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The Relationship Between Stressors and Anxiety Levels After CABG in Sari, Iran

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Abstract

Background: Hospitalization and surgery are crucial adverse life events that lead to considerable anxiety in patients.
Objectives: The present study aimed to investigate stressors after coronary artery bypass graft surgery and identify stressors that predict anxiety.
Patients and Methods: This is a descriptive-analytical study that uses a non-random convenience sampling method on patients undergoing coronary artery bypass graft surgery at the cardiac surgery intensive care unit of Fatemeh Zahra Cardiac center in Sari, Iran. A total of 186 patients completed the post-surgical stressors questionnaire and the Spielberger State-Trait Anxiety Inventory on postoperative days 2 or 3 in the cardiac surgery intensive care unit. Data were analyzed using descriptive statistics including frequencies, means, and standard deviations. The Mann-Whitney U test was used to determine the relationship between the observed variables, and the logistic regression model was used to identify the relationship between stressors and anxiety after-surgery.
Results: Post-surgical anxiety predictors included insufficient sleep during hospitalization (Odds ratio [OR]: 5.42; 95% confidence interval [CI]: 1.46 - 20.00; P = 0.010), treatment not explained to the patient by the nurse (OR: 4.83; 95% CI: 1.82 - 12.84; P = 0.002), being away from family members (OR: 3.88; 95% CI: 1.46 - 10.26; P = 0.006), presence of a chest tube (OR: 3.27; 95% CI: 1.83 - 5.84; P = 0.000), and pain in any part of the body (OR: 1.95; 95% CI: 1.06 - 3.58; P = 0.031).
Conclusions: Physical or physiological and psychological stressors impose greater stress and are predictors of anxiety. When preparing their nursing care plan, nurses should consider these stressors that affect anxiety levels in patients undergoing CABG surgery and those hospitalized in intensive care units.

Keywords: Coronary Artery Bypass Graft Surgery, Stressors, Anxiety

1. Background

Cardiovascular diseases are the most common cause of death worldwide (1). Coronary artery disease is considered the most important cause of morbidity and mortality in the United States; it is reported to have affected over 16 million people. In Iran, cardiovascular diseases are the leading cause of mortality, also 46% of all deaths being attributed to ischemic heart diseases (2). Although cardiac surgery is a successful part of cardiac care, it is considered a stressful, unwanted, life-threatening experience for many patients and is associated with fear and anxiety to the extent of affecting several aspects of the patient's personal life (3). Concerns about coronary artery bypass graft (CABG) surgery are known as stressors (4). Grady et al. believe that stressors are circumstances and events that force people to react, and reactions to stress may manifest itself in various physical, mental, or behavioral forms (5). Anxiety is an outcome of stressors such as fear of death, fear of change in health condition, environmental changes and separation from the support system (6), lack of adequate information, rumors spread by other patients, false beliefs, and distrust in surgery outcomes, all of which lead to pre-surgical stress in the patient (7). Hospitalization, especially in the intensive care unit (ICU), leads to a series of adverse psychological complications that can manifest itself or be aggravated after the patient's discharge from hospital (8). Because of the complexity of care and treatment measures, and the complicated environment, ICU is a stressful setting and

can negatively affect patients' recovery and rehabilitation (9). Post-surgical stressors in the ICU have been explored in several studies and are observed within the 4 domains of physical, psychological, environmental, and procedural factors. The main physical stressors include thirst, presence of oral or nasal tubes, inability to sleep, and pain (9-11). The main psychological stressors include fear of death (4, 9, 11), not being in control of oneself (11), being pressurized to accept the treatment, not knowing the length of ICU stay (10), financial concerns (10, 11), fear of acquiring nosocomial infections, and treatment not explained to the patient (10). The main environmental stressors comprise medical device alarms (12), and the presence of several patients in one room(4). Finally, procedural stressors were reported to encompass observing the constant presence of nurses performing their tasks around the bed, and observing intravenous bags over the bed (9). Anxiety is a state of uncertainty about future threats, identified by stress, concern, negative emotions, and a sense of insecurity (13). Anxiety is usually considered a harmful feeling. When anxiety level is too high and disrupts daily life, it becomes irreconcilable and causes serious consequences. Anxiety ranges from normal levels to a state of illness and disorder. Evidence indicates that despite the variety of manifestations of anxiety, the psychological and physical responses to them are the same (14). It is also believed that high levels of anxiety can increase the need for anesthesia, the possible complications of anesthesia, and the need for post-surgical analgesics (15). One study reported that trait anxiety levels were higher in patients hospitalized for arrhythmia, congestive heart failure, and myocardial infarction during the 4-year period after their CABG surgery (16). A review of literature showed that anxiety related to surgery is a theme explored by various studies. In Tol and Pourreza's study, anxiety levels before and after surgery were investigated in patients undergoing CABG surgery, and the relationship between anxiety and demographic variables was assessed. Results showed that 64.7% of patients had moderate levels of anxiety before surgery and 97.3% had low levels of anxiety after surgery; that is, anxiety levels were higher before than after surgery, and were related to variables such as age, sex, number of children, and marital status (17). However, Tol and Pourreza's study did not investigate stressors. Gallagher and McKinley examined the relationship between anxiety levels and stressors before and after surgery in patients undergoing CABG surgery. Pre-surgical anxiety predictors included being a female, concerns about the waiting period before surgery, pain and discomfort, and resuming life style. Moreover, post-surgical anxiety predictors included receiving anti-anxiety and anti-depressant medications, high pre-surgical anxiety levels, lack of access to personal belongings, and sleep problems (18). A review of literature revealed that most studies merely investigated the stressors of patients in ICUs (4, 19, 20), with some studies reporting the stressors of CABG surgery without investigating anxiety (4). According to available databases, no study has been conducted in Iran to date on the relationship between stressors and anxiety levels after surgery in patients undergoing CABG surgery, with the exception of one study on patient's perception of stressors associated with CABG surgery (4); this study however did not explore post-surgical anxiety.

2. Objectives

Given the importance of post-surgical anxiety in the recovery process of these patients, the present study was designed to investigate the relationship between stressors and anxiety after surgery in patients undergoing CABG surgery and thereby to identify stressors and anxiety levels and propose preventive care and treatment measures for this patient group.

3. Patients and Methods

This is a descriptive-analytical study performed using the non-random accessible sampling method on patients undergoing CABG surgery at the cardiac surgery ICU of Fatemeh Zahra Cardiac center in Sari, Iran. Fatemeh Zahra hospital is a government referral center located in the heart of Sari. The inclusion criteria comprised first time CABG surgery; age of 18 years and older; being oriented in time, person, place; having the ability to communicate; not under treatment for severe psychological disorders; and not having severe visual, hearing and voice impairments. The exclusion criteria included patient's unwillingness to cooperate at any stage of the study and conditions requiring emergency interventions. The sample size was calculated to be 186 according to the study conducted by Shahmansouri et al., with a prevalence of 39% moderate level of fear (p), 95% confidence coefficient (z), and a detection accuracy of 0.07 (d) (20).

$$(1) \quad n = \frac{z^2 \times p(1-p)}{d^2} = \frac{3.84 \times 0.39(1-0.39)}{(0.07)^2} = 186$$

The data collection tool comprised 3 questionnaires, including the socio-demographic and medical data questionnaire, the post-surgical stressors questionnaire, and the Spielberger State-Trait Anxiety Inventory. The socio-demographic and medical data questionnaire solicited information regarding the participants' age, gender, marital status, level of education, employment, history of surgery, and history of psychiatric diseases. A researcher-constructed, 35-item, post-surgical stressors questionnaire was based on various studies and the 50-item Intensive Care Unit Environmental Stressor Scale (ICUESS). The post-surgical stressors questionnaire was issued to patients on the second or third day after surgery. The 50-item questionnaire was first used by Ballard in 1981 and then by Nastasy in 1985; it was subsequently revised by other researchers (9). In our study, the post-surgical stressors questionnaire was tested for

face and content validity. To assess the content validity ratio (CVR), the 45-item questionnaire was first distributed among 12 experts in the fields of psychiatric nursing, psychiatry, medical-surgical nursing, and behavioral sciences and 10 items were then excluded from the questionnaire. The CVR was found to be above 0.67 for the remaining items. The content validity index (CVI) was found to be 0.92. To ensure the questionnaire's reliability, internal consistency was measured (using Cronbach's alpha) and was calculated at 0.863 subsequent to the completion of the questionnaire by 30 CABG patients. The 35 items were rated using a 4-point Likert scale, with 4 indicating severely stressful, 3 highly stressful, 2 moderately stressful, 1 slightly stressful, and 0 not stressful or not applicable. The overall score ranged from 0 to 140, with 0 - 35, 36 - 70, 71 - 105, and 106 - 140 indicating, in the respective order, slightly, moderately, highly, and severely stressful post-surgical stressors. Obtaining a score of 0 indicated the lack of any experience with the stressors after surgery. The 40-item Spielberger State-Trait Anxiety Inventory was used to measure anxiety levels before and after surgery. Items 1 to 20 measures the state anxiety with 4 choices (not at all, somewhat, moderately, and very much), while items 21 to 40 measures trait anxiety with 4 choices (almost never, sometimes, often, and almost always) (21). Each item is scored on a scale of 1 to 4. Items indicating anxiety are reverse-scored from 1 to 4, while statements showing lack of anxiety are reverse-scored from 4 to 1. To find the respondents' score in each of the two scales, the total score is calculated separately for each scale given that some items are reverse-scored. Items 3, 4, 6, 7, 9, 12, 13, 14, 17, 18, 22, 24, 25, 28, 29, 31, 35, 37, 38, and 40 are scored from 1 to 4, while items 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 23, 26, 27, 30, 32, 33, 34, 36 and 39 are reverse scored from 4 to 1 (22). A score of 0 to 40 shows the lack of anxiety, 41 to 80 mild anxiety, 81 to 120 moderate anxiety, and 121 to 160 represents severe anxiety (23). The validity and reliability of the Persian version of this questionnaire have been established by the psychology department of the Tarbiat Modares university (24, 25). In another study, Cserep et al. reported the questionnaire's reliability to be 0.94 (26). Ethical approval was obtained from the Medical Research and Ethical Committee of the Mazandaran University of Medical Sciences. Patients were sampled from February 2013 to June 2014 using convenience sampling method and in accordance with the study's inclusion and exclusion criteria. Eight patients did not complete the questionnaire because they were too sick and/or exhausted. Furthermore, two patients developed complications after surgery. All patients were informed about the aims of the study, their right to withdraw from the study at any time without having to give a reason and without negative consequences to patient care. Written informed consent was then obtained from each participant. The first questionnaire, socio-demographic and medical data questionnaire, was completed for patients by one of the researchers (AJ). The 35-item post-surgical stressors questionnaire was completed on postoperative days 2 or 3 in the cardiac surgery ICU, and anxiety levels were measured concurrently using the Spielberger's State-Trait Anxiety Inventory. Data were analyzed with SPSS-16 software, using descriptive statistics (such as mean, standard deviation and percentage) and analytical tests (such as Mann-Whitney U, logistic regression model and one-sample Kolmogorov-Smirnov). The Mann-Whitney U test was used to assess the relationship between the variables. The logistic regression model was performed to determine the relationship between stressors and anxiety after surgery. If one-sample Kolmogorov-Smirnov test showed that the variables (anxiety and stressors) were not normally distributed, then nonparametric tests were used. An alpha level of .05 or less was set as the criterion for significance.

4. Results

Of the total 186 patients participating in the study, 52.2% were male, 44.6% were over 60 years old, 86.1% had under diploma education, and 93.5% were married. Table 1 shows the socio-demographic and medical data of the study population. The frequencies of stressors after surgery are shown in Table 2.

Table 1. Socio-Demographic and Medical Data of Sample

Patient Characteristics	No. (%)
Level of education	
Under diploma	160 (86.1)
Diploma	22 (11.8)
Bachelor's degree and higher	4 (2.1)
Marital status	
Married	174 (93.5)
Widow/widower	9 (4.8)
Single	2 (1.1)
Separated or divorced	1 (0.5)
Employment	
House worker	78 (41.9)
Retired	27 (14.5)
Employed	11 (5.9)
Unemployed	9 (4.9)
Other	61 (32.8)
Previous surgery	
Yes	35 (18.8)
No	151 (81.2)
History of psychiatric illness	
Yes	26 (14)
No	160 (86)

The highest frequency (79%) of post-surgical stressors was seen in the slightly stressful group; 7.5% and 7.5% patients fell in the moderately stressful and highly stressful groups, respectively, and 5.9% in the severely stressful group. No patient reported complete absence of stress. The highest mean stressfulness score was noted for being in pain (mean ± SD, 1.76 ± 1.34), followed by having a chest tube (1.75 ± 1.23) and hearing the ICU staff talking about the patient (1.43 ± 1.18). Overall, the maximum and minimum mean score of the 35 items were between 1.76 ± 1.34 and 0.47 ± 1.06, respectively. The median, 25 percentile (P25), 75 percentile (P75), and interquartile range of post-surgical stressors were, respectively, 14, 8, 28, and 20. Following surgery, the frequency of mild, moderate, and severe anxiety was 70.4%, 28.5%, and 1.1%, respectively. The highest frequency of anxiety after surgery was noted for the state of mild anxiety (Table 3). Median, P25, P75, and interquartile range of post-surgical anxiety were in the following order: 68, 55, 82, and 28.

The Mann-Whitney U test was used to assess the relationship between stressors and anxiety after surgery. Because of the lack of a significant relationship with anxiety, certain post-surgical factors were excluded from the logistic regression model; these included the presence of a urinary catheter, uncomfortable bed, and not knowing the length of stay in the ICU. The logistic regression test revealed the following predictors of post-surgery anxiety: insufficient sleep during hospitalization (P = 0.010), being away from family members (P = 0.006), treatment not explained to the patient by nurses (P = 0.002), presence of a chest tube (P = 0.000), and pain in any part of the body (P = 0.031; Table 4).

Table 2. Distribution of Absolute and Relative Frequency of Post-surgical Stressors in Patients Undergoing CABG Surgery

Stressfulness	Absolute Frequency	Relative Frequency, %
Not stressful (0)	0	0
Slightly stressful (1 - 35)	147	79
Moderately stressful (36 - 70)	14	7.5
Highly stressful (71 - 105)	14	7.5
Severely stressful (106 - 140)	11	5.9
Total	186	100

Table 3. Distribution of Absolute and Relative Frequency of Pre- and Post-Surgical Anxiety in Patients Undergoing CABG Surgery

Anxiety level	Absolute Frequency	Relative Frequency, %
Absence (0-40)	0	0
Mild (41-80)	131	70.4
Moderate (81-120)	53	28.5
Severe (120-160)	2	1.1
Total	186	100

Table 4. Relationship Between Post-surgery Stressors and Anxiety Levels After Surgery in Patients Undergoing CABG Surgery

Post-surgery Stressors	B	Std. Error	P Value	Anxiety Odds Ratio EXP (B)	95% Confidence Interval (Upper Limit – Lower Limit)
Coefficient	1.21	0.27	0.000	0.29	-
Insufficient sleep during hospitalization	1.69	0.66	0.010	5.42	(1.46 - 20.00)
Treatment not explained to the patient by nurses	1.57	0.49	0.002	4.83	(1.82 – 12.84)
Being away from family members	1.35	0.49	0.006	3.88	(1.46 - 10.26)
Presence of a chest tube	1.18	0.29	0.000	3.27	(1.83 – 5.84)
Pain in any part of the body	0.67	0.31	0.031	1.95	(1.06 – 3.58)

5. Discussion

The present study showed that, in general, the mean stressfulness score after surgery was low, which is similar to the results of studies conducted by Parvan et al. (4) and Gallagher and McKinley (18). In Parvan et al.'s study, the overall mean ± standard deviation of the Revised Cardiac Surgery Stressors Scale (RCSSS) was 1.63 ± 0.36, indicating the low levels of stressfulness associated with the factors before and after surgery (4). In Gallagher and McKinley's study, the highest level of stressfulness was noted for the waiting period for surgery, with a mean of 2.02 (18), a result similar to that of the present study. Despite low levels of stressfulness, the results of all these studies show that CABG candidates experience stress, reinstating the importance of nursing care plans for decreasing complications of stress and anxiety. Most patients had mild anxiety in our study. In Gallagher and McKinley's study that used Hospital Anxiety and Depression Scale (HADS), anxiety at the clinical level (scores above 8) was 28% during hospitalization in the ICU (18). Low anxiety (scores 0 - 7) had the highest frequency in that study, a finding similar to the results of the present study. Also in Tol and Pourreza's study, which used Spielberger's State-Trait Anxiety Inventory, the highest frequency of anxiety after surgery was noted for low anxiety (66%) (17). In the present study, a majority of patients were over 60 years old; as patients in these ages usually have a history of heart disease and hospitalization, low levels of anxiety can be expected. Although our study shows low levels of anxiety, it is essential to evaluate anxiety levels because anxiety may lead to adverse effects on the cardiovascular system. All relevant studies have reported that patients experience anxiety, and therefore, it is recommended to design appropriate interventions. In the present study, the logistic regression analysis showed that insufficient sleep during hospitalization (OR = 5.42) was a major post-surgery stressor (Table 4). Based on the 50-item ICUESS, stressors of ICUs are divided into 4 categories: physical or physiological, psychological, procedural, and environmental. In our study, physical or physiological stressors such as insufficient sleep were among the major stressors. Yava et al. (2010) examined stressors using the 50-item ICUESS and revealed that except for fear of death (a major stressor perceived by patients and nurses), physiological stressors such as thirst, pain, sleep problems, and presence of oral and nasal tubes had a greater significance when compared with stressors such as environmental or other psychological stressors (9). Furthermore, So and Chan (2004) reported that physiological stressors such as thirst, pain, and sleep problems were major stressors (11), a finding similar to that of our study. In these two studies, the relationship between the aforementioned factors and anxiety was not evaluated. In Gallagher and McKinley's study, insufficient sleep (OR = 1.38) was predictive of anxiety after surgery. In the present study, insufficient sleep had a greater level of anxiety when compared with that shown by Gallagher and McKinley's study; this difference could be due to difference in ICU facilities. Treatment not explained to the patient by nurses (OR = 4.83) was another important post-surgical stressor. A study revealed that treatment not explained to the patient by nurses was a major stressor, a finding in agreement with our study (10). In So and Chan's study, the relationship between this factor and anxiety has not been investigated (11). Koivula (2002) investigated the receipt of in-hospital social support, which is multi-dimensional and includes emotional, informational, and tangible support, and its effect on CABG patients (27). The study indicated that patients received a substantial support from nurses and that their anxiety levels were reduced because of informational support provided by nurses (25). Thus, this finding indicates the significance of psychological stressors to patients and the educational role of nurses. According to the present study, a psychological predictor of anxiety was being away from family members (OR = 3.88), which is consistent with the results of other studies (4, 18). In Parvan et al.'s study, this factor, with a mean ± SD of 2.77 ± 1.30, was the second major extra personal stressor (4), but the relationship between this factor and anxiety was not evaluated. Considering the substantial role of family as a source of social support for patients (27), it is expected that being away from family members during surgery to be stressful and cause anxiety. It is crucial that patients to be able to meet their family members after surgery and during hospitalization in the ICU. Our analysis also showed the presence of a chest tube (OR = 3.27) as a major physical predictor of anxiety, a finding by Parvan et al. who reported this as a major extra personal stressor for the patients (4). Parvan et al. and Yava et al. found the presence of oral and nasal tubes as a major post-surgery stressor (9). Given that certain stressors of CABG surgery, such as the presence of chest, urinary, nasal, gastric, and tracheal tubes, are inevitable, it is crucial for patients to be well-informed about the necessity of these intubations; in addition, certain measures should be taken to ensure patient's greater comfort during this time. Furthermore, pain in any part of the body (OR = 1.95) was a major post-surgical predictor of anxiety. Likewise, other studies also reported body pain to be a major post-surgical stressor (4, 9, 10). In Gallagher's study, this factor only existed in patients before surgery (18). Given that people have different perceptions of pain, effective pain management can only be exercised through proper objective examination of the pain, using reliable behavioral and physiological indicators and choosing proper analgesics (10). We found procedural and environmental factors to be less significant, a result aligned with those of other studies. It is generally accepted that many stressors are correlated. For instance, presence of tubes and immobility can cause pain, pain can cause insomnia, and insomnia can in turn affect the perception of stress by increasing

stress levels (28). Thus, identifying these factors is also of great importance.

5.1. Conclusions

Our study showed that physical or physiological and psychological stressors were perceived as more stressful after CABG surgery. Stressors like insufficient sleep during hospitalization, being away from family members, treatment not explained to the patient by nurses, presence of a chest tube, and pain in any part of the body were predictors of anxiety after surgery. Thus, when preparing their nursing care plan, nurses should consider stressors that affect anxiety levels in patients undergoing CABG surgery and those hospitalized in ICUs.

5.2. Limitations of the Study

In this study, most of the patients were over 60 years old and had no formal education; therefore, generalization of results to other age groups should be done with caution.

5.3. Strength of the Study

Based on the review of literature, many stressors have been explored in patients undergoing CABG surgery, but stressors that cause anxiety have not been identified.

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Footnotes

Authors' Contribution: Azam Jafari designed the research and participated in data collection. Masoumeh Bagheri Nesami collaborated in study concept and performed critical revision of the manuscript for important intellectual content. Ali Reza Khalilian provided assistance in the analysis and interpretation of data. Seyed Afshin Shorofi participated in the design of study, critically reviewed the manuscript, and corrected the manuscript for publication. Shervin Ziabakhsh Tabari participated in the coordination of study.

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