantly associated with ACS. This association remained statistically significant when adjusted for age, sex, and traditional risk factors of coronary artery disease (body mass index, smoking, hypertension, dyslipidemia, and diabetes).

Discussion

The association of the maladaptive coping strategies and lower level of social support with acute coronary events in bases of IHD have been demonstrated in the present study. In addition, multivariate analyses showed the inverse association of adaptive coping strategies and ACS in patients with chronic IHD independent to age, sex, and traditional cardiovascular risk factors.

Two community-based studies showed health condition is worse in patients with poor social support and chronic disease compared to patients with good social support and
Table 1  Characteristics of participants in case and control groups.

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>ACSa (n = 78)</th>
<th>CSAb (n = 146)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>57.02 ± 11.26</td>
<td>54.03 ± 9.91</td>
<td>0.51</td>
</tr>
<tr>
<td>Male (%)</td>
<td>56 (78.8)</td>
<td>100 (68.5)</td>
<td>0.65</td>
</tr>
<tr>
<td>Married (%)</td>
<td>67 (87.0)</td>
<td>130 (89.0)</td>
<td>0.42</td>
</tr>
<tr>
<td>Insurance (%)</td>
<td>70 (89.7)</td>
<td>130 (89.0)</td>
<td>0.87</td>
</tr>
<tr>
<td>High income (%)</td>
<td>41 (61.2)</td>
<td>81 (56.3)</td>
<td>0.50</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate (%)</td>
<td>15 (19.2)</td>
<td>38 (26.0)</td>
<td>0.32</td>
</tr>
<tr>
<td>≤12 year (%)</td>
<td>47 (60.3)</td>
<td>73 (50.0)</td>
<td></td>
</tr>
<tr>
<td>College graduate (%)</td>
<td>16 (20.5)</td>
<td>35 (24.0)</td>
<td></td>
</tr>
<tr>
<td>Traditional risk factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body mass index (mean ± SD)</td>
<td>27.56 ± 3.41</td>
<td>26.71 ± 4.46</td>
<td>0.15</td>
</tr>
<tr>
<td>Current smoker (%)</td>
<td>18 (23.1)</td>
<td>31 (21.2)</td>
<td>0.75</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>59 (75.6)</td>
<td>83 (57.2)</td>
<td>0.006</td>
</tr>
<tr>
<td>Dyslipidemia (%)</td>
<td>74 (94.9)</td>
<td>106 (72.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes (%)</td>
<td>29 (37.2)</td>
<td>50 (34.2)</td>
<td>0.41</td>
</tr>
</tbody>
</table>

a  Acute coronary syndrome (case group).

b  Chronic stable angina (control group).

Table 2  Unadjusted and adjusted association of psychological factors with acute coronary syndrome.

<table>
<thead>
<tr>
<th></th>
<th>Crude OR (95% CI)</th>
<th>Adjusted ORa</th>
<th>Fully Adjusted ORb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute life event score</td>
<td>1.08 (1.04, 1.12)</td>
<td>1.10 (1.06, 1.14)</td>
<td>1.09 (1.05, 1.13)</td>
</tr>
<tr>
<td>Maladaptive coping strategies</td>
<td>3.58 (1.36, 9.41)</td>
<td>3.77 (1.39, 10.18)</td>
<td>5.81 (1.93, 17.49)</td>
</tr>
<tr>
<td>Adaptive coping strategies</td>
<td>0.17 (0.04, 0.71)</td>
<td>0.18 (0.04, 0.77)</td>
<td>0.21 (0.05, 0.94)</td>
</tr>
<tr>
<td>Total functional support</td>
<td>0.45 (0.21, 0.96)</td>
<td>0.47 (0.25, 0.97)</td>
<td>0.49 (0.26, 0.97)</td>
</tr>
<tr>
<td>Total network support</td>
<td>0.22 (0.10, 0.49)</td>
<td>0.25 (0.15, 0.51)</td>
<td>0.27 (0.15, 0.53)</td>
</tr>
</tbody>
</table>

OR, odds ratio; CI, confidence interval. A separate model was constructed for each psychological factor.
a  Adjusted for age and sex.
b  Adjusted for age and sex and traditional risk factor (body mass index, smoking, hypertension, dyslipidemia, and diabetes).
†  p < 0.05.
‡  p < 0.01.
in leisure time than persons who experience lower levels of stress [35, 37]. In the current study, the results have shown the association of maladaptive coping strategies and acute coronary events in patients who suffer from IHD independent of body mass index, smoking, hypertension, dyslipidemia, and diabetes mellitus, but this association maybe due to other factors such as stress.

Considering the number of studies which have evaluated the effect of coping strategies on acute coronary events at the time of admission is the strength of the present study. However, case control design, using self-administered questionnaire, and unmeasured confounders must be regarded as the limitations of this study.

Conclusion

Since adaptive coping strategies and upper level of social support could independently prevent developing acute coronary events in patients suffering from chronic IHD, improvement in these factors should be considered. Hence it is recommended to run clinical trials to evaluate the role of learning adaptive coping strategies and improving social support in prevention of ACS incidence.

Acknowledgment

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