



## Brief Report

# Effect of Digital Storytelling on Anxiety in Patients Who Are Candidates for Open-Heart Surgery

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**Background:** Open-heart surgery in persons with cardiovascular disease is associated with high levels of anxiety. **Objective:** The goal of this study was to determine the effect of digital storytelling on anxiety in patients who were candidates for open-heart surgery. **Methods:** In this quasi-experimental study, 80 patients were randomly allocated into 2 groups. The intervention group received routine training and digital storytelling. In each group, anxiety was measured by the State-Trait Anxiety Inventory anxiety scale before surgery and 5 days after surgery. The collected data were analyzed using SPSS software V18. **Results:** There was no significant difference in the anxiety of both groups during the 2 days before the surgery ( $P = .40$ ). After the surgery, the mean of anxiety scores in the intervention group was lower than that of the control group ( $P < .001$ ). **Conclusions:** Digital storytelling is an effective method to reduce anxiety in patients who are candidates for open-heart surgery.

**KEY WORDS:** education, digital storytelling, anxiety, open-heart surgery

## Background

Cardiovascular disease is one of the most serious health problems and disabling factors in developed and developing countries. Globally, cardiovascular disease is a leading cause of death.<sup>1</sup> In Iran, coronary artery disease is responsible for 40% of deaths. The mortality rate for cardiovascular disease is equal to 171.4 per 100 000 people in the population as a whole.<sup>2</sup> When medical treatment for patients with coronary artery disease fails, coronary artery bypass graft surgery is often recommended to improve outcomes.<sup>3</sup> For patients who undergo open-heart surgery, anxiety is the most common psychiatric problem

during the period before surgery to afterward. After this surgery, anxiety has a negative effect on physical, social, family, occupation, and even treatment effectiveness.<sup>4</sup>

Studies have shown that sharing the experiences of patients who have had open-heart surgery with surgery candidates can help to reduce anxiety and increase hope.<sup>5,6</sup> Also, raising awareness is a basic component of health education programs that can respond to many patients' ambiguities and prepare them to deal with the future situation.<sup>7</sup> One health education method to improve awareness is through digital storytelling. In this method, personal experiences and narratives are presented in a storyline of 2 to 10 minutes, with the help of technology tools that can be seen and heard through the narrator's image and sound. Using static and animated images when narrating a story helps to improve understanding

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of the subject, activate mental themes, and increase the interest and motivation of listening and thus reduce anxiety.<sup>8</sup> Research that has been conducted in multimedia suggests that the use of images with oral narratives has a greater impact on people than other approaches.<sup>9</sup>

A variety of multimedia production software is available to build digital stories, such as Movie Maker, Photo Story, iMovie, and Corel Video Studio. Such software provides the ability to combine sound, music, effects, and other requirements for creating an engaging digital storyline.<sup>10,11</sup>

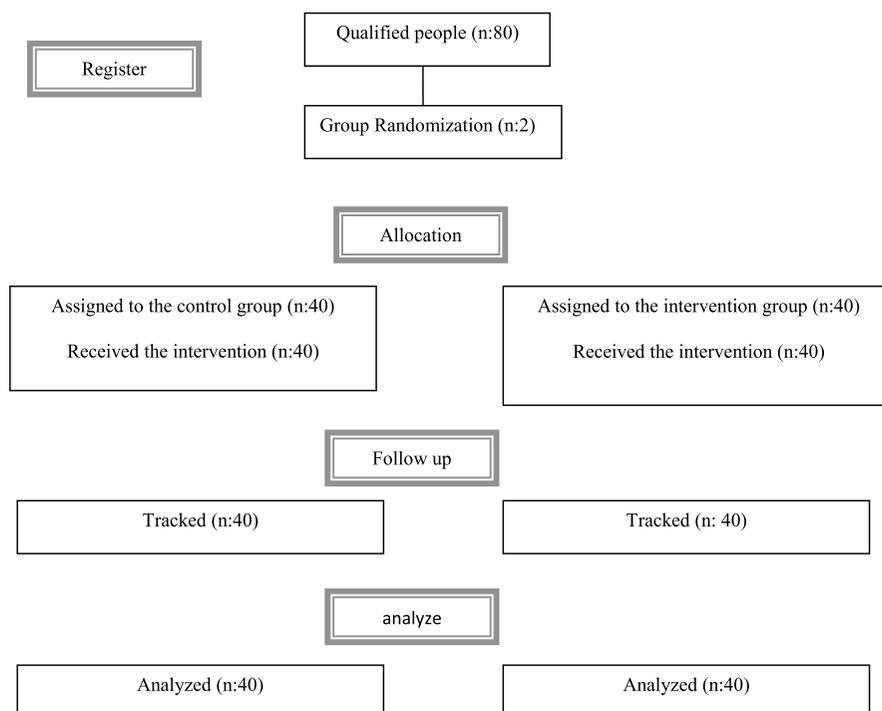
For many patients, learning about the experiences from people with a similar course of disease and treatment may help to accelerate the process of adaptation by overcoming their anxiety.<sup>12</sup> Therefore, the use of digital storytelling in patients undergoing open-heart surgery may help to reduce anxiety.<sup>12,13</sup> This study was conducted to determine the effect of digital storytelling on the anxiety of candidates for open-heart surgery.

## Materials and Methods

This semiexperimental research (Figure) is based on Meyer's multimedia learning cognitive theory. Based on this theory, using words, images, and text can increase the capacity of short-term memory when processing information and leading to more active learning.<sup>14</sup> Because this study is based on multimedia-based learning, this theory was the basis for designing the digital education package. The sample of this study included 80 candidates for open-heart surgery who were referred to 2 educational

hospitals in Isfahan, Iran, in 2017. There were 40 patients in the intervention and 40 in the control group. The inclusion criteria for participation in this study included the following: being a candidate for coronary artery bypass graft, first time open-heart surgery, lack of cognitive problems such as dementia, lack of physical disability such as blindness or deafness, lack of having medical education, does not use medication for anxiety, age range between 40 and 70 years, and the physician's permission. Exclusion criteria included the following: cases in which the patient died during the study or had new physical problems that would lose his/her ability to take care of him/her, the patient was not willing to continue the cooperation, and an incident that increases his/her anxiety that patient expresses. Sampling was done by convenience sample method, and then subjects were randomly allocated into 2 groups. Those with an even file number were allocated to the intervention group, and those with odd file numbers were in the control group. To determine the sample size by 95% confidence and 85% test capability, 38 subjects were needed for each group. A total of 80 subjects were recruited (40 in each group). The intervention in this study was digital storytelling. In order to provide digital narratives, 3 steps were taken<sup>15</sup>:

1. Preparation and preproduction: (1) Choose the subject of the stories based on the needs and knowledge of patients, (2) design the story board, (3) design and search for images that are based on the story board, and (4) record audio files of thematic narratives from candidates who have had open-heart surgery, at the stage of recovery and at the time of discharge. Then, 5 audio files were selected for presentation.



**FIGURE.** Flow diagram methodology process.

2. Production: (1) Using Corel Video Studio software to produce multimedia content, the story board's digital storytelling includes placing images in the order of the predicted sequence based on the storytelling process in the software environment; adding graphics and visual effects; mixing the narrator's voice with images and soundtrack and final adjustment of sound; saving multimedia files in MPEG format for display in digital devices; (2) reviewing the content that has been produced by several cardiologists and nurses; and (3) making necessary corrections based on expert opinions.
3. Presentation: The 30-minute digital file was ready for presentation.

The anxiety of the patients who were under study was measured in both the intervention and control groups before education. Then, for the intervention group, in addition to routine education 2 days before the surgery, digital storytelling was individually presented by 2 researchers with a 10-minute period for questions. Patients in the control group received routine education individually by a physician and nurse, and their questions were answered in 5 minutes. The anxiety level of both groups was measured 5 days after surgery.

The data collection instruments were 2 questionnaires, including personal information and disease characteristics, and the Spielberger State-Trait Anxiety Inventory. Each scale has 20 questions. The 4-point scale for State anxiety (S) is as follows: 1 = "not at all," 2 = "somewhat," 3 = "moderately so," and 4 = "very much so." The 4-point scale for Trait anxiety (T) is as follows: 1 = "almost never," 2 = "sometimes," 3 = "often," and 4 = "almost always." Higher scores indicate greater anxiety. The validity and reliability of the State-Trait Anxiety Inventory have already been investigated in Iran. Its reliability in the norm society was equal to 0.95 and it was equal to 0.94 in the criterion society. The internal reliability of this scale was determined by the Cronbach's  $\alpha$  method, and the coefficient of validity was equal to 0.92.<sup>16</sup>

The data were analyzed using SPSS software V18. Among the 2 groups, the Kolmogorov-Smirnov test was performed before the intervention, and the distribution of the data was normal. Descriptive statistics were used to describe the frequency of data and, independent and paired *t* test was used to compare the data. The significance level for all tests was set to less than .05.

### Ethical Considerations

This study was approved by the ethics committee of the biomedical research of the Islamic Azad University Najafabad branch on April 15, 2018, with the ID: IR.IAU.NAJAFABAD.REC.1396.77. Ethical considerations in this research include obtaining permission from relevant authorities, introducing themselves to research units, explaining the goals and nature of the research, obtaining written informed consent from patients, recruiting

participants in the research, and providing information to the research units if desired and reliable. The patient's personal information was kept confidential.

### Findings

The findings of the study showed that the intervention and control groups were similar in terms of their personal characteristics, age, marital status, gender, and educational level (Table 1); there were no significant differences between the groups. The mean (SD) age in the intervention group was 61.4 (2.49) years and in the control group was 63.8 (1.65) years.

The independent-sample *t* test showed that there was no significant difference in State (S) and Trait (T) anxiety between intervention and control groups at baseline (before the surgery). There was a significant difference in the mean score of the S- and T-anxiety scales between the intervention group and the control group after the intervention (Table 2). Using the paired *t* test, there was a significant decrease in both the S- and T-anxiety scales in the intervention group after the intervention, but the mean scores of the S- and T-anxiety scales did not significantly decrease in the control group. The research hypothesis was that digital storytelling would reduce the anxiety of candidates for open-heart surgery. Because the anxiety of patients in the intervention group was significantly decreased in the posttest, the research hypothesis was supported.

### Discussion

The results of the study indicate that digital storytelling had a significant effect on the anxiety of the candidates for open-heart surgery in the intervention group. In the control group, there was no significant decrease in anxiety despite the receipt of routine training. The results of prior research has indicated that the most common cause of anxiety among patients undergoing open-heart surgery is fear of death, which may be a result of their lack of information on surgical care. Therefore, it is important to provide education to the patient about

**TABLE 1** Demographic Characteristics of Patients in the Intervention and Control Groups

Characteristics	Intervention	Control
	n (%)	n (%)
Marital status		
Single	15 (37.5)	16 (40)
Married	25 (62.5)	24 (60)
Gender		
Male	22 (55)	20 (50)
Female	18 (45)	20 (50)
Level of education		
Nonacademic	24 (60)	23 (57.5)
Academic	24 (60)	23 (57.5)

**TABLE 2** Distribution of Mean (SD) Anxiety Score in the Intervention and Control Groups

Anxiety Group	Trait (Hidden)			State (Obvious)		
	2 Days Before Surgery	5 Days After Surgery	<i>t</i> , <i>df</i> , <i>P</i>	2 Days Before Surgery	5 Days After Surgery	<i>t</i> , <i>df</i> , <i>P</i>
Intervention	1.12 (60.11)	3.12 (45.5)	<i>t</i> = 4.32 <i>df</i> = 17 <i>P</i> < .001 <sup>a</sup>	5.13 (49.18)	2.10 (22.15)	<i>t</i> = 3.12 <i>df</i> = 23 <i>P</i> < .001 <sup>a</sup>
Control	2.0 (62.12)	1.2 (55.3)	<i>t</i> = 1.30 <i>df</i> = 66 <i>P</i> = .6 <sup>a</sup>	5.61 (50.32)	4.18 (45.33)	<i>t</i> = 1.23 <i>df</i> = 59 <i>P</i> = .4 <sup>a</sup>
<i>t</i> , <i>df</i> , <i>P</i>	<i>t</i> = -1.414 <i>df</i> = 59 <i>P</i> = .48 <sup>b</sup>	<i>t</i> = -2.53 <i>df</i> = 61 <i>P</i> = .006 <sup>b</sup>		<i>t</i> = -1.18 <i>df</i> = 52 <i>P</i> = .4 <sup>b</sup>	<i>t</i> = -2.76 <i>df</i> = 68 <i>P</i> = .008 <sup>b</sup>	

<sup>a</sup> Paired *t* test.<sup>b</sup> Independent *t* test.

the process of open-heart surgery and what may be expected in the postoperative course. Given the shortened length of hospitalization for many, it is necessary to prepare patients to continue their recovery at home.<sup>17</sup>

Several studies have been done on how information is presented in a way that can affect patients' anxiety. In some studies, patient teaching methods using a story-based method of presenting experiences increases the patient's level of comfort with the information of their peers. By creating a sense of empathy and strengthening social identity, knowledge will be enhanced.<sup>18</sup> Also, in several studies, peer education has been considered effective in decreasing the anxiety of candidates for open-heart surgery.<sup>12</sup> This study is innovative in its use of storytelling from peers and integration of storytelling into multimedia. In our research, the proper design of digital storytelling had a significant role in reducing anxiety in patients because one of the effective methods of reducing anxiety is the use of appropriate and interesting content that can make the learning process enjoyable.

The findings of this study are similar to the results of the research of Zarei et al<sup>19</sup> on the symptoms of anxiety that showed a positive relationship between the reduction of anxiety and storytelling. Therefore, the digital storytelling method to control the anxiety of patients undergoing open-heart surgery may be useful for nurses as a patient education strategy and also as a means to help patients feel more involved in their treatment and care.

The limitations of this study were that some physicians did not allow the digital storytelling to be used with their patients. They believed that this might have the opposite effect as intended. Also, the study did not control for the probability that the samples learned from other sources beyond the intervention.

## Conclusion

The results of this study emphasized the promising impact of digital storytelling on the anxiety of a candidate for open-heart surgery. Using artistic techniques such as

storytelling in multimedia environments can reduce the tension experienced by many presurgical patients. This research suggests that digital storytelling is a promising new method for use in heart surgery departments.

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