



The Relationship of Discomforting Factors with Coping Strategies Among Patients in Cardiac Surgery Intensive Care Units

Masoumeh Rahimi,¹ Shohreh Kolagari,^{2,*} Khadijeh Yazdi,² and Mohammad Aryaie³

¹Intensive Care Nursing Department, Golestan University of Medical Sciences, Gorgan, Iran

²Nursing Research Center, Nursing & Midwifery Faculty, Golestan University of Medical Sciences, Gorgan, Iran

³Deputy of Research & Technology, Golestan University of Medical Sciences, Gorgan, Iran

*Corresponding author: Shohreh Kolagari, Nursing Research Center, Golestan University of Medical Sciences, Hirkanian Boulevard, Gorgan, Iran. Tel: +98-32456900, Fax: +98-32455171, E-mail: kolagari_gorgan@yahoo.com

Received 2017 November 06; Revised 2018 January 25; Accepted 2018 February 20.

Abstract

Background: Patients in cardiac surgery intensive care units are affected by different discomforting factors and use different strategies for their management.

Objective: The aim of this study was to examine the relationship of discomforting factors with coping strategies among patients hospitalized in cardiac surgery intensive care units.

Methods: This descriptive - correlational study was done in 2016. A convenience sample of 110 patients was drawn from the cardiac surgery intensive care unit of Amir - al - momenin heart surgery center, Kordkuy, Iran. Data were collected using a demographic questionnaire, the Discomforting Factors in Cardiac Surgery Intensive Care Unit Questionnaire, and Jalowiec Coping Scale. Pearson correlation analysis, the one - way analysis of variance, the paired - sample t - test and the Tukey's post hoc test were used to analyze the data. Data analysis was performed via the SPSS software (v. 16.0) and at a significance level of less than 0.05.

Results: The mean score of discomforting factors was greater than the moderate level (74.08 ± 16.93). Participants used emotion - focused coping strategies more than problem - focused ones. Discomforting factors were inversely correlated with problem - focused strategies ($r = -0.266$; $P = 0.005$) and directly correlated with emotion - focused strategies ($r = 0.247$; $P = 0.009$).

Conclusions: Patients in cardiac surgery intensive care units suffer from the negative effects of different discomforting factors and use emotion - focused coping strategies more than problem - focused strategies for the management of the factors.

Keywords: Discomforting Factors, Coping Strategies, Cardiac Surgery Intensive Care Unit

1. Background

Cardiovascular disease (CVD) is the first leading cause of death in the world (1). Annually, CVD causes around 17 million deaths in the world (2). The World Health Organization estimated that this rate will reach 25 million cases by 2020 (3). The CVD death rate in Iran is also as high as 41.3% and is estimated to reach 44.8% by 2030 (4). CVD negatively affects physical and mental health and imposes heavy costs on patients, families, healthcare systems, and societies (1).

Cardiac surgery is one of the most common therapeutic interventions for CVD management, particularly when medical treatments are not effective (5, 6). Cardiac surgeries are performed to repair valvular or arterial problems. Statistics show that each year, several hundreds of thousands of people in the United States and 35000 - 50000 individuals in Iran undergo cardiac surgeries (6).

Patients who undergo cardiac surgeries are hospitalized in cardiac surgery intensive care units (CSICUs) to re-

ceive critical care services. However, a study revealed that some patients considered cardiac surgery and CSICU hospitalization as the most significant life - threatening conditions in their lives (7). CSICU patients experience varying degrees of discomfort and stress induced by different external and internal factors (8). The most common discomforting factors in these units are healthcare providers, visitors, environmental factors, pain, anxiety, fear, loneliness, concerns, inability to verbally communicate due to endotracheal intubation, ringing telephones, equipment alarms, mechanical ventilation, staff's voices, heating and cooling systems, 24 - hour lighting, and unfamiliar routines (9-11).

Discomforting factors in CSICUs can cause different physical and mental problems (9-12). For instance, environmental noise can negatively affect physical health through increasing heart and metabolism rates, reducing gastrointestinal secretions, and raising oxygen consump-

tion (13). Environmental noise also causes mental complications such as anxiety, mood changes, aggression, and delirium (14, 15). Delirium, in turn, is associated with longer hospital stay, higher mortality rate, postoperative respiratory failure, hemodynamic instability, fall, urinary incontinence, dermatologic disorders, disability, and altered cognitive state (16). Another study also reported that in intensive care units (ICUs), environmental factors such as noise and harsh lighting can cause sleep disorders, discomfort, anxiety, headache, stress, and altered psychological and emotional abilities (17). The rate of psychological and emotional disorders in CSICUs was reported to be more than 50% (18). These disorders can increase blood pressure, heart rate, and respiratory rate, cause dyspnea, and thereby, slow recovery (19-21). In the critical postoperative period, patients attempt to use coping strategies in order to manage discomforting factors and stressors (21). Coping is the continuous attempt made in response to a threat in order to manage it and achieve balance (22). Lazarus referred to the use of coping strategies as an attempt for managing stressful situations, which protects people against the negative effects of stress (21). Coping strategies are divided into problem - focused and emotion-focused strategies (23). Problem - focused strategies include attempts for gaining control over the situation, obtaining information about the problem, and analyzing the problem (21). Emotion - focused strategies are emotional methods such as hopefulness about the improvement of the situation, worshipping and praying, fantasizing, aggression, crying, denial, avoidance, distancing, and resigning to fate (23). In other words, the aim of problem - focused strategies is to gain control over the problematic situation while emotion - focused strategies aim to solve the problem using emotional and subjective methods (24). A study in the Netherlands showed that most CSICU patients suffered from high levels of stress and used active coping strategies (25).

Another study in Iran also reported that in stressful situations and during hospital stay, cardiac patients mostly used emotion-focused strategies (26).

Our literature search revealed that most previous studies into discomforting factors and coping strategies mainly focused on patients hospitalized in general ICUs, dialysis units, and coronary care units. In other words, we found no study on discomforting factors experienced and coping strategies used by CSICU patients. As CSICU patients experience more serious mental and psychological problems compared with their patients in other critical care units, clearer understanding about their coping with healthcare - related challenges can help facilitate their coping and recovery. The aim of the present study was to examine the relationship of discomforting factors with coping strategies among CSICU patients.

2. Methods

This descriptive - correlational study was done in 2016 in Amir - al - momenin heart surgery center, Kordkuy, Iran.

Sampling was done conveniently. Inclusion criteria were complete consciousness, stable hemodynamic status, basic literacy skills, no hearing or visual, and no neurologic or psychiatric disorders (based on the data in patients' medical records). Based on the results of a pilot study on 30 patients and with a power of 80% and a type I error of 0.05, sample size was estimated to be 110.

Each day during the study, we referred to the study setting and identified and recruited eligible patients. Recruited patients were obtained with adequate explanations about the study aim and their written consents were secured. Then, they were asked to personally complete study questionnaires. Data collection lasted 8 months from April 21 to December 21, 2017. The following 3 instruments were employed for data collection.

1. A demographic questionnaire: this questionnaire included items on age, gender, marital, educational, and employment status, history of hospitalization, history of hospitalization in ICU, and previous history of undergoing surgical operation.
2. The Discomforting Factors in Cardiac Surgery Intensive Care Unit Questionnaire: this questionnaire was developed and psychometrically evaluated by Kareshki et al., in 2014. It includes 30 items scored from 0 ("Not discomforting") to 5 ("Very discomforting"). Therefore, the total score of the questionnaire can range from 0 to 150. The 5 subscales of the questionnaire are isolation and loneliness (with 7 items and a total score of 0 - 35), anxiety, environment, and therapeutic interventions (each with 6 items and a total score of 0 - 30), and pathophysiological factors (with 5 items and a total scores of 0 - 25). Higher subscale scores represent greater discomforting effects. The Cronbach's alphas values of the whole questionnaire and its subscales are 0.86, 0.71 - 0.85, respectively (7).
3. Jalowiec Coping Scale: this scale contains 15 items on problem-focused strategies and 24 items on emotion - focused strategies - 39 in total. Item scoring is performed on a 5 - point Likert - type scale on which 0 and 4 stand for "Never" and "Very much", respectively. Therefore, the total scores of the problem-focused strategies and emotion - focused strategies are respectively 0 - 60 and 0 - 96, with higher scores standing for greater use of the strategies. The Cronbach's alpha values of the scale and its problem - focused and emotion - focused strategy subscales were reported to be 0.90, 0.95, and 0.80, respectively (22).

The SPSS software (v.16.0) was used for data analysis at a significance level of less than 0.05. Data presentation was performed via descriptive statistical measures such as mean, standard deviation, frequency, and percentage. The Kolmogorov-Smirnov test showed the normal distribution of all study variables. Therefore, the Pearson correlation analysis, the one-way analysis of variance, and the paired-sample *t* and the Tukey's post hoc tests were used to analyze the data.

3. Results

The age range and the age mean of 110 CSICU patients who participated in this study were 34 - 73 and 56.75 ± 8.87 , respectively. Most participants were male (61.8%), married (91.8%), and had a previous history of hospitalization (64.5%), no history of hospitalization in ICU, and no history of undergoing surgical operation (56.4%). Furthermore, 39.2% of them were employed and 35.5% of them had secondary diploma.

The mean score of discomfoting factors was 74.08 ± 16.93 . The 2 highest-scored subscales of discomfoting factors were environment (with a mean of 16.86 ± 4.07) and anxiety (with a mean of 15.40 ± 4.87), while the 2 lowest-scored subscales were pathophysiological factors (with a mean of 12.57 ± 3.72) and therapeutic interventions (with a mean of 13.88 ± 4.11). Moreover, the mean scores of problem-focused and emotion-focused strategies were 48.59 ± 8.57 and 71.06 ± 12.99 , respectively (Table 1).

The results of Pearson correlation analysis reflected that discomfoting factors were inversely correlated with problem-focused strategies ($r = -0.266$; $P = 0.005$) and directly correlated with emotion-focused strategies ($r = 0.247$; $P = 0.009$). In other words, the more discomfoting factors the participants experienced, the less frequently they used problem-focused strategies and the more frequently they used emotion-focused strategies. Subscale analyses also revealed that the environment subscale of discomfoting factors had a direct correlation with emotion-focused strategies ($r = 0.290$; $P = 0.002$), denoting that greater discomfot caused by environmental factors was associated with greater use of emotion-focused strategies. Moreover, the anxiety subscale of discomfoting factors was inversely correlated with problem-focused strategies ($r = -0.288$; $P = 0.002$) and directly correlated with emotion-focused strategies ($r = 0.248$; $P = 0.009$). In other words, the deeper the anxiety the participants experienced, the less frequently they used problem-focused strategies and the more frequently they used emotion-focused strategies. In addition, the isolation and loneliness subscale of discomfoting factors had an inverse correlation with problem-focused strategies ($r = -0.370$; $P = 0.001$; Table 1), implying

that patients who felt more isolated and lonely used emotion-focused strategies more frequently.

Participants' gender and educational status were significantly correlated with discomfoting factors as well as problem- and emotion-focused strategies ($P < 0.05$). Moreover, their age was significantly correlated with problem-focused strategies while their employment status was significantly correlated with discomfoting factors and problem-focused strategies ($P < 0.05$). However, other demographic characteristics had no significant correlations with discomfoting factors and coping strategies ($P > 0.05$; Table 2).

4. Discussion

This study aimed to examine the relationship of discomfoting factors with coping strategies among CSICU patients. Findings showed that study participants greatly suffered from the effects of different discomfoting factors. Two earlier studies also reported that ICU patients greatly suffered from the effects of physical and mental discomfoting factors (8, 27). However, two other studies showed that the level of ICU patients' discomfot was moderate (5, 28). The differences among these studies can be attributed to the differences in the characteristics of different ICUs as well as patients' personal characteristics (10).

The most discomfoting factor in the present study was environment. Three earlier studies also reported the same finding (29-31), while a study showed that the discomfoting effects of environment were moderate (5). Environmental factors (such as noise, harsh lighting, and high or low environmental temperature) can cause ICU patients different problems and complications (such as sleep disorders or delirium) and delay their recovery. The effects of these factors greatly depend on their severity as well as ward management efficiency (29, 31).

Anxiety was the 2nd most discomfoting factor in the present study. Similarly, Zetterlund et al., Mahdavi-Shahri et al., and Bagheri-Nesami et al., reported anxiety as a significant discomfoting factor in the ICUs (32-34). However, another study found that patients in their study experienced low levels of anxiety in CSICU (35). This contradiction can be related to the differences in patients' confidence in the effectiveness of therapeutic interventions and care services. The major factors behind anxiety in CSICUs are pain, bleeding, separation anxiety, and lack of perceived social support due to inability to visit significant others (28, 35).

Study findings also showed that pathophysiological factors (such as postoperative hunger, thirst, and dyspnea) and therapeutic interventions had minimal discomfoting effects on CSICU patients. This finding can be due to the fact that during their CSICU stay, patients are connected to mechanical ventilators and receive analgesics and sedatives;

Table 1. The Scores of Discomforting Factors and Coping Strategies and Their Correlations

Discomforting Factors	Mean (Range)	Coping Strategies: Mean (Range)			
		Emotion-Focused: 71.06 ± 12.99 (43 - 95)		Problem-Focused: 48.59 ± 8.57 (27 - 71)	
		Pearson Correlation Coefficient	P Value	Pearson Correlation Coefficient	P Value
Isolation and loneliness	15.35 ± 4.98 (7 - 35)	0.079	0.414	- 0.370	0.0001
Anxiety	15.40 ± 4.87 (6 - 28)	0.248	0.009	- 0.288	0.002
Environment	16.86 ± 4.07 (7 - 24)	0.290	0.002	- 0.158	0.099
Therapeutic interventions	13.88 ± 4.11 (7 - 28)	0.158	0.099	- 0.047	0.629
Pathophysiologic factors	12.57 ± 3.72 (5 - 22)	0.199	0.037	- 0.110	0.251
Total	74.08 ± 16.93 (39 - 109)	0.247	0.009	- 0.266	0.005

hence they may not feel the effects of pathophysiologic factors (35).

We also found that study participants mainly used emotion - based strategies to cope with discomforting factors in CSICU. Most previous studies also reported the same finding. However, 2 studies in Dutch and Brazil showed that ICU survivors mainly used problem-focused strategies (36, 37). Emotional reactions are learned while dealing with difficult conditions and need to be regulated (38), while gaining the ability to use problem - focused strategies requires education and training (39). Therefore, given the lack of preoperative psychological preparation in the present study, patients' greater use of emotion-focused strategies for coping with postoperative problems is justified.

Another finding of the study was the inverse correlation of discomforting factors with problem - focused strategies and their direct correlation with emotion - focused strategies. This is in agreement with the findings reported by Yeh et al., and Nasiri et al., (40, 41). It seems that when facing discomforting factors such as anxiety and loneliness, people act reactively and inadvertently. Moreover, as most participants of the study had basic literacy skills and had not received preoperative coping - related preparations, they were unable to use problem - focused strategies. Previous studies also noted that the effective use of problem-focused strategies needs adequate preparation (40, 41).

Study findings also showed a significant direct correlation between environmental discomforting factors and emotion - focused strategies. In other words the more the patients were dissatisfied with the environment, the more they used emotion - focused strategies. Nasiri et al., also reported the same finding (41). Constant exposure to irritating environmental factors such as equipment alarms and harsh lighting in ICUs increases the likelihood of using emotion-focused strategies as the most accessible coping strategies (41).

We also found that isolation and loneliness were in-

versely correlated with problem - focused strategies, i.e. patients who were isolated and alone (due to experiencing pain, having no visitation, and being hospitalized in separated units) less frequently used problem - focused strategies. An earlier study also reported the same finding (25). The critical and life - threatening conditions of a cardiac surgery necessitate the separation and loneliness of patients and limit their relationships with the external environment and their significant others. Such isolation and loneliness incapacitate them, make them feel frustrated and impatient, and reduce their problem - solving abilities (25).

Our findings also showed the inverse correlation of anxiety with problem - focused strategies and its direct correlation with emotion - focused strategies. In other words, more anxious patients were less likely to use problem - focused strategies and more likely to use emotion - focused strategies. Similarly, Li et al., reported that anxious patients used emotion - focused strategies, while less anxious and less depressed patients used problem - solving strategies more effectively (42).

Another finding of the study was that female patients suffered from more discomforting factors compared with their male counterparts. Zakerimoghdam et al., also found that female patients in their study had lower levels of comfort than male patients. Generally, women are more sensitive and have more significant roles in their families and therefore, they feel greater concerns and experience more discomfort compared with men (5). Moreover, female patients in the present study used emotion - focused strategies more than male patients and problem - focused strategies less than male patients. These findings are in agreement with the findings of 2 earlier studies (40-43). However, our finding contradicted the finding reported by Mahmoudi et al. (44). This contradiction may be due to the differences in the contexts and the samples in different studies.

In line with the findings presented by Aslan and Tosun (31), our findings indicated that discomforting factors

Table 2. The Relationships of Demographic Characteristics with Discomforting Factors and Coping Strategies

Characteristics:	N (%)	Factors and Strategies					
		Discomforting Factors		Problem-Focused Strategies		Emotion Focused Strategies	
		Mean ± SD	P Value	Mean ± SD	P Value	Mean ± SD	P Value
Gender			0.002 ^a		0.017 ^a		0.014 ^a
Male	68 (61.8)	70.17 ± 16.19		50.11 ± 8.31		68.67 ± 13.27	
Female	42 (38.2)	80.40 ± 15.12		46.11 ± 8.50		74.92 ± 11.67	
Age (Years)			0.074 ^b		0.018 ^b		0.065
< 50 - 24	(21.8)	72.62 ± 13.95		52.6 ± 10.13		67.45 ± 14.02	
50 - 59:	39 (35.5)	76.25 ± 18.84		48.43 ± 7.79		70.94 ± 12.11	
≤ 60	47 (42.7)	73.02 ± 16.80		46.63 ± 7.74		73.01 ± 13.04	
Marital status			0.153 ^b		0.125 ^b		0.134 ^b
Single	4 (4.5)	65.12 ± 13.45		43.73 ± 6.71		72.52 ± 12.47	
Married	101 (61.8)	70.33 ± 14.53		48.80 ± 7.51		70.93 ± 14.92	
Widowed	3 (2.4)	71.19 ± 10.35		45.60 ± 7.77		72.23 ± 11.20	
Divorced	2 (1.3)	68.19 ± 10.35		51.0 ± 10.84		68.28 ± 13.59	
Employment status			0.04 ^b		0.0001 ^b		0.412 ^b
Employed	43 (39.2)	73.06 ± 18.26		52.20 ± 8.36		67.65 ± 14.66	
Housewife	30 (27.2)	80.14 ± 15.01		43.48 ± 6.79		74.51 ± 11.89	
Self - employed	37 (33.6)	73.79 ± 16.88		47.59 ± 7.3		46.63 ± 7.74	
Educational status			0.024 ^b		0.001 ^b		0.001 ^b
Elementary	34 (30.9)	70.90 ± 17.78		46.73 ± 7.87		73.97 ± 10.43	
High school	25 (22.7)	80.68 ± 14.96		44.76 ± 6.57		74.04 ± 13.59	
Diploma	39 (35.5)	74.86 ± 17.24		49.94 ± 8.56		70.69 ± 13.02	
University	2 (10.9)	64.08 ± 11.17		57.41 ± 7.68		57.83 ± 10.99	
History of hospitalization			0.353 ^a		0.121 ^a		0.244 ^a
Yes	71 (64.5)	75.59 ± 17.14		47.74 ± 7.87		71.84 ± 13.22	
No	39 (35.5)	70.52 ± 16.09		50.12 ± 9.63		69.64 ± 12.6	
History of hospitalization in ICU			0.564 ^a		0.422 ^a		0.438 ^a
Yes	31 (28.2)	73.43 ± 18.86		48.61 ± 8.20		71.51 ± 12.67	
No	79 (71.8)	73.93 ± 16.25		48.58 ± 8.76		70.88 ± 13.19	
History of surgery			0.632 ^a		0.489 ^a		0.731 ^a
Yes	48 (43.6)	73.72 ± 16.70		48.02 ± 7.46		70.60 ± 12.57	
No	62 (56.4)	73.84 ± 17.16		49.03 ± 9.37		70.64 ± 13.40	

^aThe results of the independent - sample t - test.

^bThe results of the one - way analysis of variance.

were not significantly correlated with age and marital status. Cardiac surgery candidates are mostly middle - aged and married; hence, they may have almost similar feelings, perceptions, and attitudes about stressors and discomforting factors (31). However, findings showed that patients' age was directly correlated with their use of problem - focused strategies so that older patients more fre-

quently used problem - focused strategies compared with their younger counterparts. This is consistent with the findings reported by Shahrokhi et al., (45). Older patients are more experienced; hence, can use more effective strategies for managing their problems (45).

The findings of the present study also reflected the significant correlation of discomforting factors with patients'

employment and educational status. In other words, housewife participants and those with lower educational status more greatly suffered from discomforting factors in CSICU. Esmaeili et al., also published the same finding and noted that social and occupational relationships as well as educational status can affect knowledge about cardiac surgery (46).

Another finding of the study was that compared with housewives, employed and self - employed patients used problem - focused strategies more frequently. Conversely, a study found that coping strategies had no significant correlation with employment and educational status (47). It is noteworthy that different factors other than demographic characteristics can affect the use of coping strategies (47). Finally, findings showed that discomforting factors and coping strategies had no significant correlations with the history of hospitalization, the history of hospitalization in ICU, and the history of surgical operation. In other words, patients with these histories were not significantly different from patients without such histories.

One strength of this study is that it provides a more detailed understanding about factors that cause discomfort for CSICU patients. Therefore, findings can be used to develop strategies for minimizing the negative effects of discomforting factors on these patient. On the other hand, among study limitations were sampling from a single CSICU, not including the study's' patients hospitalized in dialysis and coronary care units, and collecting data through the self - report method. Therefore, it is suggested that similar studies be carried out in other critical care units to explore the discomforting factors of hospitalized patients. Experimental studies are also proposed based on the results of this study.

4.1. Conclusion

This study shows that different factors, including environment, anxiety, isolation and loneliness, therapeutic interventions, and pathophysiologic factors can cause discomfort and tension for CSICU patients. To cope with these discomforting factors, CSICU patients mainly use emotion - focused coping strategies. Moreover, discomforting factors are inversely correlated with problem - focused strategies and directly with emotion - focused strategies. Healthcare authorities and policy - makers are recommended to improve CSICU environment, prepare patients for coping with postoperative problems and complications, and thereby, improve their postoperative physical and mental health outcomes.

Acknowledgments

The authors would like to express their heartfelt gratitude towards the Research Administration of Golestan Uni-

versity of Medical Sciences, Gorgan, Iran, the CSICU staff of Amir - al - momenin heart surgery center, Kordkuy, Iran, and the patients who collaborated with the study.

Footnotes

Authors' Contribution: Shohreh Kolagari and Khadijeh Yazdi: study design and supervising the study process; Masoumeh Rahimi: data collection; Mohammad Aryaie: assisted in extracting and analyzing the data and interpreting the findings; Shohreh Kolagari: supervising, drafting, submitting, and revising the manuscript; all authors read and approved the final manuscript.

Ethical Considerations: This article came from a master's thesis in nursing, which was financially supported by Golestan University of Medical Sciences, Gorgan, Iran. The Ethics Committee and the Institutional Review Board of the University approved the study (with the codes of IR.GOUMS.REC.1394.274 and 941029253, respectively).

References

1. Parry M, Watt-Watson J. Peer support intervention trials for individuals with heart disease: a systematic review. *Eur J Cardiovasc Nurs.* 2010;**9**(1):57-67. doi: [10.1016/j.ejcnurse.2009.10.002](https://doi.org/10.1016/j.ejcnurse.2009.10.002). [PubMed: [19926339](https://pubmed.ncbi.nlm.nih.gov/19926339/)].
2. Gersh B. The epidemic of cardiovascular disease in the developing world: Global implications. *Circulation.* 2012;**126**:A606.
3. Taghipour B, Sharifnia H, Soleimani MA, Hekmat Afshar M, Shahidifar S. Comparison of the clinical symptoms of myocardial infarction in the middle-aged and elderly. *J Kermanshah Univ Med Sci.* 2014;**18**(5):281-9.
4. Shirani F, Zaribaf F, Esmailzadeh A. Dietary glycemic index and glycemic load in relation to cardiovascular disease risk factors: A review of current evidence. [in Persian]. *Health Sys Res.* 2015;**14**:641-54. doi: [10.22122/-v10i4.1437](https://doi.org/10.22122/-v10i4.1437).
5. Zakerimoghadam M, Asgari S, Shariat E, Haghani H. Current and expected status of comfort from the point of view of hospitalized cardiac surgery patients. *Iran J Cardiovasc Nurs.* 2015;**3**(4):34-41.
6. Shafipour V, Mohammadi E, Ahmadi F. Experiences of open heart surgery patients from admission to discharge: a qualitative study. *Iran J Crit Care Nurs.* 2013;**6**(1):1-10.
7. Kareshki H, Heydari A, Malekzadeh J, Esmaily H, Mohammadzadeh Tabrizi Z, Hesarimoghaddam M, et al. Design of psychometric assessment questionnaire to determine the causes of discomfort among patients admitted to the intensive care unit. *Evid Base Care.* 2015;**5**(1):47-56.
8. van de Leur JP, van der Schans CP, Loef BG, Deelman BG, Geertzen JH, Zwaveling JH. Discomfort and factual recollection in intensive care unit patients. *Crit Care.* 2004;**8**(6):R467-73. doi: [10.1186/cc2976](https://doi.org/10.1186/cc2976). [PubMed: [15566593](https://pubmed.ncbi.nlm.nih.gov/15566593/)].
9. Alguindy AA, Mohamed WY, Gado AS. Personal lived experience of mechanically ventilated patients during the recovery period after open-heart surgery at El Manial University Hospital. *J Biol Agric Healthc.* 2014;**4**:61-79.
10. Demir Y, Korhan EA, Eser I, Khorshid L. Factors affecting experiences of intensive care patients in Turkey: patient outcomes in critical care setting. *J Pak Med Assoc.* 2013;**63**(7):821-5. [PubMed: [2390700](https://pubmed.ncbi.nlm.nih.gov/2390700/)].

11. Claesson Lingehall H, Smulter N, Olofsson B, Lindahl E. Experiences of undergoing cardiac surgery among older people diagnosed with postoperative delirium: one year follow-up. *BMC Nurs*. 2015;14:17. doi: [10.1186/s12912-015-0069-7](https://doi.org/10.1186/s12912-015-0069-7). [PubMed: [25866476](https://pubmed.ncbi.nlm.nih.gov/25866476/)].
12. Koster S, Hensens AG, Schuurmans MJ, van der Palen J. Consequences of delirium after cardiac operations. *Ann Thorac Surg*. 2012;93(3):705-11. doi: [10.1016/j.athoracsur.2011.07.006](https://doi.org/10.1016/j.athoracsur.2011.07.006). [PubMed: [21992939](https://pubmed.ncbi.nlm.nih.gov/21992939/)].
13. Johansson L, Bergbom I, Lindahl B. Meanings of being critically ill in a sound-intensive ICU patient room - a phenomenological hermeneutical study. *Open Nurs J*. 2012;6:108-16. doi: [10.2174/1874434601206010108](https://doi.org/10.2174/1874434601206010108). [PubMed: [22977654](https://pubmed.ncbi.nlm.nih.gov/22977654/)].
14. Christensen M. The physiological effects of noise: considerations for intensive care. *Nurs Crit Care*. 2002;7(6):300-5.
15. Malmir M, Teimouri F, Pishgooie A, Dabaghi P. The Role of Benson's relaxation on reducing state anxiety on candidate of open heart surgery patient's. *Mil Caring Sci*. 2015;2(3):182-90. doi: [10.18869/acad-pub.mcs.2.3.182](https://doi.org/10.18869/acad-pub.mcs.2.3.182).
16. Zolfaghari M, Arabi M, Pedram Razi S, Biat K, Bavi A. Effectiveness of a Multifactor Educational Intervention on Delirium Incidence and Length of Stay in Patients with Cardiac Surgery. *J hayat*. 2012;18(1):67-78.
17. Cunha M, Silva N. Hospital Noise and Patients' Wellbeing. *Procedia - Soc Behav Sci*. 2015;171:246-51. doi: [10.1016/j.sbspro.2015.01.117](https://doi.org/10.1016/j.sbspro.2015.01.117).
18. Hofhuis JG, Spronk PE, van Stel HF, Schrijvers AJ, Rommes JH, Bakker J. Experiences of critically ill patients in the ICU. *Intensive Crit Care Nurs*. 2008;24(5):300-13. doi: [10.1016/j.iccn.2008.03.004](https://doi.org/10.1016/j.iccn.2008.03.004). [PubMed: [18472265](https://pubmed.ncbi.nlm.nih.gov/18472265/)].
19. Mahdipour R, Nematollahi M. The effect of the music listening and the intensive care unit visit program on the anxiety, stress and depression levels of the heart surgery patients candidates. *Iran J Crit Care Nurs*. 2012;5(3):133-8.
20. Cho MY, Min ES, Hur MH, Lee MS. Effects of aromatherapy on the anxiety, vital signs, and sleep quality of percutaneous coronary intervention patients in intensive care units. *Evid Based Complement Alternat Med*. 2013;2013:381381. doi: [10.1155/2013/381381](https://doi.org/10.1155/2013/381381). [PubMed: [23476690](https://pubmed.ncbi.nlm.nih.gov/23476690/)].
21. Parvan K, Zamanzadeh V, Lak Dizaji S, Mousavi Shabestari M, Safaie N. Patient's Perception of Stressors Associated with Coronary Artery Bypass Surgery. *J Cardiovasc Thorac Res*. 2013;5(3):113-7. doi: [10.5681/jcvtr.2013.024](https://doi.org/10.5681/jcvtr.2013.024). [PubMed: [24252987](https://pubmed.ncbi.nlm.nih.gov/24252987/)].
22. Jalowiec A, Murphy SP, Powers MJ. Psychometric assessment of the Jalowiec Coping Scale. *Nurs Res*. 1984;33(3):157-61. [PubMed: [6563533](https://pubmed.ncbi.nlm.nih.gov/6563533/)].
23. Rahimi R, Arefi M, Golmohammadian M. Comparing Personality Dimensions and coping Strategies in Healthy Individuals and Heart Patients. *J Shahid Sadoughi Univ Med Sci*. 2016;23(10):957-68.
24. Seyam S, Hidarnia AR, Tavafian SS. Self-care Education through Coping Style for Patients after Heart Surgery. *J Isfahan Med Sch*. 2011;29(135).
25. Milaniak I, Wilczek-Ruzyczka E, Wierzbicki K, Sadowski J, Kapelak B, Przybylowski P. Role of Personal Resources in Depression and Stress in Heart Transplant Recipients. *Transplant Proc*. 2016;48(5):1761-6. doi: [10.1016/j.transproceed.2016.01.080](https://doi.org/10.1016/j.transproceed.2016.01.080). [PubMed: [27496487](https://pubmed.ncbi.nlm.nih.gov/27496487/)].
26. Akbari M, Mahmood Aliloo M, Aslanabadi N. Relationship between stress and coping styles with coronary heart disease: Role of gender factor. *Iran J Psychiatr Clin Psychol*. 2010;15(4):368-76.
27. Anderson DC, Hamilton DK. Rx: window bed. *J Am Geriatr Soc*. 2014;62(2):378-9. doi: [10.1111/jgs.12650](https://doi.org/10.1111/jgs.12650). [PubMed: [24521367](https://pubmed.ncbi.nlm.nih.gov/24521367/)].
28. Wang Y, Li H, Zou H, Li Y. Analysis of Complaints from Patients During Mechanical Ventilation After Cardiac Surgery: A Retrospective Study. *J Cardiothorac Vasc Anesth*. 2015;29(4):990-4. doi: [10.1053/j.jvca.2015.01.036](https://doi.org/10.1053/j.jvca.2015.01.036). [PubMed: [25939965](https://pubmed.ncbi.nlm.nih.gov/25939965/)].
29. Gonzalez Gomez A, Montalvo Prieto A, Herrera Lian A. Comfort of Patients Hospitalized in Intermediate and Intensive Care Units. *Enfermeria Global*. 2017;(45):281.
30. Ball K, Swallow V. Patient experiences of cardiac surgery and nursing care: a narrative review. *Br J Card Nurs*. 2016;11(7):348-58. doi: [10.12968/bjca.2016.11.7.348](https://doi.org/10.12968/bjca.2016.11.7.348).
31. Aslan O, Tosun B. Cardiovascular Surgery Patients: Intensive Care Experiences and Associated Factors. *Asian Nurs Res (Korean Soc Nurs Sci)*. 2015;9(4):336-41. doi: [10.1016/j.anr.2015.10.003](https://doi.org/10.1016/j.anr.2015.10.003). [PubMed: [26724243](https://pubmed.ncbi.nlm.nih.gov/26724243/)].
32. Zetterlund P, Plos K, Bergbom I, Ringdal M. Memories from intensive care unit persist for several years—a longitudinal prospective multi-centre study. *Intensive Crit Care Nurs*. 2012;28(3):159-67. doi: [10.1016/j.iccn.2011.11.010](https://doi.org/10.1016/j.iccn.2011.11.010). [PubMed: [22579396](https://pubmed.ncbi.nlm.nih.gov/22579396/)].
33. Mahdavi-Shahri M, Haghdoost Oskouie F, Mohammadi N. Environmental monitoring in critical care nursing: An evidence-based design. *Iran J Cardiovasc Nurs*. 2014;2(4):72-80.
34. Bagheri Nesami M, Shorofi SA, Jafari A, Khalilian AR, Ziabakhsh Tabari S. The Relationship Between Stressors and Anxiety Levels After CABG in Sari, Iran. *Iran Red Crescent Med J*. 2016;18(5). e25407. doi: [10.5812/ircmj.25407](https://doi.org/10.5812/ircmj.25407). [PubMed: [27437127](https://pubmed.ncbi.nlm.nih.gov/27437127/)].
35. Gallagher R, McKinley S. Stressors and anxiety in patients undergoing coronary artery bypass surgery. *Am J Crit Care*. 2007;16(3):248-57. [PubMed: [17460316](https://pubmed.ncbi.nlm.nih.gov/17460316/)].
36. Dettling-Ihnenfeldt DS, de Graaff AE, Beelen A, Nollet F, van der Schaaf M. Coping style and quality of life in Dutch intensive care unit survivors. *Rehabil Psychol*. 2016;61(2):165-72. doi: [10.1037/rep0000084](https://doi.org/10.1037/rep0000084). [PubMed: [26938222](https://pubmed.ncbi.nlm.nih.gov/26938222/)].
37. Trevizan FB, Miyazaki M, Silva YLW, Roque CMW. Quality of Life, Depression, Anxiety and Coping Strategies after Heart Transplantation. *Braz J Cardiovasc Surg*. 2017;32(3):162-70. doi: [10.21470/1678-9741-2017-0029](https://doi.org/10.21470/1678-9741-2017-0029). [PubMed: [28832793](https://pubmed.ncbi.nlm.nih.gov/28832793/)].
38. Brockman R, Ciarrochi J, Parker P, Kashdan T. Emotion regulation strategies in daily life: mindfulness, cognitive reappraisal and emotion suppression. *Cogn Behav Ther*. 2017;46(2):91-113. doi: [10.1080/16506073.2016.1218926](https://doi.org/10.1080/16506073.2016.1218926). [PubMed: [27684649](https://pubmed.ncbi.nlm.nih.gov/27684649/)].
39. Ben-Zur H, Rappaport B, Ammar R, Uretzky G. Coping strategies, life style changes, and pessimism after open-heart surgery. *Health Soc Work*. 2000;25(3):201-9. [PubMed: [10948459](https://pubmed.ncbi.nlm.nih.gov/10948459/)].
40. Yeh S-CJ, Huang C-H, Chou H-C, Wan TTH. Gender Differences in Stress and Coping among Elderly Patients on Hemodialysis. *Sex Roles*. 2008;60(1-2):44-56. doi: [10.1007/s1199-008-9515-2](https://doi.org/10.1007/s1199-008-9515-2).
41. Nasiri M, Kheirkhah F, Rahimiyan B, Ahmadzadeh B, Hasannejad H, Mohamad jahfari R. Stressful factors, coping mechanisms and quality of life in hemodialysis patients. *J Crit Care Nurs*. 2013;6:119-26.
42. Li CC, Shun SC. Understanding self care coping styles in patients with chronic heart failure: A systematic review. *Eur J Cardiovasc Nurs*. 2016;15(1):12-9. doi: [10.1177/1474515115572046](https://doi.org/10.1177/1474515115572046). [PubMed: [25681369](https://pubmed.ncbi.nlm.nih.gov/25681369/)].
43. Nohi E, Abdolkarimi M, Rezaeian M. Quality of life and its relationship with stress and coping strategies in coronary heart disease patients. *J Rafsanjan Univ Med Sci*. 2011;10(2):127-37.
44. Mahmoudi G-R, Shariati A, Behnampour N. Relationship between quality of life and coping among hemodialysis patients in hospitals [in Persian]. *J Gorgan Univ Med Sci*. 2003;5:43-52.
45. Shahrokhi Z, Rayyani M, Sabzevari S, Haghdoost AA. Stressors and Coping strategies of dialysis patients. *J Crit Care Nurs*. 2014;6(4):184-93.
46. Esmaeili Z, Ziabakhsh Tabari SH, Vazezadeh N, Mohamadpour RA. Quality of Life after Coronary Artery Bypass Grafting in. *J Mazandaran Univ Med Sci*. 2007;17(61):170-4.
47. Ghasemi N. The Comparison of Anxiety Sensitivity and Coping Stress Strategies between Patients with Non-Cardiac Chest Pain, Cardiac Patients and Normal Subjects [in Persian]. *Knowl Res Appl Psychol*. 2017;17(3):45-58.