Evaluating The Effectiveness of Nurse-Led Education on The Anxiety Level of Preoperative Candidates for Opening Vascular Access in Shariati Hospital

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Received: 2023-12-05; Received in revised form: 2023-12-13; Accepted: 2024-01-09

Abstract

Background: Every year, many patients with Chronic Kidney Disease (CKD) undergo surgeries to provide suitable vessel access for hemodialysis. These surgeries cause significant anxiety in these patients. Therefore, this study was conducted to examine the effectiveness of nurse-led training on reducing the level of anxiety experienced by these patients.

Methods: 38 patients were randomly selected from the candidates for vascular access opening at Shariati Hospital, Tehran, Iran. They were divided equally into two groups: cases and controls. The anxiety level was measured in both groups using the Spielberger State-Trait Anxiety Inventory at baseline. After 30 minutes of personalized training, the anxiety level was reevaluated in the cases and statistically compared with the anxiety level before the intervention using a paired t-test.

Results: The mean baseline anxiety level was 40.94 in the cases and 40.42 in the controls. These numbers changed to 34.78 in the cases and 40.05 in the controls after the training intervention. Statistical comparison revealed a significant decrease in the case group ($p = 0.048$), while the observed difference was statistically insignificant in the controls ($p = 0.788$).

Conclusions: Providing an appropriate personalized nurse-led educational package can significantly reduce the anxiety level in preoperative candidates for vascular access opening in kidney failure cases. Further studies are required to better develop the content of this training and also to determine whether a gap between the training and surgery is required to increase effectiveness.

Citation: Molavi B., Molavi R., Yaghoobi Notash A. **Evaluating The Effectiveness of Nurse-Led Education on The Anxiety Level of Preoperative Candidates for Opening Vascular Access in Shariati Hospital.** *Acad J Surg*, 2024; 7(1): 6-9.

Keywords: Anxiety, Preoperative Training, Permcath, Venous Arterial Fistula

Introduction

Hemodialysis is the ultimate treatment for patients with kidney failure [1]. The greatest challenge for efficient hemodialysis is appropriate vascular access, which is commonly provided by either a native arteriovenous fistula, an arteriovenous graft, or a central venous catheter [2]. The necessity of this surgical procedure, which requires immediate action and presence in the operating room, causes significant anxiety in the candidates [3].

Many physicians approach drug administration to address this heightened anxiety and facilitate the procedure [4]. However, the potential complications of the administered sedatives and analgesics [5] and potential contraindications for kidney failure patients [6] present many challenges with this approach.

Moreover, recent works inquiring into patients' perspectives on this issue suggest multifactorial causes of their experienced anxiety, mainly consisting of heightened vulnerability and fear of confronting decisions and consequences [7]. These can all be addressed more appropriately by providing personalized information and training. Therefore, this study was designed to evaluate the effectiveness of nurse-led training in reducing the anxiety rate in these patients.

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Materials and methods

This study was conducted as an interventional randomized controlled trial with a pre-test and post-test design. Cases were selected from the candidates for permcath or arteriovenous fistula insertion surgery at Shariati Hospital, Tehran, Iran, who gave their written informed consents for enrollment in the study and met the following criteria: (a) aged between 18 to 70 years, (b) were fully oriented to time and place. The enrollment was voluntary, and those with hemodynamically unstable conditions, coagulopathy, and intubated cases were excluded.

Thirty-eight patients were found eligible for inclusion in the study, who were equally divided into two groups of cases and controls. After obtaining the demographic data from all the participants, including age, sex, weight, marital status, past surgical history, and lastly, the initial diagnosis necessitating the permcath or arteriovenous insertion surgery, the Spielberger state-trait anxiety inventory [8] was acquired from both cases and controls. This questionnaire consists of 20 multiple-choice questions that are a valid and reliable momentary anxiety evaluation tool [9]. The validity and reliability of this questionnaire were approved in a former study [10]. This questionnaire categorized the anxiety level into three groups of mild anxiety (20-40 scores), moderate anxiety (40-60 scores), and severe anxiety (60-80 scores).

After measuring the initial anxiety rate, both in-person and video-based education were provided to the case group, along with an educational pamphlet. The training lasted for 30 minutes, and after the training, all the patients' questions were adequately answered. Subsequently, the Spielberger state-trait anxiety inventory was obtained again, and the mean scores were calculated for both cases and controls. Basic information was also provided to the controls regarding the procedure. To reduce confounders, the same nurse educator and surgeon were involved for all the cases and controls. Analysis of variance (ANOVA) and paired t-test statistical tests were applied to statistically analyze the results using SPSS version 25 for Windows.

Results

The mean age of all 38 participants in this study was 57.34. The male-to-female ratio was 20 to 18. Also, 28 candidates underwent permcath insertion, while nine went for arteriovenous fistula, and one underwent both surgeries. Patients' education levels were assessed and categorized as undergraduates, diploma, or higher. Regarding the vascular access records for hemodialysis, in the case group, eight had a history of fistula implantation, while five patients had a history of Shaldon implantation, and seven cases had a history of permcath implantation. In the control group, these numbers were 7, 5, and 8, respectively. The distribution of the demographic features is illustrated in Table 1.

The mean baseline anxiety scores were 42.45 in females compared to 38.72 in males. This difference was statistically insignificant.

The statistical comparison between the preoperative anxiety levels with the education level using independent samples t-test yielded

Table 1: The demographic features and distribution of cases

Demographic Feature		Count (%)
Mean Age ± SD	57.34 ± 15.209	
Gender	Male	18 (47.4%)
	Female	20 (52.6%)
Education Level	Undergraduate	14 (36.8%)
	Diploma	5 (13.2%)
	Higher	1 (2.6%)
Type of Intervention	Permcath	28 (73.7%)
	Fistula	9 (23.7%)
	Both	1 (2.6%)
Total	38	

Table 2: The correlation analysis results regarding the Spielberger state-trait anxiety inventory scores before and after training

	Anxiety Score Before Training	Anxiety Score After Training	P-value
Cases	40.94	34.78	0.048
Controls	40.92	40.05	0.778

insignificantly. The anxiety scores were 40.94 in the illiterate group and 40.45 in the other groups.

Regarding heart rate and blood pressure, there was no statistically significant change in the comparison of these numbers in each of the case and control groups, which was controlled once after the study and once before the operation.

Paired samples t-test was applied to statistically investigate the alterations of the anxiety rate before and after the intervention in the case group. The baseline anxiety rate was 40.94 in cases compared to 40.92 in the controls, which were altered to 34.78 and 40.05 in cases and controls, respectively, after the intervention. The reduction in the anxiety level in the cases was statistically significant ($p = 0.048$) (Table 2).

Discussion

This study was conducted with the aim to evaluate the effectiveness of a novel personalized training package presented by the nursing staff on the anxiety level in patients who are candidates for opening vascular access procedure.

The relatively high mean age in our study was congruent with former works, which is justifiable due to the most prone age range for End-Stage Renal Disease (ESRD) [11]. Therefore, the commonly higher anxiety rate in older people [12] and considering the fact that greater anxiety is associated with higher dissatisfaction with various aspects of healthcare in patients [13], emphasizes the significance of our research and the necessity of developing these training packages to reduce the anxiety rate in our patients.

The reduction in anxiety was significant in the rate of stress reduction after the educational intervention in the intervention group, but no significant decrease was observed in the control group. This finding aligns with previous studies that addressed the effect of structured preoperative nurse counseling in reducing the anxiety rate of patients who are candidates for other surgeries [14]. Notably, the significant role of educational multimedia was confirmed in previous works [15]. However, one study suggested the ineffectiveness of nurse training in reducing the anxiety levels of open cardiac surgery [16]. This finding might be attributed to the content of the training. Further research is required to better elaborate on the sufficiency and comprehensiveness of the educational content in reducing the anxiety rate.

Overall, our research, in agreement with previous studies, suggests that since the majority of preoperative anxiety can be attributed to the fear of the unknown and lack of information [17], developing these personalized training packages is remarkably effective in reducing the experienced anxiety in preoperative cases. Also, it has been indicated that a 3-5 days gap between the training and the surgery is crucial so that the patients would be capable of appropriately applying the training [16]. Further research is required, however, to elaborate on this potentially required gap.

Conclusion

The stressfulness of preoperative conditions for patients can lead to significant anxiety levels. This high level of anxiety might lead to numerous consequences, including prolonged hospitalization and the administration of higher doses of sedatives and analgesics.

The authors' results indicate that nurse-assisted personalized training prior to providing vascular access-related surgeries can significantly reduce the anxiety experienced by these patients. Due to the aforementioned consequences of this experienced anxiety, these interventions are of great importance. Future studies are also required to better elaborate on the content of these trainings and determine whether a gap between the training and the procedures is required to increase effectiveness.

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