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Comparison of the effects of peer education and orientation tour on the hemodynamic parameters of patients undergoing coronary angiography

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ABSTRACT

Background: Patients undergoing coronary angiography suffer from anxiety and stress during this procedure, which often leads to changes in hemodynamic parameters. This study aimed to compare the effects of peer education and orientation tour on the hemodynamic parameters of patients undergoing coronary angiography.

Methods: This quasi-experimental study was conducted on patients undergoing coronary angiography, who referred to a hospital affiliated with AJA University of Medical Sciences in Tehran, Iran during 2014-2015. In total, 177 patients were selected using convenience sampling and randomly assigned to three groups of peer education, orientation tour and control (each group: 59 samples). Participants in the peer education group were trained in the angiography unit by peers, while the samples of the orientation tour were instructed by the researcher. Hemodynamic parameters of patients were measured and recorded two hours after admission and two hours before angiography. Data analysis was performed in SPSS version 21 using Chi-square, one-way ANOVA and paired t-test.

Results: In this study, a significant reduction was observed in the systolic blood pressure (P=0.01), diastolic blood pressure (P=0.05), respiratory rate (P=0.03) and heart rate (P<0.001) in the samples of peer education group, all of which significantly decreased in the orientation tour group as well (P<0.001). In contrast, all the hemodynamic parameters increased in the control group (P<0.001). After the intervention, a significant difference was found between the intervention and control groups (P<0.001).

Conclusion: According to the results of this study, peer education and orientation tour could lead to a significant reduction in the hemodynamic parameters of patients undergoing coronary angiography. Therefore, it is recommended that these methods be applied for such patients.

1. Introduction

Cardiovascular diseases are among the chronic diseases with a high prevalence at any age and in different racial and ethnic groups.[1] In this regard, one of the most common diseases is coronary artery disease, currently known as the leading cause of mortality and hospitalization worldwide.[2-4]

In 2002, cardiovascular death rate reached a population of about 16.5 million people in the world, which is expected to increase to 25 million by 2020.[5] Cardiac diseases are in fact the third leading cause of mortality in Iran, which account for 40-45% of the total mortality rate in our country.[6, 7] While improvement in technology has contributed to increased incidence rate of cardiovascular diseases, enhanced knowledge and discovery of diagnostic and therapeutic procedures (e.g., angiography) have been associated with a significant decrease in the mortality rate of such patients.[1, 8]

Angiography is a standard approach used to anatomically evaluate coronary arteries and collect data to identify the most effective treatment, such as pharmacological treatments, angioplasty and bypass surgery, for cardiac diseases.[3, 9, 10] However, studies have shown that angiography is accompanied with anxiety and emotional stress in patients.[11, 12] According to the literature, approximately 82% of the patients undergoing angiography suffer from anxiety.[8, 13]

Stress and anxiety could have a profound impact on physiological and biochemical responses in patients through activating the sympathetic nervous system. In addition, they might increase some hemodynamic parameters, such as blood pressure, heart rate, and respiratory rate. Literature review has revealed that these impairments could lead to negative consequences, including increased need for sedatives, prolonged hospitalization and high treatment costs.[12, 14] Therefore, it seems necessary to take preventive measures to alleviate stress and anxiety, so that hemodynamic signs of patients are stable before angiography.[15] One of the most important measures is patient education, regarded as one of the rights of patients and a major nursing duty.[16] Studies have marked that providing patient health information in terms of the method used in angiography requires measures before, during, and after the treatment process, which could result in decreased anxiety and modified hemodynamic measurements.[2, 16]

To date, several approaches have been introduced to educate patients and provide information, the most common of which are peer education and orientation tour. Peer education is defined as behavior, data and attitude exchange with those who are not professionally trained but have valuable experiences in a certain area.[17] In this method, patients with similar characteristics interact with one another and benefit from the experiences of other peers in a simple training environment created at the lowest cost.[18, 19]

Furthermore, patients visit the hospital wards to closely observe the environment in which the therapeutic intervention will be conducted. This is probably due to the fact that facing an unfamiliar setting could lead to stress and anxiety, followed by changes in hemodynamic measurements of patients. On the other hand, the angiography unit could be a stressful place due to the existence of large equipment, low lighting, noises of devices and hospital staff wearing masks and gowns.[20] Therefore, an orientation tour of this setting could familiarize patients with the environment prior to procedure.[21]

In this regard, Var'ee et al. (2013) conducted a study on patients undergoing angiography, and their results were indicative of alleviated stress in patients after the application of orientation tour during the night before the intervention.[15] In another study by Var'ee et al. (2013), positive effects of peer education on the anxiety level of patients undergoing coronary artery bypass graft surgery (CABG) were demonstrated. In addition, peer education was described as a contributing factor in reducing anxiety levels in cardiac patients.[22]

So far, limited studies have been conducted to evaluate the effects of various educational methods on hemodynamic measurements. Adib Haj Bagheri et al. (2014) argued that reduced heart rate and systolic and diastolic blood pressure could be achieved through comprehensive preparation of patients using individual guidance, educational pamphlets and videos, as well as sharing the experiences of similar patients and familiarizing patients with the staff and ward.[12] In this regard, Foji et al. (2015) also stated that guided imagery or being in a stream of thought, in which patients are able to see, hear, feel or smell everything they desire, could significantly decrease hemodynamic parameters in patients undergoing angiography.[23]

Literature review revealed that no previous research has been conducted to compare the effects of orientation tour and peer education on the hemodynamic parameters of a group of patients. Given the increased number of cardiac patients undergoing angiography and their insufficient knowledge on this process, this study aimed to compare the effects of orientation tour and peer education on the hemodynamic parameters of patients undergoing coronary artery angiography.

2. Methods

2.1. Design

This quasi-experimental study was conducted on patients undergoing coronary artery angiography, who referred to a hospital affiliated with AJA University of Medical Sciences in Tehran, Iran during 2014-2015.

2.2. Participants and setting

In this study, Sample size was calculated at 36 cases per group based on the study by Hanifi et al. (2011)[16] ($\alpha=0.05$, $Z_{1-\alpha/2}=1.96$, $Z_{1-\beta}=1.28$, $\delta_2=3.19$, $\mu_1=10.33$). Considering the lack of homogeneity between the study groups, sampling was continued until the groups were homogenous.

In total, 207 patients were enrolled in the study, 25 of whom were excluded due to lack of compliance with inclusion criteria, and five cases were eliminated due to unwillingness to participate in the research. Eventually, 177 patients (59 cases per group) were selected using convenience sampling and randomly allocated to each study group (peer education, orientation tour and control). Random allocation method was conducted every other day, and samples were assigned to each study group through drawing lots using papers labelled as different days of the week. Afterwards, the researcher randomly selected the days of the week.

Inclusion criteria were first experience of angiography, non-emergency coronary angiography, adequate literacy, no history of heart

valve diseases, physical disabilities, anxiety and stress, no use of sedatives, age range of 25-65 years, and not being a hospital staff or first-degree relative of hospital personnel.

It is worth mentioning that sedatives were administered to the patients at least 30 minutes before angiography in the selected hospital, which had no interference with our study. However, the samples would be excluded in case of hemodynamic instability caused by sedatives (not the routine medicine).

2.3. Instruments

Data collection tools were demographic questionnaires and Blood pressure measurement. Demographic forms contained 8 items on data such as gender, marital status, educational level, occupational status, place of residence, smoking status, age and duration of disease.

Blood pressure measurement was conducted for all the samples using CE approved Rossmax device (Taiwan). In this process, blood samples were obtained from the right hand of subjects in a sitting position. The accuracy of our selected blood pressure monitor was confirmed by comparing it with another device. In addition, right radial pulse was used to measure the patients' pulse rate, and a similar wrist watch was selected for the measurement of heart rate and respiratory rate.

2.4. Data Collection

In this study, it was attempted to avoid any interaction between the participants and other patients in the ward who were undergoing angiography at the time. Therefore, after obtaining the permission of the head nurse, evaluated patients were placed in separate rooms, and the intervention was conducted in each group after its completion in the previous group. Hemodynamic parameters were recorded two hours after admission, and the intervention was initiated in the intervention group, whereas the control group only received the routine care of the ward.

Peer education was carried out by a peer educator, who underwent a successful angiography and was selected by the researcher after two training sessions (duration: one hour). This process was held in the form of a one-hour training session under the supervision of the researcher, in which several issues were addressed regarding angiography, such as nature, symptoms, treatment course, prior preparations and postoperative care, self-care behaviors at home and follow-up. On the other hand, orientation tour was conducted on groups of 3-6 samples, who visited the angiography unit for 30-40 minutes to become familiar with the environment, tools and devices in the ward. To finish this tour, participants were asked some questions by the researcher. It is worth mentioning that patient education booklets about angiography were given to the subjects of peer education and orientation tour groups during the intervention. At the end of the research, these booklets were provided for the samples of control group as well.

Hemodynamic parameters (e.g., heart rate, systolic and diastolic blood pressure and respiratory rate) in all of the samples were measured and recoded one day before (two hours after admission) and two hours after angiography by the researcher.

2.5. Ethical considerations

After receiving the approval of hospital authority, our researcher visited the coronary care unit (CCU) daily to select eligible patients for the study. Following that, the objectives of study were explained to the participants, and they were assured of the safety of intervention. Finally, written informed consent was obtained from the samples after being informed that they could withdraw from the study at any time. The participants were required to complete the demographic questionnaires upon enrolment.

2.6. Statistical analysis

Data analysis was performed in SPSS version 21 using Chi-square (to compare the groups in terms of gender, marital status, educational level, occupational status, place of residence and smoking status), one-way ANOVA (for the comparison of mean hemodynamic parameters in the study groups and comparing the groups regarding age and duration of heart disease), and paired t-test (to compare the differences in hemodynamic parameters before and after intervention).

3. Results

Demographics of the participants are shown in Table 1, which revealed no significant difference between the study groups before the intervention.

After the intervention, a significant difference was observed in the peer education group in terms of systolic blood pressure ($P=0.01$), diastolic blood pressure ($P=0.05$), respiratory rate ($P=0.03$) and heart rate ($P<0.001$), compared to before the intervention. Similarly, a significant reduction was observed in the hemodynamic parameters of the tour orientation group after the intervention ($P<0.001$); however, these parameters significantly increased in the control group after the intervention ($P<0.001$) (Table 2).

In addition, a significant difference was observed after the intervention regarding respiratory rate and heart rate. According to LSD results, these differences were at the significance levels of P=0.005 and P=0.002 between the peer education and control groups, and P=0.002 and P<0.001 between the tour orientation and control groups, respectively.

On the other hand, the results of LSD were indicative of no significant difference between the peer education and tour orientation groups in terms of hemodynamic parameters.

Table 1. Demographic characteristics of participants

Variable	Group	Peer education N (%)	Tour orientation N (%)	Control N (%)	P-value
Gender	Female	30 (50.85)	27 (45.76)	30 (50.85)	*0.81
	Male	29 (49.15)	32 (54.24)	29 (49.15)	
Marital status	Single	8 (13.56)	5 (8.47)	7 (11.86)	*0.67
	Married	51 (86.44)	54 (91.53)	52 (88.14)	
Educational level	Diploma/below diploma	48 (81.36)	51 (86.44)	50 (84.75)	
	Higher education	11 (18.64)	8 (13.56)	9 (15.25)	*0.74
Occupational status	Employed	38 (64.40)	47 (79.66)	36 (61.02)	*0.06
	Unemployed	21 (35.6)	12 (20.34)	23 (38.98)	
Place of residence	Urban	42 (71.19)	43 (72.88)	40 (67.78)	*0.82
	Rural	17 (28.81)	16 (27.12)	19 (32.22)	
Smoking status	Smoker	16 (27.12)	13 (22.03)	18 (30.5)	*0.57
	Non-smoker	43 (72.88)	46 (77.97)	41 (69.5)	
Age (year)	M±SD		57.7±14.5		**0.97
Duration of disease (year)	M±SD		2.2±69.82		**0.55

*Chi-square; **one-way ANOVA

Table 2. Mean hemodynamic parameters before and after intervention in the study groups

Hemodynamic parameters	Group	Peer education M±SD	Tour orientation M±SD	Control M±SD	**P-value
Systolic blood pressure (mmhg)	Before the intervention	129.15±13.64	132.58±15.75	128.49±17.47	0.31
	After the intervention	125.76±13.10	126.12±17.38	134.59±17.47	<0.001
	*P-value	0.01	<0.001	<0.001	
Diastolic blood pressure (mmhg)	Before the intervention	78.02±8.8	79.93±9.02	77.59±9.15	0.32
	After the intervention	76.58±8.73	75.25±8.44	80.24±7.74	<0.001
	*P-value	0.05	<0.001	0.01	
Respiratory rate (per minute)	Before the intervention	17.88±2.82	18.44±2.78	17.32±2.34	0.07
	After the intervention	17.24±2.17	17.07±2.52	18.47±2.40	<0.001
	*P-value	0.03	<0.001	<0.001	
Heart rate (per minute)	Before the intervention	74.63±8.83	75.49±6.95	73.68±7.14	0.44
	After the intervention	72.78±7.99	71.53±7.76	77.07±7.45	<0.001
	*P-value	<0.001	<0.001	<0.001	

*Paired t-test; **one-way ANOVA

4. Discussion

According to the results of the present study, a significant reduction was observed in hemodynamic parameters of the samples in peer education and tour orientation groups after the intervention (e.g., systolic and diastolic blood pressure, heart rate and respiratory rate). However, these parameters escalated in the control group. In this regard, Adib Haj Bagheri et al. (2014) indicated that systolic and diastolic blood pressure, as well as heart rate and respiratory rate, could decrease in patients through providing the required education using preparation packages, such as face-to-face individual training, delivery and distribution of education pamphlets to patients, and displaying video tutorials of the angiography process in the unit, along with familiarizing the patients with angiography unit and providing additional explanations in person,[12] which is in line with our findings.

A comprehensive training program can contribute to the physiological stability of the body through enhancing the awareness of patients. Results obtained by Izadi et al. (2011) were indicative of reducing effects of oral and written instruction before surgery on the anxiety and some of the physiological indices (e.g., systolic and diastolic blood pressure, heart rate and respiratory rate) of patients.[24] Similarly, in a study by Hashemi

et al. (2002) conducted on patients undergoing heart surgery, it was demonstrated that preoperative educational classes for patients led to a significant decrease in their anxiety and stress levels and a significant improvement in blood pressure. In the current research, patient education led to monitored hemodynamic parameters, including blood pressure.[25] In another study by Philippe *et* al. (2006) conducted to evaluate 200 patients undergoing coronary artery angiography, a significant reduction was reported in the heart rate of patients, for whom learning via videos was provided by the researchers.[26]

Another benefit of patient education is the relaxed mental state before surgery. It could be suggested that mental calmness in patients is one of the contributing factors in reducing hemodynamic parameters, which is mainly resulted from raising patients' awareness toward the procedure. Moreover, one of the subjects presented in patient education programs is the application of relaxation methods, including deep breathing exercises. In a study by Hanifi *et* al. (2005), it was marked that teaching Benson's relaxation response technique, which is a breathing relaxation method, to patients before angiography caused a significant reduction in hemodynamic parameters, especially diastolic blood pressure.[27]

Another method used in the present study was the orientation tour, which was introduced as a major factor to lower anxiety levels in patients after angiography in a study by Var'*ee et* al. (2013).[15, 22] The mentioned researchers conducted another study to evaluate the effects of peer education on the anxiety levels of patients undergoing CABG. According to the results, peer education was associated with a significant decrease in the anxiety levels in patients, which is in congruence with the results of the present study.

Similarly, Dehghani *et* al. (2013) concluded that familiarizing patients with the surgery procedure could significantly decrease the anxiety levels in patients undergoing CABG.[28] In this regard, Kit Chan *et* al. (2003) reported that group training is an effective approach to diminish anxiety in patients before cardiac catheterization.[29] In another study by Zakeri Moghadam *et* al. (2009), patient education before surgery led to the significant alleviation of anxiety.[30] Furthermore, Momeni *et* al. (2008) demonstrated that training through the use of educational CDs had a significantly positive impact on the anxiety levels of patients before CABG.[31] In another study, Momeni *et* al. (2006) investigated the role of training using educational booklets on the day before surgery.[32] While these studies evaluated the effect of education on anxiety levels in patients before invasive procedures, anxiety could be independently responsible for changes in hemodynamic parameters. Therefore, the results of previous studies are consistent with our findings.

One of the major drawbacks of the present study was selecting one healthcare center as the study setting, which might restrict the generalizability of the findings. On the other hand, differences in the demographic characteristics of patients might have affected the results, which could not be controlled by the researcher.

5. Conclusion

According to the results of this research, educational methods, such as peer education and orientation tour, caused a significant reduction in the systolic and diastolic blood pressure, heart rate and respiratory rate of the patients undergoing angiography. Therefore, it is recommended that cost-effective, non-invasive and non-pharmacological approaches be used by nurses to normalize hemodynamic parameters in patients undergoing various surgeries. It is also suggested that future studies be conducted to evaluate the effects of these educational programs on other outcomes, including depression, anxiety and level of patient satisfaction.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

Zahra Farsi: assistance in research design and implantation, data analysis, drafting and critical review of manuscript. Reza Eslami: research design and implantation, data collection and analysis Seyedeh Azam Sajadi: research design and implantation, monitoring the implementation of research Efat Afaghi: data analysis and drafting of manuscript.

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