



# Effect of Angiography Room Orientation Tour on Anxiety of Patients Awaiting Cerebrovascular Angiography

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## Abstract

**Introduction:** Cerebrovascular angiography is a method of diagnosing cerebrovascular disorders. Invasive procedures induce anxiety in patients. Poor management of anxiety may be life-threatening for patients. It is the duty of nurses to reduce anxiety. Given the prevalence of anxiety in patients awaiting cerebrovascular angiography and its detrimental complications and also the critical role of nurses in the psychosomatic support of patients and their struggle to reduce anxiety, the use of different methods of patient education such as familiarizing them with diagnostic and therapeutic processes is of utmost significance. This study investigated the effect of orientation tour on anxiety in candidates of cerebrovascular angiography.

**Methods:** In this experimental study, 114 patients awaiting cerebrovascular angiography presenting to Imam Hussein Hospital and Shohadaye Tajrish Hospital in Tehran, capital of Iran, were selected with a convenient sampling method and assigned randomly to either case or control groups. The control group just received routine education in the ward. In contrast, the case group received routine education in the ward and instructions on performing angiography and its pre-, peri-, and post-operative care. Demographics questionnaire and the Depression Anxiety Stress Scale (DASS-21) were used to collect data. Patients' anxiety was measured twice with this instrument at hospitalization and after the intervention. The gleaned data were analyzed with SPSS21 using independent t-test, Chi-square test, and ANOVA.

**Results:** Distribution of age was the same in both groups ( $P < 0.11$ ). Independent t-test showed a significant difference in the mean score of anxiety before intervention in the control group (9.2) and case group (7.2) ( $P = 0.02$ ). This test also indicated a significant difference in the mean score of patients' anxiety after intervention in both the control group (9.7) and case group (6.7) ( $P = 0.001$ ). However, using data collected before the orientation tour as the covariate, repeated measures ANOVA showed a significantly more significant reduction of anxiety in the case group.

**Conclusions:** According to our findings, participation in the angiography room orientation tour leads to reduced anxiety in patients awaiting cerebrovascular angiography. The use of this method is advisable for patients before diagnostic and therapeutic processes.

## INTRODUCTION

Stroke is the third common cause of disability and mortality. The diagnosis of stroke is made based on clinical signs and/or inspection of stroke in cerebral imaging. Some standard diagnostic interventions and a specific classification criterion are required for determining the etiology of stroke [1]. Digital

Subcranial Angiography (DSA) is a highly useful invasive procedure for diagnosing cerebrovascular accidents (CVA) and intracranial tumors [2]. This method provides images of cerebral vessels that help in diagnosing disorders like thrombosis or fatty plaques. Despite the availability of noninvasive substitute

procedures such as CT angiography and MR angiography, cerebrovascular angiography is still used in the diagnosis of intracranial disorders for treatment plans [3]. In this procedure, the specialist introduces a microcatheter into the carotid and vertebral vessels through the femoral artery using local anesthesia. When the catheter is properly located, the contrast dye is injected, and blood vessels are displayed with good contrast [4]. Anxiety may aggravate the symptoms of exerting adverse effects on the patient's physical status [5]. Severe tension and anxiety are important risk factors for vasospasm. Reduced blood supply and ischemia induced by spasm may predispose to thrombotic complications. Besides, sometimes vasospasm hinders the passage of catheter to the target site. These complications can be avoided via tranquilizing patients by sedation [6]. Anxiety affects the clients' physiologic reactions exposing them to risks in the angiography room by increasing the blood catecholamines [7, 8]. Moreover, anxiety may activate the stress response provoking epinephrine and norepinephrine release that is associated with physiologic changes like hypertension, tachycardia, and increased cardiac output [9]. Poor management of anxiety may be life-threatening so that it may increase the odds of myocardial infarction (MI) or stroke in patients with coronary artery disease (CAD) [10]. A wide range of sedatives is used before angiography to maintain patient comfort, reduce pain and tension, support the restless patient regarding self-damage and/or specific drug therapies. An ideal drug is one that has predictable side-effects with a rapid onset of effect and recovery [4]. Non-pharmaceutical methods may also be used to diminish anxiety in which there are fewer complications along with the faster achievement of therapeutic results compared to drug therapy. Methods like sedation, education, and music therapy may be applied to control anxiety before surgery [11]. A study on dialysis patients demonstrated that spiritual counseling might also aid in decreasing tension and depression in patients. It is recommended that this approach be utilized as a complementary effective, low-cost, noninvasive nursing intervention to reduce the psychological problems of the patients [12]. Considering the importance of anxiety and apprehension, and the related consequences for patients, any attempt to control and diminish anxiety is highly important. It is crystal-clear that if the patient's apprehension is decreased via non-pharmaceutical methods, there will be the need for lower doses of sedatives and tranquilizers and finally, the patient will sustain fewer complications. Numerous studies have suggested that patient anxiety can be reduced by increasing their awareness of diagnostic and therapeutic procedures. The study by Shamsizadeh et al. (2013) and also by Hanifi et al. (2012) indicated that angiography room orientation tour decreased anxiety in candidates

of coronary artery angiography (CAA). However, they did not explore the effect of this type of education on anxiety in patients awaiting cerebrovascular angiography [8, 13]. Karimi et al. (2014) also revealed that the orientation tour diminished anxiety even in pediatric candidates of surgery [14]. Nevertheless, the study by Lee et al. (2016) showed that providing information to candidates of cerebrovascular angiography did not affect reducing their anxiety [15]. Also, the review study by Ferreira et al. (2015) investigating the use of non-pharmaceutical methods for decreasing anxiety in patients awaiting coronary artery angiography (CAA) did not refer to the information provided as a method of controlling their anxiety [16]. Various studies in Iran and around the globe have expunged upon the effects of different methods and also orientation tour on patient anxiety, indicating the importance of anxiety and their struggle for reducing it in patients. No study was found on the list of patients awaiting cerebrovascular angiography in Iran; also, the global studies abroad were obsolete and out-of-date. Given the high importance of reducing anxiety in cerebral patients and the significant role of nurses in teaching patients and also considering that the studies conducted in this field so far report variable results, this study elucidated the effect of angiography room orientation tour on anxiety in cerebrovascular angiography patients.

## METHODS

This study aimed at determining the effect of angiography room orientation tour on anxiety in candidates of cerebrovascular angiography in hospitals affiliated to Shahid Beheshti University of Medical Sciences in 2018. With an orientation tour, we mean close familiarization of patients with the angiography room through explanations on angiography procedure and equipment during their visit to the room. In this experimental study, 114 cerebrovascular patients presenting to Imam Hussein Hospital and Shohadaye Tajrish Hospital (because angiography is performed only in these 2 hospitals of Shahid Beheshti University hospitals) during February 2017-November 2018 were selected with convenient sampling method and assigned into case and control groups. The sampling of the case and control groups was done every other week. The sample size was estimated using Hanifi's study [8] on the basis of mean scores of depression in both groups with Type I error=0.05 and test power of %80 with the following formula:

$$n = \frac{(Z_{\alpha} + Z_{\beta})^2 (S_1^2 + S_2^2)}{(\mu_2 - \mu_1)^2}$$

$$n = \frac{(1.96 + 0.84)^2 (1.21^2 + 2.4^2)}{(7.99 - 8.90)^2}$$

The sample volume was 114 patients, so, considering some subject attrition, 120 patients were selected so that there were 60 patients in each group. The inclusion criteria were: age of 15-80 years, absence of psycho-cognitive problems according to patients' self-report, angiography for the first time, consciousness, and the ability for verbal communication. The exclusion criteria were: suppressed consciousness due to any reason during the study and decreased ability for verbal communication. The Depression Anxiety Stress Scale (DASS-21) was used to measure anxiety. The validity and reliability of this inventory were investigated and established by Samani & Jowkar (2007). The reliability coefficients for depression, anxiety, and stress were 0.80, 0.76, and 0.77, respectively, whereas Cronbach's  $\alpha$  coefficients for this scale were 0.81, 0.74, and 0.78, respectively. In this study, to verify the reliability, 30 participants were selected to complete the questionnaire, and Cronbach's and ICC were used to ensure the reliability of the questionnaire. The results showed that the questionnaire is reliable (Cronbach's  $\alpha=0.907$  and ICC: 0.974).

To collect the required data, the researcher presented to the intended hospitals in person during the week, and the samples were selected based on inclusion criteria after coordination with hospital authorities in angiography and neurology wards and obtaining their permission. The samples were candidates of cerebrovascular angiography that sustained cerebral problems such as stroke, cerebral hemorrhage, headache, vertigo, cerebrovascular problems, etc. They met the inclusion criteria. The research goals and procedures were elucidated to the patients, and informed written consent was obtained from each. Explanations were given to control patients by a ward nurse and to the case patients by the researcher. Furthermore, they were assured of information anonymity and confidentiality. They were given the right to leave the study at any stage. Subsequently, the demographics questionnaire and DASS-21 were completed for the case group before angiography. All patients in the case group were transported individually to the angiography ward before angiography after routine education by the ward nurse and got familiar with the angiography room and equipment by the researcher. Next, a 10-min educational session was held

by the researcher in which some explanations were provided 30 min before the procedure on the basis of a pedagogic pamphlet on the method of performing angiography, lack of need for general anesthesia, the use of local anesthesia, duration of the procedure, pre-, peri-, and post-operative care for angiography, duration of absolute bed rest after the procedure, and their feelings during the procedure. Again, the DASS-21 was distributed to them to be completed, and their anxiety score was measured. Sampling was done every other week for the case and control groups to avoid interference of orientation tour for the case and control groups that could possibly affect the results of the study. Regarding the control group, the routine education was given by the ward nurse, and then, they were given the questionnaire to be completed. Their anxiety scores were determined before and after routine explanations in the ward. If the patients were literate, they completed the questionnaire themselves; otherwise, it was completed by the help of the researcher and the patient's attendant/companion. The gleaned data were analyzed with SPSS21 using independent t-test, Chi-square test, and ANOVA (for controlling pre-test data and also as a confirmation test for the independent t-test).

## RESULTS

The results showed the same distribution of age, gender, marital status, and literacy level in both groups ( $P < 0.05$ ) (Table 1). The mean age of patients was 55.79 years in the control and 51.67 years in the case group. Also, %71 of the patients aged 50+ years, %90.3 were married, and %76.7 held a sub-diploma degree. The patients' mean score of anxiety before the orientation tour was 9.22 in control and 7.28 in the case group. Statistical analysis with an independent t-test demonstrated a significant difference in the patients' anxiety scores in both groups before the orientation tour ( $P = 0.022$ ). Subsequently, we used ANOVA for the control of confounding variables (Table 2). The mean score of patients' anxiety after the orientation tour as the intervention was 9.75 in control and 6.78 in the case group. Statistical tests suggested a significant difference in the mean score of anxiety after intervention between the case and control groups ( $P = 0.001$ ) (Table 3).

**Table 1.** Demographic Characteristics of Patients in the Case ( $n = 60$ ) and Control Groups ( $n = 60$ )

	Control Group Mean $\pm$ SD	Case Group Mean $\pm$ SD	Statistical Test	Values
Age (years)	55.7 $\pm$ 11.2	51.6 $\pm$ 15.8	Independent t-test	T = 1.5, P = 0.11
<b>Gender</b>			Chi-square	P = 0.17
Male	24 (%42.1)	30(%52.6)		
Female	33 (%57.9)	27(%47.4)		
<b>Marital status</b>			Chi-square	P = 0.26
Single	7 (%12.3)	4(%7)		
Married	50 (%87.7)	53(%93)		
<b>Literacy</b>			Chi-square	P = 0.12
Under diploma	34 (%59.7)	42 (%73.7)		
University	23 (%40.3)	15 (%26.3)		

**Table 2.** Results of Repeated Measures ANOVA for Comparing the Anxiety Mean Between the Two Study Groups

Mean Score	Times of Intervention		Total		Time Effect	Group Effect	Interaction
	Before	After	Case	Control			
Anxiety	8.2 ± 4.5	6.8 ± 4.6	7.3 ± 4.5	7.3 ± 4.4	$F_{(df)} = 0.01$ (1,112) P: 0.928	$F_{(df)} = 8.86$ (1,112) P: 0.004*	$F_{(df)} = 6.82$ (1,112) P: 0.010*

The mean ± SD of anxiety was presented in the pre-post.

\*Significance level at 0.05.

**Table 3.** The Results of Comparison of Mean Score of Anxiety in Both Case and Control Groups Before and After Intervention

Group	Before Intervention Mean ± SD	After Intervention Mean ± SD
Control	9.2 ± 4.4	9.7 ± 4.4
Case	7.2 ± 4.5	6.7 ± 4.6
Type of test	Independent t-test	Independent t-test
Result	P = 0.02, t = 2.3	P = 0.001, t = 3.4

However, repeated measures ANOVA using data gleaned before the orientation tour as a covariate revealed that changes in the case group were significantly more significant, meaning that the case group experienced significantly less anxiety. We used a statistical test for controlling confounding variables, and reanalyzing the data showed that regardless of the significant difference between the two groups before the intervention, this difference was because of the intervention.

## DISCUSSION

Analysis of results showed the same distribution of demographics in both groups. The mean score of the patients' anxiety was more significant in the control group before the orientation tour compared to the case group. The Independent t-test suggested a significant difference in the patients' anxiety scores before intervention in both groups (Table 2). Also, the mean score of patients' anxiety after the orientation tour was greater in the control group compared to the case group indicating a statistically significant difference between the case and control groups (Table 2). Although the case and control groups showed a significant difference in anxiety before the intervention, the repeated measures ANOVA using data collected before intervention as covariate demonstrated that changes in the case group were significantly greater after intervention meaning that the case group experienced less anxiety. The results of this study are consistent with the findings by Shamsizadeh et al. (2013) and Hanifi (2012). The effect of orientation tour on anxiety in children before elective surgeries has also been assessed, showing reduced anxiety in the case group after orientation tour [14]. This indicates that the method can be used for different age groups and even for children. The effect of orienting patients with the process of cardiac surgery on anxiety in patients with coronary artery bypass graft (CABG) has also been investigated, showing that the mean score of anxiety decreased significantly in the case group after education and before wheeling into the operating room compared to before education [17] (P=0.001). This method is applicable in controlling anxiety in different diagnostic and therapeutic procedures. Of course, in some studies,

the researcher's attempts to find a way of decreasing anxiety in patients have remained futile. For example, Vanderboom et al. (2012) investigated in their study the effects of music therapy on anxiety, stress response, and the need for drugs in cerebrovascular angiography. They reported that music intervention exerted no benefit on diminishing anxiety in these patients [18].

Additionally, the study by Lee et al. (2016) conducted on the effects of information on anxiety, blood pressure, and heartbeat of cerebrovascular candidates in a hospital in Korea showed that verbal provision of information required for angiography to the case group had no beneficial effect on their anxiety [15]. Indeed, the strategy used determines the rate of patient's response to stress and the decrease in anxiety. The study by Ferreira et al. (2015) used some strategies to reduce anxiety in cardiac angiography candidates, including music therapy, educational film, and massage therapy. They made no mention of orientation tour or even information provision to patients to reduce anxiety in patients awaiting angiography [16]. The results of this study showed that the angiography room orientation tour is effective in diminishing anxiety in patients awaiting cerebrovascular angiography.

Limitations: In this study, if the patients were literate, they completed the questionnaire themselves; otherwise, it was completed by the help of the researcher and patient's attendant/companion; this can be a limitation for this study.

## Clinical Significance

Since the angiography room orientation tour is effective in reducing anxiety in patients awaiting cerebrovascular angiography, the use of this method is advisable for use in diagnostic and therapeutic procedures.

## CONCLUSIONS

This study investigated the effect of orientation tour on anxiety in patients awaiting cerebrovascular angiography in hospitals affiliated to Shahid Beheshti University of Medical Sciences in 2018. Data analysis with independent t-test showed a significant difference in patients' anxiety after participation in the angiography room orientation tour in both control and case groups. Also, repeated measures ANOVA using data gleaned before the orientation tour, as covariate suggested that

changes in the case group were significantly more significant, indicating that the case group experienced significantly less anxiety. Finally, our findings supported the research hypothesis indicating that the angiography room orientation tour before the angiography procedure reduced anxiety in patients awaiting cerebrovascular angiography.

#### Author Contributions

M.Z. and R. E. contributed to the design and supervise of the research. Z.K. implemented the research and wrote the manuscript. M. K. analyzed the results.

#### Founding/Support

This project is financially supported by Shahid Beheshti University of Medical Sciences.

#### Ethical Considerations

These included obtaining the required permission from Deputy-in-Research and Higher Education Center of School of Nursing and Midwifery, approval of study proposal by the Committee of Ethics in Human Research at Shahid Beheshti University of Medical

Sciences with code of ethics: IR.SBMU.PHNM.1396.907, obtaining introduction letter from the said university for presenting to the intended hospitals affiliated to this university, explanations on research goals and procedures to the participants, explanations on information anonymity and confidentiality concerning the checklists, obtaining informed written consent from each patient, voluntary participation, and the right to withdraw at any stage of the study.

#### Conflict of Interest

Conflict of Interest: There is no conflict of interest.

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