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Original Article

Explaining Health Anxiety in Patients after Open Heart Surgery: A Qualitative Study

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Abstract

Background: Health anxiety is one of the most prevalent psychological reactions observed in patients after open heart surgery. Thus, the present study was conducted to explain health anxiety in these patients.

Methods: In-depth semi-structured interviews were conducted with 15 patients with a history of open heart surgery in educational hospitals affiliated to Zahedan University of Medical Sciences in 2023-2024. The interviews were immediately transcribed and underwent conventional content analysis. MAXQDA 2022 software was used for data categorization and data were also analyzed using the method proposed by Lundman and Graneheim.

Results: According to the current study results, open heart surgery can lead to health anxiety among patients. This anxiety appears as mental turmoil, ineffective psychological reactions to the disease, pathological search for information and treatment, and the incidence of mood disorders.

Conclusion: The results of the present research demonstrate that open heart surgery is a stressor and patients develop health anxiety after surgery. Hence, it is suggested that hospitals pay attention to patients' health anxiety in their educational programs, consultations, and rehabilitation programs and design and implement influential psychological interventions in the form of standard protocols to be used at the level of hospitals and cardiac rehabilitation centers.

Keywords: Heart attack, Coronary artery bypass graft, Health anxiety

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Introduction

Heart attack is one of the most prevalent coronary artery diseases and one of the leading causes of illness, hospitalization, disability, and death in human communities, imposing heavy care and treatment costs on the family and the community's healthcare system (1) and causing individuals to find out that they need permanent care (2).

Diverse methods are employed to treat these patients, including pharmacotherapy, angioplasty, and coronary artery bypass graft (CABG) (3). However, despite the advancements in new treatment methods, coronary heart disease is chiefly treated by open heart surgery (4,5), which is stressful similar to other surgeries and results in common and critical disorders such as depression and anxiety in this group of patients (6) so that a large number of patients have reported experiencing negative psychological consequences after surgery (7,8). Psychological distress accompanies changes in the neuroendocrine system, hypothalamus-pituitary-adrenal (HPA) axis, blood platelet function, and heartbeat (9). Studies have demonstrated that individuals with less distress tolerance show avoidance behaviors or do not express their feelings when exposed to stressful conditions. Also, they continue avoidance behaviors to relieve their distress quickly and change these behaviors to a behavioral pattern (10). These factors lead to increasing health anxiety in cardiac patients (11). Health anxiety may be considered the most important anxiety states (12). The findings demonstrate that 51% of cardiovascular patients have this anxiety (13). Health anxiety is a multidimensional concept regarding the mind's preoccupation with having or developing an illness or the progress of an existing disease accompanied by behaviors such as seeking health again and medical attention (12), culminating in resentment, frequent hospitalizations, continuous worries of patients and their companions, and paying heavy costs (14). Health anxiety is also a disorder in which individuals, without being in danger or having a particular disease, get severely worried and anxious about their body and health and consider simple physical symptoms as a serious disease (15).

If this anxiety is intensified, the person may develop

hypochondria (15). In this regard, Albushoke and Sepehrianazar conducted to examine the relationship between health anxiety and the motivation to behavior change among patients with coronary heart disease in the city of Urmia, Iran, demonstrated a significant negative relationship between health anxiety and the patients' motivation for behavior change. They also indicated in their study that health anxiety had the highest ability to predict patients' motivation for behavior change among the investigated components (16).

On the other hand, patients who spend most of their time worrying about their health and their thoughts about the disease are so strong that they do not try to stop it anymore, easily surrender to problems, and feel insecure. Furthermore, they see their living and financial conditions as undesirable and they are worried that they will not be able to obtain appropriate conditions in life in the appropriate time. Such pressures lead an individual to feel tired in life and feel mentally and physically that he/she has no energy to continue and subsequently has no motivation to change his/her life either (17).

However, there are very limited studies on health anxiety in cardiac patients, but numerous studies have been conducted on stress and anxiety in cardiac patients (9,18). Thus, given the widespread scope of physical and psychological problems of patients in need of open heart surgery and the necessity of paying attention to their health issues, the mental and human phenomena, such as health anxiety, in patients after open heart surgery must be investigated with a qualitative approach so that it is specified that how much the open heart surgery has affected health anxiety in patients after open heart surgery.

Method

Study design

The current qualitative study was conducted in 2023-2024 in two educational hospitals (Khatem and Ali Ibn-E-Abitaleb) affiliated with Zahedan University of Medical Sciences. This research is a conventional content analysis conducted in order to explain health anxiety in patients after open heart surgery. Conventional content analysis is an appropriate method for obtaining valid and reliable results from textual data. This method seeks to collect data from participants who have sufficient knowledge and experience in the field under investigation. Hence, in this research, the phenomenon in question was explained using this method and via in-depth investigation of experiences and behaviors in the individuals' real world.

Participants

The participants in this study consisted of patients with heart attack undergoing open heart surgery. After the patients' acute stage of the disease had passed and when they visited the hospital to continue treatment and annual examinations, the researcher asked the patients to participate in this study if they were willing. These individuals were selected from among those meeting at least the following criteria: Being able to communicate verbally, a history of open heart surgery according to the medical file, being over 18 years of age, and passing at least 6 months since their open heart surgery. After that the participants were selected, informed consent (written and verbal) was obtained to conduct the interview. The interviews were carried out in a place where the patients felt relaxed and comfortable (whether in the hospitalization room in the hospital, nursing school, or after discharge at the participant's home). A total of 15 participants were interviewed for 6 months. Sampling with maximum diversity was followed by selecting a broad range of patients with diverse characteristics in the variables of gender (female, male), education, a history of disease, length of marriage, the disease severity, and having or not having children. Sampling continued purposefully until reaching data saturation, i.e., until all codes and categories were completed and new interviews added no new data to the previous data.

Data collection

Semi-structured and individual interviews with each of the participants were used in this study to collect data. Besides semi-structured interviews, observation, field notes, and memos were also used. To do this, before the sampling and after reviewing the important points that should be taken into account in the interview, the consent form was designed based on the latest recommendations concerning the preparation of the consent form in qualitative studies. After designing the consent form, data collection started by obtaining letters of introduction for the hospitals affiliated to Zahedan University of Medical Sciences and Kerman University of Medical Sciences, and then continued by obtaining the permission from the officials and participants and filling out the consent form by them. After explaining the research objective to the participants, the interviews were performed in a two-way communication method.

In this research, the interview with the first participant was carried out in an unstructured way. The researcher tried to have minimal interference in the interview process. Simultaneously, as the interview and analysis progressed, the researcher used the interview guide to manage the situation and keep the relation between the questions and the research objective so that the subsequent interviews persisted in a semi-structured manner according to the interview guide designed based on the first interview. The questions of this guide aimed to explain health anxiety in patients after open heart surgery.

The interview began with general and simple questions to start the discussion and establish communication. These questions asked about background information,

diagnosis, treatment, etc. A sample of the interview questions are as follows:

- Please remember the first day you noticed that you had a heart attack and had to undergo an open heart surgery to treat it. Tell me about that day and your experiences?
- Please explain your feelings and thoughts before and after open heart surgery?
- Explain the events that occurred to you after that?
- What changes occurred in your daily life after open heart surgery?
- What problems occurred in your life after open heart surgery and what were your and your spouse's experiences to resolve these problems?

In the following, the interview continued with some open questions with the aim of participants expressing their feelings, thoughts, and experiences using their words and expressions. During the interview, the researcher benefitted clarifying and helpful techniques to obtain greater and more focusing information during the interview.

At the end of the interviews, the participants were also asked to talk about anything left to say. The interviews were performed on one or more occasions based on the participant time and patience, the obtained information, and the participant willingness. The interview time ranged from 45-90 minutes according to the participant conditions and patience. All interviews were recorded after obtaining written and oral consent and then transcribed verbatim within the following 24 hours. MAXQDA2020 software was used to store, manage, and reconstruct data. Data analysis and primary coding of each interview were carried out before the next interview.

Data analysis

Simultaneously with performing the interviews, data analysis was carried out based on the method proposed by Lundman and Graneheim, who suggest five stages for qualitative data analysis as follows: 1) Transcribing the whole interview immediately after each interview, 2) reading the interview full-text to achieve a general understanding of its content, 3) determination of meaning units and primary codes, 4) categorization of similar primary codes in more comprehensive categories, and 5) determination of hidden content in the data (19,20). Thus, in this study, immediately after each interview, the text was also transcribed and typed verbatim, and then the transcribed texts were read several times and the primary codes were extracted. Afterward, the interrelated primary codes were merged and formed the categories based on the similarities. Finally, the concepts hidden in the data were extracted. Evidently, during the analysis, many codes were replaced and the categories were also assigned particular names.

For the accuracy and validity of the research data, four validity indices of Guba and Lincoln were used. These criteria included credibility (validity), dependability (reliability), confirmability, and transferability. The way of complying and achieving these criteria are explained below (21).

In order to guarantee the data credibility, the researchers used specific methods of qualitative research, such as continuous engagement with the subject and data and also double-check by the participants (member check) in such a way that the researcher established a long-term communication with the participants, which helped gain their trust. In addition, after forming the primary codes, the participants' comments were enjoyed for the accuracy of the codes and interpretations, and they were corrected if the codes were inconsistent with the participants' comments. The researchers also employed the integration of researchers, constant comparison of data, revision of codes and sampling with maximum diversity in the participants.

For dependability, the comments of an external observer were used in such a way that all the codes and themes of this study were provided to other professors (external check, peer check) to further assess and enhance their strength to review and correct any existing contradictions and deficiencies. Finally, a consensus was achieved.

For confirmability, all performed activities were recorded and a report of the research process was prepared. Finally, for transferability, the results were shared with two patients and two spouses of the patients who were outside the study with the same conditions as the participants, and the data were confirmed by them as well.

Moreover, the confidentiality of all interviews was observed and the individuals were free to leave the research whenever they wished. It is worth mentioning that MAXQDA2020 software was used for data analysis.

Results

A total of 15 participants took part in this study, including 6 female and 9 male patients (mean age = 54 years). All patients were married, had children, and had an about 10-year history of disease. The history of open heart surgery was more than 10 years in two of the patients and about four years in other patients, and three of them had a history of two times of angiography after open heart surgery. Overall, 385 primary codes were extracted from the description provided by the participants. After reviewing several times, the codes were summarized and categorized based on similarity and appropriateness, which were finally placed in 5 main categories and 15 sub-categories, which are provided below (Table 1).

Mental turmoil

One of the traits frequently observed among patients was reviewing negative thoughts and experiences in the

Table 1. Categories and sub-categories extracted from patients' health anxiety after open heart surgery

Main categories	Sub-categories	Themes
Mental turmoil	Reviewing negative thoughts and experiences	Patient's mental confrontation with past problems and mistakes Patient's regret for past actions and not quitting drug use Patient's regret for not occupying a governmental job Patient's regret and sadness for preventing the spouse from going to work
	Fear of the unknown	Fear of the unknown in the patient
	Fear of a vague future	Fear of a vague future in the patient Thinking about the future and feeling confused about the illness Patient's concern about the future of his/her spouse and children in case of death Patient's concern about the children's occupational future and their unemployment Expressing the patient's worry and anxiety about the future of his/her spouse and children Children's discomfort and hardship as the cause of the patient's worry about the future Patient's concern about the children's behaviors in case of his/her death Patient's concern about the disintegration of the family in case of death
	Worrying about the worsening of the disease process	Fear of occurring heart pain Fear of occurring repeated heart attack in the patient Fear of disease and worsening of the disease process
Ineffective psychological reactions to the disease	Morbid fear of upcoming treatments	Patient's fear of the treatment process and complications of treatment methods Fear of repeated heart surgery Fear of worsening of the disease and long treatment process
	Mental preoccupation with the disease	Patient's distress and concern about his/her health status Patient's sensitivity to the disease and checking the symptoms Patient's mental preoccupation with the disease Focus on the disease Observance due to manipulation of the heart Patient's excessive mental preoccupation and doctor's advice to resolve it Patient's concern about the disease and whether it will get better or not Patient's frequently asking the child to check the symptoms
	Mental preoccupation with others' words	Patient's mental preoccupation with others' words
	Escaping from reality and disrupting its acceptance	Not accepting heart attack and self-care Ignoring one's own illness because of the children's problems Not accepting the disease reality by family members Patient's mental effort to persuade him/herself that the problem is not a heart problem Impaired perception of heart pain because of using opium for many years Not paying attention to what the family says Ignoring medical recommendations despite the doctor's emphasis
Search for information	Visiting various doctors	Family's concern about the patient's status and seeking help from the doctor Attempting to talk to the doctor and achieving new information Visiting various doctors and searching for the truth
	Using websites	Updating information about medicines through the Internet Reading various materials to achieve information
	Using the experiences of other individuals	Talking to similar patients to achieve information
	Studying and updating the information	Patient's attempt to update information for better self-care
Treatment seeking	Paying attention to and following each symptom in the treatment process	Emergence of new symptoms and the patient's concern and visiting the doctor Adhering treatment and visiting proficient doctors in bigger cities Emergence of new symptoms and insistence of people around to go to Tehran
Mood fluctuations stemming from the disease	Incidence of depressive states in the patient	Patient's demoralization, reclusiveness, and silence Occurrence of depression in the patient and doctor's advice to resolve it Isolation and occurrence of traumas in the patient Occurrence of negative mood changes in the patient after heart attack
	Incidence of anxiety states in the patient	Occurrence of worry and anxiety in the patient with his/her re-hospitalization Constant anxiety and stress as the cause of worsening and non-recovery Patient's increased fear and worries at night Excessive anxiety on the day of surgery in patients and relatives Occurrence of obsessive states and their intensification after illness Exacerbation of patient's neurological problems after open heart surgery Recurrence of patient's nervous tics simultaneously with worsening the disease Patient's developing neurological problems after open heart surgery Occurrence of nervous headaches in the patient after open heart surgery Worsening of heart problem due to exposure to stress for children Extreme fear and anxiety and inability to solve problems in emergency occasions Invasion of fears, worries, and anxieties toward the patient Occurrence of stress and anxiety in the patient after heart attack Patient's mental confusion Patient's getting nervous after a change in the disease status Patient's feeling confused in facing life problems Patient's waiting for bad news

mind. For example, Participant No. 8, who had faced with numerous financial problems after open heart surgery and had not been employed by the government in the past, said:

"But I could and I liked to become a teacher, to study. I was also admitted, but I did not continue. Now that I think about it, I find out that I was wrong. At present, I do not have proper insurance and I cannot continue my work under these conditions." (Participant No. 8, a 56-year-old male patient).

Fear of the unknown and what will happen was also one of the things that had resulted in mental turmoil among patients. In the meantime, the incidence of the coronavirus disease 2019 (COVID-19) pandemic and seasonal flu and the categorization of cardiac patients in the category of high-risk patients had intensified patients' fear. The fear of disease, the effect of this disease on the patient's heart problem, the manifestation of new symptoms, and even the fear of death after contracting COVID-19 and seasonal flu were among these fears. In this regard, Participant No. 3 said:

"You also hear some words from different individuals and you are more afraid. What will happen in the end? I am so much sick, my heart problem was minor, but now COVID-19 and colds have been added and I am very scared. What will happen if I get infected since I am not a healthy person either." (Participant No. 3, a 47-year-old female patient)

The main concerns mentioned by the patients were related to the concerns after open heart surgery, the loss of property, and family disruption. Participant No. 9 also mentioned this issue:

"I am worried about the future of my children. I am worried that my wife will not be in trouble after me. There should be someone to take care of her." (Participant No. 9, a 65-year-old male patient).

The growing process of the disease and its chronic trend were among the cases that increased the mental preoccupation of the patients. Fears such as the occurrence of cardiac pains, repeated heart attacks, the worsening of the disease process, and being disabled and dependent on others were among the cases that were frequently expressed by patients. In this regard, one of the participants said:

"I am constantly scared the damn pain will occur again; I got a kind of fear; I am very cautious not to get sick; however, I am hospitalized all the time." (Participant No. 4, a 75-year-old male patient).

In this regard, Participant No. 2 stated:

"My work is such that I have to go on the road; now, I am worried what I should do if I have a heart attack on the road." (Participant No. 2, a 34-year-old male patient)

Another participant stated in this context:

"Or when my heart hurts again, I am afraid that lest I will become worse, I will become disabled, etc. I am afraid of these things." (Participant No. 6, a 67-year-old female patient).

Ineffective psychological reactions to the disease

Some of these reactions are the morbid fears arising in them due to the upcoming treatments. In this regard, Participant No. 7 stated:

"Now, the doctor told me again that you should do an angiogram. I had an open heart operation five years ago. Now when the name angiography comes up, my mind gets preoccupied and I think that lest I will have to do surgery again" (Participant No. 7, a 54-year-old female patient).

The mental preoccupations of the patients regarding the disease were also among the other cases that led the patients to have ineffective psychological reactions to the disease. In this regard, Participant No. 1 said:

"Unconsciously, the person thinks more about the disease so that he/she gets the same stress and anxiety that is forbidden for him/her. In my opinion, when you do not remember something, you do not think much about it but if you see something, it is always in your mind. I think this is more a reflective method it is always in your mind." (Participant No. 1, a 54-year-old male patient)

Participant No. 9 said in this regard:

"For several months, I was afraid to go to the doctor because of COVID-19, to get a new pain again, to get a new disease. I am very scared of getting sick; now that I have heart disease, I am scared of any other illness, I am afraid that lest I will get sick again." (Participant No. 9, 65-year-old male patient)

Participant No. 11 also mentioned in this regard:

"I am worry about whether this disease will recover or not." (Participant No. 11, 75-year-old male patient)

Mental preoccupations with others' words were among the issues mentioned in this part. In this regard, Participant No. 5 stated:

"All the time when we were sitting in the car going to the hospital, I was just praying that nothing happened. I was thinking that lest something bad would happen in the middle of the surgery; what I should do with people's words. What will happen if I die in the middle of the surgery? People say that the poor woman has worked so hard, now that she is sick, her husband did not take her to a bigger city to be treated." (Participant No. 5, a 50-year-old female patient).

The individual's escape from reality and disrupting its acceptance the disease again after open heart surgery were other ineffective psychological reactions to the disease. In this situation, an individual did not want to understand the severity of the situation at all and constantly tried to resist the existing facts. In this regard, one of the participants mentioned:

"I annoyed my family a lot, especially after surgery. I did not want to accept that I have undergone heart surgery and now I have to comply with many issues. Although I was always worried, I tried not to show my worry in front of others; I tried very hard to deny the disease." (Participant No. 12, a 50-year-old male patient).

Search for information

The disease had occurred unexpectedly and the patients made so much effort to reach the adaptation and the conditions before the disease. After the conditions were stabled and they got out of the amazement state and shock stemming from open heart surgery, the patients were seeking for information, more recognition of the disease, and post-surgery care so that they might get rid of the stressful conditions due to a heavy surgery.

On the one hand, the disease had a constantly changing nature, and by the patient's aging, not only the disease complications increased, but also the aging and the resulting disabilities were added to the disease complications. On the other hand, treatment methods, drugs, and complications of drugs were also increasing every day, and given the disease chronic process, patients had to elevate their knowledge about the disease even after the disease acute stage. For this reason, they are always looking for achieving new information. With the onset of each new symptom, they also started seeking treatment in such a way that they visited various doctors and even individuals who had more financial abilities would adhere a part of their treatment process in other cities and provinces, such as Tehran and Mashhad, and even if they sometimes traveled to these cities, they would definitely look for the best specialist doctor in that city and ask for his/her opinion to retrieve at least a part of their lost health. In this regard, one of the participants stated:

"I was fine after the surgery until we went to Mashhad to visit a doctor. The doctor said, 'a vein in your heart is blocked, it cannot be opened at all, and no doctor can open it.' I got stressed again; what was going to happen again; I visited another doctor there, too. The doctor performed an echo and an electrocardiography on me again. He did everything and then said, 'Mr. ..., this vein will not be opened at all; the only person who can open it in Iran is doctor ... in Tehran. If the doctor says it will open, open it. If he says that it cannot be opened, do not touch it and do not go to another doctor either.' The same doctor understood. We went to Tehran to visit Dr. … The doctor said, 'it cannot be opened at all, do not touch it. This vein is fed from the heart's back. Do not be sad.' Then, we found the doctor who had operated 10 years ago. We went to the same doctor again. He was in Masih Deneshvari Hospital in Tehran. In Tehran, a female doctor also worked with that doctor, doctor Ms. …, introduced us to him. He came himself, looked at the CD, reviewed all angiograms, and said 'not to operate.'" (Participant No. 14, a 64-year-old male patient)

Another participant mentioned in this regard:

"*I visited two or three doctors. They prescribed a sublingual tablet, ten packs of pills, and six ampoules, which I injected. The following day, I went to the doctor... and he said, 'I will prescribe you an exercise test and an angiography.*'" (Participant No. 14, male, a 64-year-old male patient).

It is worth mentioning that visiting different doctors in different cities was only part of the tried to elevate their information in this regard. In this regard, one of the participants stated:

"Well, I was always reading and searching to get more information." (Participant No. 15, a 74-year-old female patient)

Patients also used the experiences of others to search for and obtain more information. Being in different hospitals, continuous hospitalizations, visiting various doctors, and getting to know similar patients had provided learning opportunity for the patients. On the other hand, the presence of a feeling of sympathy and similarity between individuals led to a strong feeling of trust among them and therefore, outreach to help each other. In this regard, one of the participants stated:

"During the time I was admitted in the hospital, there was a woman who had a stroke several years ago; well, I got some information from her during that time." (Participant 3, a 47-year-old female patient)

In addition to the cases mentioned above, the patients also benefitted from studying and updating their information about the disease in order to search for information. It should be noted that the motivation to obtain information was stronger in patients with higher levels of education, and they usually sought to obtain information, and even when by starting to take a new drug, they searched on different websites. An attractive point that may be mentioned as a part of the findings of this study is that in illiterate patients or those with lower levels of education, not only the motivation to acquire information was lower, but it seemed that given that they had limited information about the disease process, their stress and anxiety levels were also lower and sometimes they even got better along the disease. Moreover, they had no motivation to acquire new information. In this regard, one of the participants hospitalized due to digoxin poisoning, stated:

"Since they started taking me digoxin, I am constantly checking its complications. I told my doctor several times, but unfortunately he did not pay attention and related them mostly to my digestive problems, until I visited Dr. … and he told me that 'you noticed the symptoms correctly and it is very good that you came earlier.' I am very worried now too. I read on the Internet that

digoxin poisoning lasts until six months." (Participant No. 3, a 47-year-old female patient).

Treatment seeking

As mentioned, the disease is changing by nature and patients constantly face new symptoms; these symptoms sometimes occur in the patient because of the disease progress or even starting a new drug and manifest in different ways. The manifestation of new symptoms always resulted in a wave of concern among patients and family members. Some of the cases mentioned by the participants in this study included the incidence of drug complications that caused them to visit the doctor repeatedly. In this regard, Participant No. 15 experiencing digoxin complications said:

"About two months ago, I felt dizzy and short of breath. It started with dizziness. I could not see anywhere; I would sit down and short of breath also would begin. I visited a doctor. The doctor said, 'it is nothing special.' They performed an echocardiogram on me and said, 'it is nothing special.' I went to Tehran just to continue my treatment. There, I found out that I was poisoned by digoxin." (Participant No. 15, a 47-year-old female patient).

Another participant also mentioned in this regard:

"They had started to take me a new blood pressure drug. I would fall into a corner when I was taking it. Then, suddenly I felt very bad, I fainted. The ambulance was called; they took my blood pressure, which was on six. I visited the doctor. The doctor changed the drug and prescribed the same one as before. Since that day, every medicine is prescribed for me, I take it cautiously; I am constantly afraid and worried." (Participant No. 13, a 50-year-old female patient).

Mood fluctuations stemming from the disease

The patients' mood changed a lot after the disease. The close struggling with death, intricate care process, mental and physical exhaustion, mental turmoil, and the changes that had shattered the family structures at once led the patients' mood to be disturbed. In this regard, Participant No. 4 said:

"I was depressed. I used to sit in a corner and not to speak. I was completely depressed after the surgery." (Participant No. 4, a 67-year-old female patient).

Participant No. 12 also mentioned in this regard:

"I was a happy person before that event. After being sick, I was very broken." (Participant No. 12, a 50-year-old male patient).

Another participant stated in this regard:

"Since my illness affected my morals and mood, now, I am not on the mood as before; I get annoyed quickly." (Participant No. 11, a 75-year-old male patient).

In addition to the aforementioned cases, sometimes the patients developed anxiety states. In this regard, Participant No. 8 mentioned:

"I was also anxious that, for example, what I should do if my heart would start working. I was thinking about it and I did not tell my wife, but she saw it with her own eyes." (Participant No. 8, a 50-year-old male patient).

Participant No. 3 also stated in this regard:

"I had nervous tics before; as soon as I felt sick, my tics have relapsed because of my nervous tics. I am at present under the supervision of Dr. .... They are now testing the sedative pills gradually to see which pill reduces the nervous tics. Thank God, they have relieved a lot." (Participant No. 3, a 54-year-old female patient).

Another participant stated in this regard:

"When the doctor told me that I had to be hospitalized, I got highly stressed. I was very afraid to be hospitalized again, especially now that there is also COVID-19. I had gone to the same clinic with so much prayings so that God forbid I get this new disease." (Participant No. 9, a 65-year-old male patient).

Discussion

The results of this qualitative study were categorized into five main categories, including mental turmoil, ineffective psychological reactions to the disease, search for information, treatment seeking, and mood fluctuations stemming from the disease.

The results of the present research demonstrated that heart attack in patients and its subsequent open heart surgery would cause concerns, the impacts of which manifest in the form of various fears and concerns, and since the feeling of worry is a destructive feeling that can emerge for various reasons, may also cause different reactions (22).

Similar to the obtained results, Davidson and Harvey also point out in their study that the uncertainty of the conditions leads patients to describe their situation as "being suspended and unable to keep up with life." This issue normally has an undesirable effect on the patient's mental condition, and the instability of his/her heart status will face him/her with numerous psychological problems too (23). In addition, Vahdaninya et al in their study achieved the "emotional confusion" theme and suggested that emotions, as the strongest human forces, fluctuate due to the effects of the human's inside and outside environment. In a study on novice nurses facing death, they achieved concepts such as confusion, fear, stress, etc (22), which is matched with the results of this section of the current research. Kheftan et al also mentioned the category of "occurrence of mental problems" in patients with multiple sclerosis and suggested that the participants in the research often suffer from experiences of mental problems, such as irritability and anger, being tired of living, loss of self-esteem and independence, becoming bored and careless, suicidal thoughts, feeling dailiness, anxiety, depression, decreased motivation, feeling alone, and waiting for death, which is consistent with

the findings of this section of the current research (24). Therefore, paying special attention to the psychological issues related to these patients is necessary because anxiety symptoms are chronic and accompany disease progress, poor prognosis, poor physical functioning, poor quality of life, and negative effects on the treatment outcomes of this group of patients (25).

The sudden onset of the disease and complications involved the patients and their families chronically had caused fears and worries in the patients. Patients' confrontation with a critical disease and the unpredictable conditions of their disease and hospitalization in the intensive care unit (ICU) create unfavorable psychological consequences in them (26). The findings of this part of the present research indicated that sometimes patients respond ineffectively to the phenomenon of the disease occurrence so that the patients had lost the ability to react effectively to the disease, and subsequently, it had made it difficult for them to manage such intricate conditions and had led them to show ineffective reactions to the disease instead of effectively adapting to the disease.

The results of various related studies also demonstrate that in the psychological dimension, reactions manifest as feelings of guilt, anger, despair, fear of losing the patient, uncertainty, high stress, anxiety, depression, acute stress disorder, and post-traumatic stress disorder. These reactions may continue both during the patient's hospitalization in the ICU and after that (26-28).

Pourghane et al also revealed in their study that heart disease and acceptance of CABG were considered a life-threatening experience for patients and many patients refuse to accept CABG (29).

The results of this part of the present research also demonstrated that patients constantly had numerous mental preoccupations about the disease, the treatment process, and its course and prognosis, which is matched with the findings of Kheftan et al. These authors also indicated in their study and in the category of "disease-related mental preoccupation the patient" that women with MS were often concerned with thoughts such as the disease progress, their future status despite the disease, and the disruption of their children's marriage due to the disease of the mother of the family, and thinking about these issues every day caused them pain, and torment, and distress (24).

Furthermore, Goudarzi et al pointed out in their research and in the category of "purgatory of words" to two sub-categories of "others' thought about uselessness of care and its result" and "the annoyance of disappointing words." In the category of "unjust accusation" also they have mentioned the sub-categories of "accusation of inadequate care" and "discomfort with the accusation of inadequate care." Moreover, in the category of "annoying marginal words," they have mentioned the sub-category of "others' marginal words." In other words, the people around a patient, while providing psychological support, caused his/her harassment, which is consistent with the findings of this section of the research (30). Under critical conditions, patients' problem-solving approaches are emotion-oriented and they focus less on problem-solving approaches in a problem-oriented manner. Thus, patients' reactions are emotional and ineffective. As a result, patients' psychological reactions to the disease should be identified by healthcare system workers and the required training should be provided to them.

The findings of this qualitative study also demonstrated that patients and their spouses searched for more information about the disease in order to reach adaptability. Actions such as visiting different doctors, using websites, using other individuals' experiences, and reading and updating information are some of these efforts. The findings of this part of the present qualitative study are matched with the findings of Salminen-Tuomaala et al. They also suggest in their study that spouses are committed to caring for the patient after illness and actively seek information about the disease and treatment and drugs so that the spouses' lives after a heart attack revolves around their spouses' disease and the meaning of their life is based on controlling the symptoms of the disease; in addition, the spouses should regularly elevate their awareness about various physiological and psychological clues (31,32).

In their other study, they also indicated that family dynamics and a history of sharing experiences greatly affected patient adaptability (33)

Patients also proceed with seeking treatment to adapt to each new symptom. The findings of this part of the present qualitative study are consistent with the findings of Huriani's study. According to Huriani, the learning needs and priority of information change over time among patients after heart attack (34). The results of the aforementioned studies indicate that quality of life of patients is improved by providing information. In order to achieve this goal, healthcare system workers must identify patients' educational needs and provide them with the necessary information.

The results of this section of the current research demonstrated that after open heart surgery, patients experience many mood fluctuations, including the incidence of anxiety and depression. The incidence of anxiety and depression in patients can negatively impact their mental health and enhance their risk of death. On the other hand, inadequate understanding of the disease status because of the insufficient time allocated by healthcare providers to talk with the family or engage them in patient care play a role in patients' anxiety, fear, uncertainty, and depression (26). Patients hospitalized in cardiac ICU wards experience short-term emotional concerns, and it can be said that almost two-thirds of patients develop depression and anxiety. Depression

and anxiety are among serious problems for patients hospitalized in cardiac wards, with a prevalence rate of 15-50%. Depression and anxiety seriously affect patients' health, recovery process of specific and non-specific symptoms, and quality of life, culminating in an increased use of health care, premature disability, and an imposed economic burden on individuals and society's security systems (2). In addition, since the heart's anatomical model is sensitive to severe emotional stress, such as anger, fear, or sadness, it cannot tolerate them and cardiac arrhythmias will occur. Studies have indicated that in general, depression and a high level of anxiety heighten the risk of cardiovascular events in patients. High levels of anxiety lead to the risk of sudden death in cardiac patients, particularly after heart attack, which is 2-5 times more in anxious than in non-anxious patients. Major depressive disorder has also existed in 15-20% of patients following a heart attack (2). As Pourghane et al also report in their research, patients' anxiety factors include the fear of heart surgery and dying, anxiety, becoming disabled after surgery, and high treatment costs (29). Goudarzi et al also revealed in their study that the mood fluctuations of the family were described by the participants as discomfort, depression, aggression, and anger (31). Therefore, allocating enough time to train patients, the presence of family members during the patient's stay in the hospital, identifying the patients' anxiety and mood symptoms, and conducting therapeutic consultations can be effective in relieving the patients' mood symptoms.

Although the current study is one of the few studies that dealt with explaining health anxiety in patients, it also had limitations that should be taken into consideration in the interpretation and generalization of the results. One of the limitations of this study was that only the patients' experiences were discussed, while the disease influences not only the patient, but also his/her family. Therefore, it is suggested that the experiences of patients' families be also taken into account in future studies.

Conclusion

The results of this qualitative study indicated that after open heart surgery, patients develop health anxiety due to stress and lack of time to complete their information, and after. Health anxiety shows itself in different forms. Therefore, it is suggested that nurses and doctors help relieve patients' health anxiety by providing information regarding surgery and aftercare, convalescent period, etc. Hospitals must pay attention to patients' health anxiety in their training programs, consultations, and rehabilitation programs and design and implement effective psychological interventions in the form of standard protocols for use at the levels of hospitals and cardiac rehabilitation centers. Furthermore, given that the findings of this study provide an explicit understanding of how health anxiety occurs in patients after open heart surgery, this study can be used as a theoretical reference for training nurses and nursing students. The generated knowledge can also be effective in elevating the levels of awareness and knowledge of nursing students and nurses regarding health anxiety in patients and its symptoms, patients' need for psychological support, consultation, empowerment, and the role of nurses in providing consultation and relieving patients' health anxiety.

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Authors' Contribution

Conceptualization: Mahdieh Sarhadi, Fatemeh Rigi
Data curation: Mahdieh Sarhadi.
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Supervision: Mahdieh Sarhadi.
Validation: Mahdieh Sarhadi.
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Competing Interests

The authors declare that they have no conflict of interest.

Ethical Approval

The current study was approved by the Research Committee of Kerman University of Medical Sciences. The code of ethics (IR.KMU.REC.1399.219) was received from the Research Vice-Chancellor of Kerman University of Medical Sciences (https://ethics.research.ac.ir/IR.KMU.REC.1399.219). The participants were provided a general explanation about the research objectives; also, they were assured that responding to the research questions was not obligatory, and they were free to withdraw from the research at any stage of the research. All interviews were audio-recorded with the consent of the participants. In order to keep the subjects' identities confidential, a number was used for each participant.

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