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Anxiety evaluation in Nepalese adult patients awaiting cardiac surgery

A prospective observational study

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Abstract

Perioperative anxiety could negatively affect surgery outcomes, and cardiac diseases have long been known to be an independent risk factor for anxiety development. However, little is known about preoperative anxiety in Nepalese adult cardiac patients waiting for surgery. The primary objectives of this study were to: (1) clarify the levels of preoperative anxiety in Nepalese adult cardiac patients waiting for open heart surgery; (2) identify factors associated with preoperative anxiety; and (3) evaluate any possible factors associated with patients' desire to obtain information related to their heart surgery.

This is a prospective observational study for patients already scheduled for cardiac surgery at a core medical institution in Kathmandu, Nepal. We collected sociodemographic and clinical characteristics of the patients from their medical charts, and assessed their preoperative anxiety using the Amsterdam Preoperative Anxiety and Information Scale. We performed descriptive analyses of the collected data. Further, we employed regression models to assess to the objectives of the study.

In total, 140 patients participated, and data of 123 (87.9%) were used for analysis. 58.5% of the participants had preoperative anxiety. Female gender (OR 0.31, 95% CI 0.15–0.65, $P < .001$) and past anesthesia exposure (OR 2.38, 95% CI 1.01–5.62, $P < .05$) were identified as risk factors for developing anxiety before cardiac surgery. Further, female gender (IRR 0.80, 95% CI 0.67–0.94, $P < .001$), higher education levels (IRR 1.18, 95% CI 1.01–1.40, $P < .05$), and higher preoperative anxiety (IRR 1.44, 95% CI 1.21–1.73, $P < .001$) could lead to higher levels of desire to acquire information related to the procedure.

The study concluded that more than a half of the cardiac surgery patients experiences preoperative anxiety; female gender and having past anesthesia exposure are the risk factors. Anxious patients have more desire to acquire knowledge about the procedure. Thus, the evaluation and adequate management of preoperative anxiety should be proposed in high-risk groups.

Abbreviations: APAIS = The Amsterdam Preoperative Anxiety and Information Scale, CABG = coronary artery bypass graft, MCVTC = Manmohan Cardiothoracic Vascular and Transplant Center, STAI = The State-Trait Anxiety Inventory.

Keywords: cardiac surgery, Nepal, preoperative anxiety, prevalence

1. Introduction

Anxiety is a psychological and physiological state characterized by somatic, emotional, cognitive, and behavioral factors. It is defined as an unpleasant feeling of fear and concern and is commonly found among patients in need of or about to undergo surgical procedures. Deepening the surgical correlations, anxiety may provoke several hindrances to all surgical processes: during the perioperative period, it can disrupt anesthetic induction or hinder patient recovery; during the postoperative period, it can increase pain, increase demand for analgesic consumption,

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This study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a priori approval by the Institution Review Board of the Institute of Medicine, Tribhuvan University (279(6-11-E)/079/070). Suspecting that the high prevalence of preoperative anxiety in the participants, we continued the use of anxiolytic for the study as per the hospital guidelines (Tablet of diazepam 5mg at 10 pm on the day before the surgery).

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prolong hospital recovery stay, decrease overall patient satisfaction,[1] and increase readmission rates.[2] Perioperative anxiety has been reported to be affected by various factors, including socio-demographic characteristics (age, gender, socioeconomic status, education level, marital status, mental diseases, past anesthesia exposure) and clinical factors (type and complexity of surgery, chronicity of disease, and nature of procedure).[3–5] Also, it was shown that perioperative anxiety can be ameliorated by providing preoperative education to the patients,[6] adequate provision of information before the procedure,[7] and anxiolytic medicines.

In terms of preoperative anxiety, it was found that it differs with type and nature of surgeries, and cardiac surgery is one of the most important domains in the realm of preoperative anxiety studies as cardiovascular disease alone is reported to be an independent risk factor for the development of anxiety.[8] As an example, it may provoke detrimental effects during the perioperative period of a cardiac surgery such as hemodynamic fluctuations,[8] high morbidity, and high-readmission rates.[2] The preoperative anxiety prevalence rates in cardiac surgery patients in developing countries can go as high as 84%.[9] However, its prevalence is not uniform among different population groups around the world.[10–14] Moreover, little information is available regarding preoperative anxiety in cardiac surgeries within many developing countries.[9,11–13] For this reason, the study of preoperative anxiety in cardiac patients – which can alter the perioperative outcomes of such patients – is required in developing countries like Nepal; and, as far as our knowledge goes, this type of study has yet to be conducted within this country.

Globally, the history of cardiac surgeries started back in the 1960s, but in Nepal open heart surgeries were started to be performed regularly in the 1990s,[15] and the majority of such surgeries are still performed in its capital city (Kathmandu). Particularly, the Manmohan Cardiothoracic Vascular and Transplant Center (MCVTC), a university hospital dedicated to cardiothoracic and vascular patients located in Kathmandu, Nepal, is one of the largest cardiac centers in the city, where around 600 cardiac surgeries are carried out annually.[15] People from all over the country come to the center to get services for their heart problems. Thus, the patients in the hospital may represent the demographic and clinical characteristics of all Nepalese patients with heart diseases.

The geopolitical situation, cultural diversity, needs, available resources, educational level, socioeconomic status, availability of healthcare facilities, and beliefs towards the healthcare system of Nepalese people are quite different from those of people around the world. Particularly, cardiac surgery poses significant challenges to Nepalese patients, given that this may become a financial burden to patients' families and a social stigma related to cardiac diseases may affect patients negatively.[16] Thus, this study hypothesized that the anxiety prevalence among Nepalese people during the preoperative cardiac surgery period would be high, and that the factors associated with anxiety would be different from those reported in the existing literature.

Based on this information, this study had three objectives:

(1) to clarify the levels of preoperative anxiety in Nepalese adult cardiac patients waiting for open heart surgery (expected to be high);
(2) to identify factors associated with preoperative anxiety; and
(3) to evaluate any possible association between preoperative anxiety and patients' desire to obtain information related to their heart surgery.

2. Material and methods

2.1. Setting and patients

This was a prospective observational study conducted at the preoperative holding area on the surgery ward of the MCVTC. This study was carried out between April 2016 and March 2017 (1 year). All the adult cardiac patients, who were scheduled for the cardiac surgery during the study period, were approached to participate in the study (non-probability sampling). In total, 140 patients enrolled, and the inclusion criteria were being 16 years or older, scheduled for cardiac surgery, and able to independently answer the Amsterdam Preoperative Anxiety and Information Scale (APAIS) questionnaire written in Nepalese.

First, the principal investigator separately explained the overview and aims of the study to each patient, and then written consent was obtained from each patient who voluntarily agreed to take part in this research. Patients who did not wish to take part in the study, who were incapable of providing written consent, or who could not respond to investigators' queries due to any reason, were excluded. One day prior to the surgery (as patients were already electively scheduled to undergo surgery), within the patient's room, the principal investigator provided patients with explanations related to the questionnaire and its application, so as to avoid any confusion or doubts related to the questionnaire. On the next day, before being taken to the operating room, patients responded to the questionnaire independently. Patients who were incapable of reading and writing received assistance from the principal investigator to fill in the questionnaire. As per the hospital guidelines, all patients received a tablet of diazepam 5 mg at 10 pm on the day before the surgery.

With regard to the response rate, 12 patients did not understand the questionnaire in Nepalese, three patients had an intellectual disability and two patients were aphasic. These 17 patients were excluded from the study. In total, 123 patients (87.9%) were included in the statistical analyses.

2.2. Data collection

According to the previous literature,[3–5,12,17] we considered various factors that may influence anxiety during the perioperative period. The questionnaire consisted of socio-demographic characteristics (sex, age, socioeconomic status, educational level, marital status), past medical conditions (past mental/nervous disease, past anesthesia exposure), and type of surgery (valvular, coronary artery bypass grafting [CABG], congenital, combined [valvular surgery and CABG]). We extracted these factors from the medical chart. Socioeconomic status was stratified using the revised Kuppuswamy scale.[18] Then, we asked the participants to respond to the questionnaire with regard to their anxiety levels based on the APAIS independently. The APAIS (Table 1) was developed to measure anxiety levels (Cronbach alpha 0.86) and to provide information about anesthesia and surgery (Cronbach alpha 0.72) in preoperative patients,[19] and is a validated tool available in different languages, like Tamil, Sri Lankan, and Nepali (Table 1).[20,3]

2.3. Data analysis

We conducted a descriptive analysis of the socio-demographic characteristics and the APAIS score. We calculated the proportion for categorical variables and median for continuous variables. With regard to the APAIS score, we calculated the

Table 1

The Amsterdam Preoperative Anxiety and Information Scale (APAIS).

1. I am worried about the anesthetic.
2. The anesthetic is on my mind continually.
3. I would like to know as much as possible about the anesthetic.
4. I am worried about the procedure.
5. The procedure is on my mind continually.
6. I would like to know as much as possible about the procedure.

Answers were graded in a 5-point Likert scale, from 1 = not at all to 5 = extremely.

median and interquartile range for each item and its subscales, as follows: anesthesia-related anxiety (Sum A = items 1 +2, range 2–10; surgery-related anxiety (Sum S) = items 4 +5, range 2–10; combined anxiety (Sum C) = 1 + 2 + 4 + 5, range 4–20; information desire (Sum I) = items 3 + 6, range 2–10. Analysis of the relationship between the APAIS scales with the State-Trait Anxiety Inventory (STAI)[21] showed a correlation of 0.74 between the APAIS and the STAI.[19]

To clarify the characteristics of patients with anxiety, we conducted an exploratory analysis. We constructed a logistic regression model for the variable "combined anxiety." We used a Combined anxiety score of 10 as a cut-off value for the presence of anxiety, following a methodological approach from a previous studies.[3,19] As covariates, we considered all socio-demographic characteristics, using the backward stepwise variable selection method ($P < .1$). The covariates with a small number of participants were re-grouped when necessary.

To clarify the characteristics of patients who desired to obtain information related to their heart surgery, we conducted exploratory analysis once again. We constructed a Poisson regression model for the variable "information desire," using this variable as a count data. We chose this model given the score distribution of this subscale. As covariates, we considered all socio-demographic factors and the combined anxiety score, using the backward stepwise variable selection method ($P < .1$). All analyses were performed using Stata/IC version 15.0 and Excel.

2.4. Ethics statement

This study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a priori approval by the Institution Review Board of the Institute of Medicine, Tribhuvan University (279(6-11-E)/079/070).

3. Results

Participants' socio-demographic characteristics are presented in Table 2. There were 62 (50.4%) female and 61 (49.6%) male participants. The participants' median age was 44 years (IQR 33–56). There were 39 (31.7%) participants in the very low and low socioeconomic status groups, 43 (35%) were in the middle and 41 (33.3%) were in high or very high socioeconomic status group. There were 37 (30.1%) respondents who did not complete high school and 85 (69.1%) had a high school diploma or higher level of education and a data was missing for one patient. Approximately one-half of participants (n = 65; 52.9%) underwent valvular heart surgery, while remaining underwent other type of cardiac surgeries. There were 88 (71.5%) participants without past anesthesia exposure, and 109 (88.6%) without past mental/nervous disease.

Table 2

Participants' characteristics (N = 123).

Variable	Number (%)
Sex	
Male	61 (49.6)
Female	62 (50.4)
Age (years)	
Median (interquartile range)	44 (33–56)
Socioeconomic status	
Very low	11 (8.9)
Low	28 (22.8)
Middle	43 (35.0)
High	28 (22.8)
Very high	13 (10.6)
Educational level	
Illiterate	37 (30.1)
High school	33 (26.8)
University	36 (29.3)
Master's or above	16 (13.0)
Missing	1 (0.8)
Marital status	
Married	95 (77.2)
Single	15 (12.2)
Widow	13 (10.6)
Type of surgery	
Valvular	65 (52.9)
CABG	32 (26.0)
Congenital	21 (17.1)
Combined	5 (4.1)
Past mental/nervous disease	
Yes	14 (11.4)
No	109 (88.6)
Past anesthesia exposure	
Yes	35 (28.5)
No	88 (71.5)

CABG = coronary artery bypass graft.

Table 3 presents participants' median scores on the APAIS and its subscales. The median of participants' total anxiety score was 11 (IQR 8–13), and the median of the information desire score was 3 (IQR 2–4). According to the APAIS scale score, 72 (58.5%) participants were categorized as having preoperative anxiety (combined anxiety scale on APAIS > 10) (Supplementary Material 1, http://links.lww.com/MD/D885).

Table 4 shows the results of the univariate and multivariate logistic regression analyses for participants' combined anxiety score. The univariate analyses showed that male participants had a lower risk of having anxiety compared to females (OR 0.31, 95% CI 0.15–0.65, $P < .05$); that middle socioeconomic status participants had a lower risk of having anxiety compared to those with very low and low socioeconomic status (OR 0.34, 95% CI 0.14–0.83, $P < .05$); and those with past mental/nervous diseases had a higher risk of having anxiety compared to those without past mental/nervous diseases (OR 4.49, 95% CI 1.19–17.00, $P < .05$).

After the adjustment of covariates, it was found that male participants had a lower risk of having anxiety compared to females (OR 0.25, 95% CI 0.11–0.57, $P < .001$), and those with past anesthesia exposure had a higher risk of having anxiety compared to those without past anesthesia exposure (OR 2.38, 95% CI 1.01–5.62, $P < .05$).

Table 3

Participants' median on the APAIS and subscales scores.

	Median (interquartile range)
1. I am worried about the anesthetic.	3 (2–3)
2. The anesthetic is on my mind continually.	3 (1–3)
3. I would like to know as much as possible about the anesthetic.	2 (1–3)
4. I am worried about the procedure.	3 (2–3)
5. The procedure is on my mind continually.	3 (2–3)
6. I would like to know as much as possible about the procedure.	1 (1–3)
Anesthesia-related anxiety (1 + 2).	6 (4–7)
Surgery-related anxiety (4 + 5).	6 (4–7)
Combined anxiety (1 + 2 + 4 + 5).	11 (8–13)
Information desire (3 + 6).	3 (2–4)

APAIS = The Amsterdam Preoperative Anxiety and Information Scale.

Univariate analysis of the Poisson regression model (Table 5) showed that the incidence rate ratio (IRR) on the information desire score was lower in male participants compared to females (IRR 0.74, 95% CI 0.62–0.88, $P < .05$), and higher in participants with past mental/nervous diseases compared to those without past mental/nervous diseases (IRR 1.31, 95% CI 1.04–1.66, $P < .05$). Further, it was higher among participants with higher combined anxiety scores compared to those with lower scores (IRR 1.53, 95% CI 1.29–1.82, $P < .001$).

Table 4

Univariate and multivariate logistic regression analysis for participants' combined anxiety score.

	Univariate analysis Unadjusted OR (95% CI)	Multivariate analysis (N = 122) Adjusted OR (95% CI)
Sex		
Female	Ref.	Ref.
Male	0.31 (0.15–0.65)**	0.25 (0.11–0.57)***
Age	1.01 (0.98–1.03)	
Socioeconomic status		
Low	Ref.	
Middle	0.34 (0.14–0.83)**	
High	0.89 (0.37–2.16)	
Educational level		
Illiterate	Ref.	Ref.
Educated	1.06 (0.52–2.17)	1.42 (0.64–3.17)
Marital status		
Not married	Ref.	
Married	0.94 (0.40–2.18)	
Type of surgery		
Valvular	Ref.	
CABG	0.86 (0.37–1.20)	
Congenital	0.73 (0.27–1.96)	
Combine	1.45 (0.23–9.29)	
Past mental/nervous disease		
No	Ref.	
Yes	4.49 (1.19–17.00)**	
Past anesthesia exposure		
No	Ref.	Ref.
Yes	2.23 (1.00–4.98)*	2.38 (1.01–5.62)**

CABG = coronary artery bypass graft, CI = confidence interval, N = number, OR = odd ratio, Ref. = reference.
* $P < .1.$<***>
** $P < .05.$
*** $P < .001.$

Table 5

Univariate and multivariate Poisson regression model for participants' information desire score.

	Univariate analysis Unadjusted IRR (95% CI)	Multivariate analysis (N = 122) Adjusted IRR (95% CI)
Sex		
Female	Ref.	Ref.
Male	0.74 (0.62–0.88)**	0.80 (0.67–0.94)***
Age	1.00 (0.99–1.00)	
Socioeconomic status		
Low	Ref.	
Middle	1.00 (0.80–1.26)	
High	1.05 (0.80–1.26)	
Educational level		
Illiterate	Ref.	Ref.
Educated	1.12 (0.93–1.37)	1.18 (1.01–1.40)**
Marital status		
Not married	Ref.	
Married	0.80 (0.63–1.01)*	
Type of surgery		
Valvular	Ref.	
CABG	1.02 (0.82–1.27)	
Congenital	1.04 (0.77–1.41)	
Combine	0.77 (0.55–1.07)	
Past mental/nervous disease		
No	Ref.	
Yes	1.31 (1.04–1.66)**	
Past anesthesia		
No	Ref.	
Yes	1.01 (0.82–1.25)	
Combined anxiety score		
Lower anxiety	Ref.	Ref.
Higher anxiety	1.53 (1.29–1.82)***	1.44 (1.21–1.73)***

CABG = coronary artery bypass graft, CI = confidence interval, IRR = incidence rate ratio, N = number, OR = odd ratio, Ref. = reference.
* $P < .1.$
** $P < .05.$
*** $P < .001.$

After the adjustment of covariates, it was found that male participants had lower IRR on the information desire score compared to females (IRR 0.80, 95% CI 0.67–0.94, $P < .001$), and the IRR was higher in educated participants than in patients who had not completed high school (IRR 1.18, 95% CI 1.01–1.40, $P < .05$). Further, participants with higher combined anxiety scores had higher IRR on the information desire scores compared to those with lower scores (IRR 1.44, 95% CI 1.21–1.73, $P < .001$).

4. Discussion

In the present study, more than half of the participants experienced preoperative anxiety. Anxiety was more prevalent in females and participants with a past history of anesthesia exposure and mental/nervous disease. Participants with higher anxiety levels had a greater desire for information related to their heart surgery. Information desire was also higher in more educated participants.

In this study, the overall preoperative anxiety prevalence rate was 58.5%. The proportions of patients with anxiety reported in previous studies are diverse, but are generally higher than those in our study. For example, studies conducted in Ethiopia (61%)[13] and Pakistan[22] (for non-cardiac patients) (62%) reported

slightly higher proportions of patients with preoperative anxiety, though they used similar measures to assess preoperative anxiety. However, other three studies reported much higher preoperative anxiety: one conducted with cardiac patients in India (84%),[9] and two studies with non-cardiac patients in Sri Lanka (76.6%)[23] and Nigeria (90%).[24] The possible reasons for the relatively low prevalence of anxiety in our study are: first, all patients in our study had taken anxiolytics (Diazepam tablets) before completing the questionnaire; and second, the existence of strong family and community support within the Nepalese population, which lead to decreased anxiety levels among participants. In contrast, however, the results of this study indicated that preoperative anxiety prevalence rates were higher than that of two studies using different measurement tools: one with cardiac patients in Poland (48%), and the other with non-cardiac patients in Austria (45.3%).[10,25] The anxiety measurement tool we used was a subjective one, while the study done in Austria[25] used both subjective (questionnaire) and objective tools (biofeedback measurement and cortisol levels). The sensitivity and specificity of objective tools are supposed to be higher than that of subjective tools. The methodical difference in the measurement of anxiety could be one of the reasons for high-anxiety level observed in our participants.

Further, we believe the discrepancy in the preoperative anxiety prevalence rates between affluent and less affluent countries might be due to differences in participants' socioeconomic status, educational level and level of understanding, healthcare systems, and healthcare information. In our study, 83 (66.7%) participants had middle or low-socioeconomic status, and 70 (56.9%) had a high school education or less. These factors were associated with higher preoperative anxiety in both univariate and multivariate analyses. In Nepal, 81% of the population live in rural areas, where basic healthcare standards are still under development.[26] In that regard, the majority of the participants in this study belonged to that group and, unsurprisingly, it was the first time that many patients may have come to Kathmandu, and they came only to receive their surgery. Thus, we believe that the unfamiliar environment of the capital city and the atmosphere of the hospital – to which they were not accustomed – might have played a role in increasing their anxiety levels. In addition, it has been found that the intensity of anxiety is further increased in patients with unexpected prolonged hospital stays because of deteriorating health conditions or complications of surgery.[10]

In this study, female participants were more likely to experience higher anxiety levels than males. In corroboration of this finding, studies performed with cardiac patients in the USA,[14] Iran,[11] and Taiwan[12] also reported higher anxiety levels in female patients. We believe that this may be due to physiological reasons: female patients usually show hormonal fluctuations (in estrogen and progesterone) during stressful situations, and that may make female patients more susceptible to developing higher levels of anxiety. Additionally, it has been shown that women usually develop anxiety more easily than men, and also experience a higher fear of separation from their family.[13]

With regard to other patient characteristics, past anesthesia exposure and past mental/nervous disease were found to be positively correlated with anxiety levels. We believe that participants' fear of experiencing negative situations – much like what they have already experienced in their past – like surgical pain, postoperative nausea and vomiting, and surgery postponement,[27] may have made them more anxious. Furthermore, previous studies have shown that fear of surgery complications,[13] separation from their families, financial loss, and fear of death can lead to high-anxiety levels.[28] However, prior studies have not found associations between the specific characteristics assessed in our study (past mental/nervous disease and past anesthesia exposure) and anxiety.[22,23] Thus, the results of our study suggest that further research is required to confirm the accuracy of these findings within Nepalese cardiac surgery patients.

Our study did not find an association between age and the presence of anxiety. Previous studies, however, have reported mixed findings regarding an association between anxiety and age. A single center study done with Turkish preoperative patients[29] showed that younger patients tended to have more anxiety while, on the other hand, one study[30] found that older people are more likely to experience anxiety and depression. As we did not find a relationship between age and anxiety, further studies with larger samples are needed to clarify this relationship in Nepalese preoperative patients.

Our results also indicated that participants with higher anxiety levels also had a greater interest in receiving information related to their surgical procedure. In that regard, one previous study classified people according to how they cope with stress, and two groups were proposed: the monitors, who want to know as much information as possible; and the bunters, who want to avoid as much information as possible.[31] Further, inadequate information provided to monitors has been shown to increase their anxiety levels, and detailed information provided to bunters also had the same effect.[20] Based on this classification, we believe that participants who had past mental/nervous disease, past anesthesia exposure, and were educated might have behaved as monitors. Thus, it may be inferred that detailed and precise information regarding the procedure must be provided to anxious patients with these characteristics before the surgery, so as to prevent the development of compensatory mechanisms such as preoperative anxiety.

4.1. Limitations

This study had several limitations. First, the participants with less education required help from the investigator to complete the questionnaire, which was supposed to be filled out by the patients themselves, and this might have been a source of bias to their responses. Future studies should try different methodological approaches that avoid these situations. Second, this was a study performed within a single center in Nepal. Future studies should utilize sample groups from different locations and hospitals within Nepal. Third, in the present study anxiety levels were measured at a single instance, but during the course of study we felt that if we had measured anxiety at multiple instances preoperatively and also extended the measurement to the postoperative period, it would have increased the clinical relevance of the study. Further, anxiety is also prevalent in the pediatrics population equally or even more so than adults. We did not include pediatric patients in the study due to the nature of the measurement tool. We suggest that further study should target a pediatric population using an appropriate measurement tool.

5. Conclusion

This study demonstrated that more than a half of the participant presents preoperative anxiety and, like most countries around the

world, female patients are prone to have preoperative anxiety. Similarly, history of past anesthesia exposure is identified as a risk factor for preoperative anxiety. However, adequate information is required to anxious patients with specific sociodemographic characteristics – female gender as well as educated participants – before the procedure, which may decrease preoperative anxiety. The preoperative evaluation of anxiety and its proper management in high-risk groups should be incorporated in the management protocol, so as to improve the quality care of cardiac surgery patients.

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References

[1] Maranets I, Kain ZN. Preoperative anxiety and intraoperative anesthetic requirements. Anesth Analg 1999;89:1346–51. doi: 10.1097/00000539-199912000-00003.
[2] Tully PJ, Baker RA, Turnbull D, et al. The role of depression and anxiety symptoms in hospital readmissions after cardiac surgery. J Behav Med 2008;31:281–90. doi: 10.1007/s10865-008-9153-8.
[3] Vadhanan P, Tripaty DK, Balakrishnan K. Pre-operative anxiety amongst patients in a tertiary care hospital in India – a prevalence study. J Soc Anesthesiol Nepal 2017;4:5–10. doi: 10.3126/jsan.v4i1.17377.
[4] Badner NH, Nielson WR, Munk S, et al. Preoperative anxiety: detection and contributing factors. Can J Anaesth 1990;37:444doi: 10.1007/BF03005624.
[5] Caumo W, Schmidt AP, Schneider CN, et al. Risk factors for preoperative anxiety in adults. Acta Anaesthesiol Scand 2001;45:298–307. doi: 10.1034/j.1399-6576.2001.045003298.x.
[6] Guo P. Preoperative education interventions to reduce anxiety and improve recovery among cardiac surgery patients: a review of randomised controlled trials. J Clin Nurs 20152015;24:34–46. doi: 10.1111/jocn.12618.
[7] Hernández-Palazón J, Fuentes-García D, Falcón-Araña L, et al. Assessment of preoperative anxiety in cardiac surgery patients lacking a history of anxiety: contributing factors and postoperative morbidity. J Cardiothorac Vasc Anesth 2018;32:236–44. doi: 10.1053/j.jvca.2017.04.044.
[8] Székely A, Balog P, Benkö E, et al. Anxiety predicts mortality and morbidity after coronary artery and valve surgery – a 4-year follow-up study. Psychosom Med 2007;69:625–31. doi: 10.1097/PSY.0-b013e31814b8c0f.
[9] Ramesh C, Nayak BS, Pai VB, et al. Pre-operative anxiety in patients undergoing coronary artery bypass graft surgery – a cross-sectional study. Int J Africa Nurs Sci 2017;7:31–6. doi: 10.1016/j.ijans.2017.06.003.
[10] Rosiek A, Kornatowski T, Rosiek-Kryszewska A, et al. Evaluation of stress intensity and anxiety level in preoperative period of cardiac patients. Biomed Res Int 2016;1248396:1–8. doi: 10.1155/2016/1248396.
[11] Fathi M, Alavi SM, Joudi M, et al. Preoperative anxiety in candidates for heart surgery. Iran J Psychiatry Behav Sci 2014;8:90–6.
[12] Tung HH, Hunter A, Wei J, et al. Gender differences in coping and anxiety in patients after coronary artery bypass graft surgery in Taiwan. J Cardiopulm Acute Care 2009;38:469–79. doi: 10.1016/j.hrtlng.2009.01.006.
[13] Mulugeta H, Ayana M, Sintayehu M, et al. Preoperative anxiety and associated factors among adult surgical patients in Debre Markos and Felege Hiwot referral hospitals, Northwest Ethiopia. BMC Anesthesiol 2018;18:155doi: 10.1186/s12871-018-0619-0.
[14] Gallagher R, McKinley S. Anxiety, depression and perceived control in patients having coronary artery bypass grafts. J Adv Nurs 2009;65:2386–96. doi: 10.1111/j.1365-2648.2009.05101.x.
[15] Hosain N, Amin F, Rehman S, et al. Know thy neighbors: the status of cardiac surgery in the South Asian countries around India. Indian Heart J 2017;69:790–6. doi: 10.1016/j.ihj.2017.09.219.
[16] Kreatsoulas C, Anand SS. The impact of social determinants on cardiovascular disease. Can J Cardiol 2010;26(suppl C): 8C–13C. doi: 10.1016/S0828-282X(10)71075-8.
[17] Norris W, Baird WLM. Pre-operative anxiety: a study of the incidence and aetiology. Br J Anaesth 1967;39:503–9. doi: 10.1093/bja/39.6.503.
[18] Shaikh Z, Pathak R. Revised Kuppuswamy and B G Prasad socio-economic scales for 2016. Int J Community Med Public Heal 2017;4:997–9. doi: 10.18203/2394-6040.ijcmph20171313.
[19] Moerman N, van Dam FS, Muller MJ, et al. The Amsterdam Preoperative Anxiety and Information Scale (APAIS). Anesth Analg 1996;82:445–51. doi: 10.1097/00000539-199603000-00002.
[20] Pokharel K, Bhattarai B, Tripathi M, et al. Nepalese patients' anxiety and concerns before surgery. J Clin Anesth 2011;23:372–8. doi: 10.1016/j.jclinane.2010.12.011.
[21] Spielberger CD, Gorsuch RL, Lushene R, et al. State-Trait Anxiety Inventory for adults. Mind Garden 2010;1–75. doi: 10.1037/t06496-000.
[22] Jafar MF, Khan FA. Frequency of preoperative anxiety in Pakistani surgical patients. J Pak Med Assoc 2009;59:359–63.
[23] Matthias AT, Samarasekera DN. Preoperative anxiety in surgical patients – experience of a single unit. Acta Anaesthesiol Taiwan 2012;50:3–6. doi: 10.1016/j.aat.2012.02.004.
[24] Ebirim L, Tobin M. Factors responsible for pre-operative anxiety in elective surgical patients at a university teaching hospital: a pilot study. Internet J Anesthesiol 2010;29:1–6.
[25] Wetsch WA, Pircher I, Lederer W, et al. Preoperative stress and anxiety in day-care patients and in patients undergoing fast-track surgery. Br J Anaesth 2009;103:199–205. doi: 10.1093/bja/aep136.
[26] Ministry of Health of Nepal, New ERA, ICFNepal Demographic and Health Survey 2016. Kathmandu: Ministry of Health, Nepal; 2017.
[27] Homzová P, Zeleníková R. Measuring preoperative anxiety in patients undergoing elective surgery in Czech Republic. Cent Eur J Nurs Midw 2015;6:321–6. doi: 10.15452/cejnm.2015.06.0023.
[28] Sigdel S. Perioperative anxiety: a short review. Glob Anaesth Perioper Med 2015;1:107–8. doi: 10.15761/gapm.1000126.
[29] Erkilic E, Kesimci E, Soykut C, et al. Factors associated with preoperative anxiety levels of Turkish surgical patients: From a single center in Ankara. Patient Prefer Adherence 2017;11:291–6. doi: 10.2147/PPA.S127342.
[30] Flint AJ. Epidemiology and comorbidity of anxiety disorders in the elderly. Am J Psychiatry 1994;151:640–9. doi: 10.1176/ajp.151.5.640.
[31] Miller SM, Combs C, Stoddard E. Steptoe A, Appels A. Information, coping and control in patients undergoing surgery and stressful medical procedures. Stress, Personal Control and Health 1989;Oxford, England, 107–30.