

Effects of Peer-Facilitated, Video-Based and Combined Peer-and-Video Education on Anxiety Among Patients Undergoing Coronary Angiography

Randomised controlled trial

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نتائج التعليم بمساعدة الأقران والفيديو والجمع بين التعليم بالأقران والفيديو على
القلق لدى المرضى الخاضعين لتصوير الأوعية التاجية
دراسة سريرية منضبطة

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ABSTRACT: Objectives: Coronary angiography can be stressful for patients and anxiety-caused physiological responses during the procedure increase the risk of dysrhythmia, coronary artery spasms and rupture. This study therefore aimed to investigate the effects of peer, video and combined peer-and-video training on anxiety among patients undergoing coronary angiography. **Methods:** This single-blinded randomised controlled clinical trial was conducted at two large educational hospitals in Iran between April and July 2016. A total of 120 adult patients undergoing coronary angiography were recruited. Using a block randomisation method, participants were assigned to one of four groups, with those in the control group receiving no training and those in the three intervention groups receiving either peer-facilitated training, video-based training or a combination of both. A Persian-language validated version of the State-Trait Anxiety Inventory was used to measure pre- and post-intervention anxiety. **Results:** There were no statistically significant differences in mean pre-intervention anxiety scores between the four groups ($F = 0.31$; $P = 0.81$). In contrast, there was a significant reduction in post-intervention anxiety among all three intervention groups compared to the control group ($F = 27.71$; $P < 0.01$); however, there was no significant difference in anxiety level in terms of the type of intervention used. **Conclusion:** Peer, video and combined peer-and-video education were equally effective in reducing angiography-related patient anxiety. Such techniques are recommended to reduce anxiety amongst patients undergoing coronary angiography in hospitals in Iran.

Keywords: Cardiac Imaging Techniques; Coronary Angiography; Anxiety; Patient Education; Iran.

المخلص: الهدف: تصوير الأوعية التاجية يمكن أن يكون مقلقا للمرضى وردود القلق الفسيولوجية أثناء التدخل قد يزيد من خطورة عدم انتظام ضربات القلب وتشنجات الشريان التاجي والتمزق. تهدف هذه الدراسة إلى التحقق من نتائج تثقيف الأقران والفيديو والجمع بينهما على القلق عند المرضى الذين سيخضعون لتصوير الأوعية التاجية. **الطريقة:** تم إجراء هذه الدراسة الطبية المنضبطة في مستشفيين تعليمين كبيرين في إيران من أبريل إلى أغسطس 2016. تم تجنيد مجموع 120 مريضا سيخضعون لعملية تصوير الأوعية التاجية. باستخدام طريقة الكتلة العشوائية، تم تعيين المشاركين إلى أحد الأربعة مجموعات، بحيث أن المشاركين في مجموعة التحكم لم يتلقوا أي تدريب وبقية الثلاثة مجموعات التداخلية تلقت إما مساعدة الأقران أو الفيديو أو كليهما. تم لاحقا استخدام نسخة محققة باللغة الفارسية من حالة قائمة سمة القلق لقياس مستوى القلق قبل وبعد التدخل. **النتائج:** لم يكن هناك أي فارق إحصائي معتد في متوسط نتائج القلق ما قبل التدخل بين الأربعة مجموعات ($F = 0.31$; $P = 0.81$). في المقابل، كان هناك انخفاض كبير في القلق بعد التدخل بين جميع مجموعات التدخل الثلاثة مقارنة مع مجموعة التحكم ($F = 27.71$; $P < 0.01$). إلا أنه لم يوجد فارق معتد لمستوى القلق من حيث نوعية التدخل المستخدم. **الخلاصة:** استخدام وسائل التدريس بالأقران والفيديو والجمع بينهما تعتبر وسائل فعالة في خفض مستويات القلق المرتبطة بتصوير الأوعية التاجية. هذه الوسائل يوصى بها لتخفيض مستوى القلق للمرضى الذين يخضعون لتصوير الأوعية التاجية في المستشفيات الإيرانية.

الكلمات المفتاحية: طرق التصوير القلبي؛ تصوير الأوعية التاجية؛ القلق؛ تثقيف المريض؛ إيران.

ADVANCES IN KNOWLEDGE

- The findings of this study indicate that either peer-facilitated training, video-based training or a combination of both may reduce the anxiety levels of patients undergoing coronary angiography.

APPLICATION TO PATIENT CARE

- Peer-facilitated, video-based or peer-and-video training is recommended to reduce anxiety among patients undergoing coronary angiography in Iranian hospitals.

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ANXIETY IS AN EMOTIONAL STATE WHEREBY an individual experiences feelings of uneasiness or apprehension in response to a perceived or actual threat. The subsequent activation of the autonomic nervous system can trigger various physical symptoms, including palpitations, tachycardia and chest pain.¹ Moreover, intense anxiety is associated with decreased immune response and changes in cardiovascular function, such as impaired heart rate, endothelial dysfunction and vascular inflammation, which may lead to a deterioration in a patient's coronary condition.² Previous research has shown that patients undergoing clinical or surgical procedures such as coronary angiography often experience high levels of anxiety.^{3,4} As such, methods to improve clinical outcomes and identify appropriate interventions to reduce patient anxiety are necessary.

For patients undergoing coronary angiography or similar procedures, a lack of knowledge regarding the procedure may be directly related to their anxiety levels; accordingly, the provision of necessary, detailed and accurate procedure-related information as well as a breakdown of the actions that must be taken before, during and after the procedure can help reduce stress and anxiety.⁴⁻⁷ Several studies have confirmed the effectiveness of providing information about the angiography process in reducing patient anxiety.^{8,9} However, further research is required to identify the most effective approach and time to prepare a patient and their family for the procedure.¹⁰ The use of an appropriate educational technique—such as educational leaflets or peer-facilitated or video-based training—may be effective in reducing patient anxiety.¹¹ Peer-facilitated training is based on the social learning theory that people learn from each other via observation, imitation and modelling; patients can therefore benefit from their peers' experiences in terms of learning to cope with their

illness or the planned investigation.¹² Video-based training may also reduce anxiety, stress and depression while a combination of both visual and auditory information is an effective tool to facilitate knowledge acquisition and retention, reduce anxiety, improve coping skills and increase self-care behaviours.^{13,14}

However, while the use of peer-facilitated and video-based patient education is well established worldwide, there is a lack of research on this topic in Iran. Moreover, although medical technologies have progressed rapidly, strategies focusing on health education, promotion and self-management are not yet widely implemented in Iranian hospitals. This study therefore sought to investigate the effects of peer-facilitated, video-based and combined peer-and-video training on anxiety among patients undergoing coronary angiography at two hospitals in Iran.

Methods

This randomised controlled trial was conducted among 120 patients undergoing coronary angiography at two large educational hospitals in Iran between April and July 2016. Patients were recruited from the Ayatollah Taleghani Hospital and Seyed-al-Shohada Hospital in Urmia. Only patients aged 18–80 years old with no prior history of angiography and no cognitive disorders or physical disabilities were included in the study. Patients were excluded if they underwent emergency angiography, were employed as a staff member at the hospital, were receiving intensive care or had been admitted to the cardiac care unit. The necessary sample size was calculated as a minimum of 23 participants per group at a confidence level and test power of 95%.¹⁵ Accounting for potential participant loss, 30 patients per group were subsequently recruited for a total of 120 patients [Figure 1].

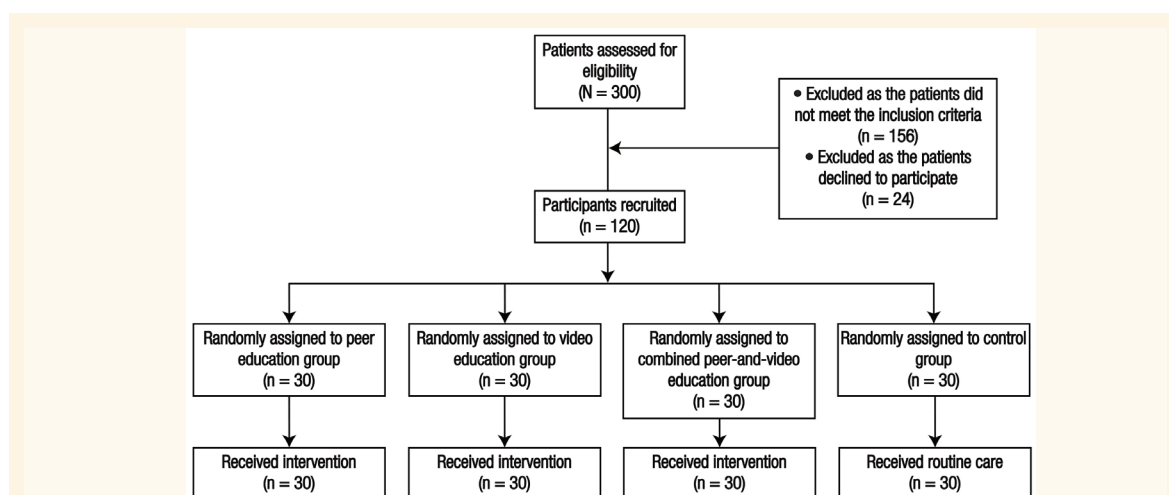


Figure 1: Diagram showing the clinical trial design used in the current study. Once randomly assigned to each group, none of the patients were lost to follow-up or excluded from the final analysis.

A single-blind clinical trial design was adopted with four parallel arms to examine the effects of peer-facilitated, video-based and combined peer-and-video training as an intervention to reduce anxiety levels in patients undergoing coronary angiography. Participants were randomly assigned to each group on a weekly basis to avoid interference between the groups. In the first week, the first group received peer-facilitated training, while the second group received video-based training the following week and the third group received combined peer-and-video training the week after that. In the fourth week, the control group received routine care. Recruitment continued until the required sample size was achieved. To avoid data contamination arising from patients discussing their experiences with each other and to minimise researcher bias, the recruitment and sampling process for each subsequent group occurred once all previous patients from the previous week had been discharged. Patients were randomly allocated to a group by a person uninvolved in the sampling and data collection process.

Each intervention took place in a quiet room with sufficient lighting and suitable seating on the evening before the angiography procedure. The first intervention group took part in a 30-minute peer-facilitated training session. Under the supervision of the researcher, two patients who had recently undergone angiography were asked to talk to between four and six of the participants about their feelings and experiences before, during and after the procedure. In the video-based intervention group, the participants watched a five-minute movie about what they should expect before, during, and after angiography and another 15-minute movie filmed within the actual operating room where the procedure would take place. Both movies were broadcast under the researcher's supervision during a 20-minute period. At the end of the intervention, the effectiveness of the film was evaluated during a brief question-answer session.

In the combined peer-and-video intervention group, all of the training steps described for the aforementioned groups were performed. As before, a 20-minute video-based training session took place; then, after a 15-minute break, a 30-minute peer-facilitated group session was carried out under the supervision of the researcher. Verbal feedback was again used to evaluate effectiveness of the training. For those in the control group, each participant received routine care which involved no education or preparation for the procedure from a health professional. Regardless of group, each patient was admitted to the hospital in advance of the procedure for surveillance purposes, including the monitoring of their vital signs, laboratory tests and an electrocardiogram. All participants

remained under the supervision of the researcher between the end of the intervention and the beginning of the procedure.

The State-Trait Anxiety Inventory (STAI) is a 20-item questionnaire tool designed to assess an individual's feelings at the time of assessment.¹⁶ A Persian-language version of the STAI questionnaire was used to measure patient anxiety both the day before the coronary angiography prior to the delivery of any training as well as 30 minutes before the patient was transferred to the operating room. Responses to the STAI questionnaire were self-assessed by participants and scored on a four-point Likert scale, with one indicating "not at all anxious", two indicating "sometimes anxious", three indicating "often anxious" and four indicating "frequently anxious." Total anxiety scores from 20–80 were calculated for each patient, with scores of 20–29, 30–49, 50–69 and 70–80 indicating mild, relatively mild, relatively severe and severe anxiety, respectively. The questionnaire had been previously validated in Iran with a Cronbach's alpha of 0.91.¹⁷ Demographic and clinical characteristics of the participants were also recorded, including age, gender, duration of disease, marital status, history of hospitalisation, education level and economic status. Economic status was classified as unfavourable (monthly income of <\$250 USD), partly favourable (monthly income of \$250–500 USD) or favourable (monthly income of >\$500 USD).

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 19.0 (IBM Corp., Armonk, New York, USA). The normality of the quantitative data was confirmed using a Kolmogorov-Smirnov test. A Chi-squared test and one-way analysis of variance was used to compare the sociodemographic and clinical characteristics of the groups, as appropriate. A Tukey's *post-hoc* test was employed for the pairwise comparison of post-intervention differences in anxiety scores between the groups. A *P* value of ≤ 0.05 was considered statistically significant.

Ethical approval for this study was obtained from the Committee of Ethics of the Urmia University of Medical Sciences, Urmia, Iran (#IR.umsu.rec.1395.21). This study was registered under the Iranian Registry of Clinical Trials (#2016072429052N1). Written informed consent was obtained from all participants prior to their inclusion in the study.

Results

Table 1 shows the sociodemographic characteristics of the participants according to group. There were no significant differences between the groups in terms of age, gender, marital status, duration of disease, history of

Table 1: Sociodemographic and clinical characteristics of adult patients undergoing coronary angiography at two large hospitals in Iran (N = 120)

Characteristic	n (%)				P value
	Peer intervention group	Video intervention group	Combined intervention group	Control group	
Age in years					
35–50	5 (17)	9 (30)	8 (27)	12 (40)	
51–65	18 (60)	17 (57)	15 (50)	14 (47)	0.51 [†]
66–80	7 (23)	4 (13)	7 (23)	4 (13)	
Mean ± SD	58.80 ± 8.57	56.07 ± 8.89	57.27 ± 9.32	54.30 ± 9.79	0.28*
Gender					
Male	16 (53)	16 (53)	15 (50)	17 (57)	
Female	14 (47)	14 (47)	15 (50)	13 (43)	0.96 [†]
Marital status					
Married	26 (87)	23 (77)	29 (97)	28 (93)	
Unmarried	4 (13)	7 (23)	1 (3)	2 (7)	0.11 [†]
Medical history					
Presence of chronic disease	17 (57)	17 (57)	13 (43)	13 (43)	0.77 [†]
Mean duration of disease in years ± SD	3.12 ± 2.47	3.21 ± 2.60	1.70 ± 1.67	2.60 ± 1.97	0.51*
History of hospitalisation	19 (63)	0 (0)	15 (50)	15 (50)	0.65 [†]
Mean number of hospital admissions ± SD	1.46 ± 1.17	2.45 ± 1.60	1.06 ± 0.90	0.99 ± 0.80	0.22*
Years of education					
9–11	24 (80)	24 (80)	20 (67)	22 (74)	
12	6 (20)	6 (20)	10 (33)	7 (23)	0.39 [†]
>13	0 (0)	0 (0)	0 (0)	1 (3)	
Economic status					
Unfavourable	17 (57)	20 (67)	17 (57)	18 (60)	
Partly favourable	9 (30)	7 (23)	10 (33)	9 (30)	0.98 [†]
Favourable	4 (13)	3 (10)	3 (10)	3 (10)	

SD = standard deviation.

*Calculated using a one-way analysis of variance. [†]Calculated using a Chi-squared test.

hospitalisation, presence of chronic disease and income or education levels; accordingly, all four groups were considered homogenous.

Mean pre-intervention anxiety scores were 41.40 ± 9.90, 41.80 ± 8.76, 39.96 ± 8.28 and 40.00 ± 9.98 for the peer education, video education, combined peer-and-video education and control groups, respectively, with no statistically significant difference between the groups ($P = 0.81$). However, mean post-intervention anxiety scores were 34.30 ± 7.21, 36.23 ± 7.29, 30.73 ± 5.56 and 42.86 ± 11.64, respectively, with a statistically significant difference between the intervention groups and the control group ($P < 0.01$). The mean difference

between pre- and post-intervention anxiety scores was -6.70 ± 4.39 , -5.53 ± 2.19 and -7.56 ± 6.45 for the peer education, video education and combined peer-and-video education groups, respectively, in contrast to the control group (5.85 ± 2.86 ; $P < 0.01$) [Table 2].

A pairwise comparison showed a statistically significant mean difference between pre- and post-intervention anxiety scores of participants undergoing peer-facilitated training group, video-based training or combined peer-and-video training in comparison to the control group; however, there was no significant difference in terms of the type of intervention used [Table 3].

Table 2: Anxiety scores* according to intervention group among adult patients undergoing coronary angiography at two large hospitals in Iran (N = 120)

	Mean anxiety score \pm SD				P value [†]
	Peer intervention group	Video intervention group	Combined intervention group	Control group	
Pre-intervention	41.40 \pm 9.90	41.80 \pm 8.76	39.96 \pm 8.28	40.00 \pm 9.98	0.81
Post-intervention	34.30 \pm 7.21	36.23 \pm 7.29	30.73 \pm 5.56	42.86 \pm 11.64	<0.01
Mean difference	-6.70 \pm 4.39	-5.53 \pm 2.19	-7.56 \pm 6.45	5.85 \pm 2.86	<0.01

SD = standard deviation.

*Anxiety levels were assessed using a validated version of the 20-item State-Trait Anxiety Inventory.^{16,17} [†]Calculated using a one-way analysis of variance.

Table 3: Comparison of anxiety scores* between intervention groups among adult patients undergoing coronary angiography at two large hospitals in Iran (N = 120)

Group B	Group A					
	Peer intervention group		Video intervention group		Combined intervention group	
	Difference [†]	P value [‡]	Difference [†]	P value [‡]	Difference [†]	P value [‡]
Video intervention group	-1.93	0.80	-	-	-	-
Combined intervention group	3.56	0.35	5.50	0.05	-	-
Control group	-8.56	<0.01	-6.63	0.01	-12.13	<0.01

*Anxiety levels were assessed using a validated version of the 20-item State-Trait Anxiety Inventory.^{16,17} [†]Mean difference in anxiety score in group A versus B for post-intervention comparisons. [‡]Calculated using Tukey's post hoc test.

Discussion

In the current study, peer-facilitated training, video-based training and combined peer-and-video training were all found to significantly reduce anxiety levels among patients undergoing coronary angiography in comparison to a control group. Lundén *et al.* similarly found that it was necessary to provide patients with comprehensive and accurate information reflecting the actual conditions of the angioplasty unit in order for patients to remain calm during and after an angioplasty procedure.¹⁸ Tame *et al.* also confirmed that written and verbal education was an effective approach to reducing preoperative anxiety.¹⁹ However, in another randomised controlled trial, Goodman *et al.* found that providing information alone had no significant effect on levels of anxiety among patients scheduled for a coronary artery bypass surgery.²⁰

In the present study, one of the interventions involved patients watching video footage taken in the surgical environment and an explanation of the actions taken before, during and after the procedure. Tou *et al.* also found a reduction in patients' anxiety levels following a video-based intervention.²¹ Previous studies have concluded that peer-facilitated training is similarly effective in reducing anxiety among patients who are candidates for coronary surgery or who have multiple sclerosis.^{9,22} Eslami *et al.* noted reduced mean stress scores among patients undergoing coronary angio-

graphy who participated in peer-facilitated education in comparison to a control group.²³ One explanation for the efficacy of this educational technique may be that patients trust and respect the views and experiences of individuals with similar conditions or undergoing similar medical procedures.

The use of a combined peer-and-video training has also been previously found to be effective in reducing patient anxiety; Moumeni *et al.* observed that supplementing video training sessions with an educational booklet led to reduced preoperative as well as post-intervention anxiety among patients undergoing coronary artery bypass grafting.²⁴ A similar study found that a combined education programme reduced anxiety among orthopaedic surgery candidates.²⁵ In addition, Mosavi *et al.* showed that anxiety and depression among open heart surgery patients were significantly reduced using face-to-face training combined with an educational booklet.²⁶

Overall, the results of the current study found no significant difference in post-intervention anxiety reduction between the three different interventions; in other words, peer-facilitated, video-based and combined peer-and-video training were all equally effective in reducing anxiety among patients undergoing angiography. This finding is consistent with the results of previous research.²⁷⁻²⁹ Najafi *et al.* reported no significant difference in terms of state and trait anxiety levels among echocardiography patients undergoing various

forms of training (booklets and face-to-face training).²⁷ Face-to-face, pamphlet and electronic training among patients with acute myocardial infarctions have similarly resulted in no statistically significant differences in anxiety levels according to the type of training received.^{28,29}

The current study is subject to certain limitations. As patients were hospitalised one day before the angiography procedure, the amount of time available for patients to take part in training or review information about the procedure was minimal. Hence, patients undergoing emergency angiography and those hospitalised on the day of the procedure were excluded as there was insufficient time to perform the pre-procedure training; furthermore, inconsistencies in the length of time between the training and the procedure might affect the generalisability of the findings. However, the anxiety levels of such patients should be determined and further studies should include these patients in the analysis.

Furthermore, in order to avoid data contamination and researcher bias, patients in the current study were recruited in staggered phases, with new participants recruited only after all those involved in the previous intervention had been discharged. However, physiological variations among patients were not investigated; thus, it is recommended that future studies include appropriate measurements to rule out the impact of clinical and haemodynamic parameters on anxiety. Moreover, prior knowledge of a coronary angiography procedure—for example, gleaned from the Internet or based on the experiences of friends or family members—may have influenced feelings of anxiety among the participants, regardless of intervention type. Future research should seek to determine baseline levels of knowledge of the procedure prior to ascertaining anxiety levels.

Conclusion

This study found that peer-facilitated, video-based and combined peer-and-video training were equally effective in reducing anxiety among patients undergoing coronary angiography in comparison to a control group. Such methods are therefore recommended and may be incorporated as part of routine pre-angiography clinical care in Iranian hospitals in order to reduce patient anxiety.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

This study was funded with the aid of a grant from the Urmia University of Medical Sciences (grant #IR.umsu.rec.1395.21).

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