



Research Paper

Role of pre-operative counseling with NSQIP surgical risk calculator in the surgical patients

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ABSTRACT

Introduction: Patient satisfaction is important tool to monitor health care performance and quality of health plans, emphasizing effective counseling and consent processes. The objective of the study is to assess patient satisfaction and anxiety with the use of NSQIP surgical risk calculator in comparison to standardized questionnaires. **Methodology:** This is an interventional prospective randomized study. Difference in patient satisfaction is assessed by a 7-point Likert scale and anxiety assessment by 5-point Likert scale of Amsterdam Preoperative Anxiety and Information Scale (APAIS) questionnaire written in Nepalese. Satisfaction scores were compared using analysis of variance (ANOVA), or the Kruskal-Wallis test. P- value <0.05 was considered statistically significant.

Results: Satisfaction score regarding comfort during counseling and consent process was similar with and without use of NSQIP surgical risk calculator (83.3 % and 76.9 %, respectively). Satisfaction score regarding plan of anesthesia was 63.33 % with the use of NSQIP and 53.8 % without NSQIP tool. 30.76 % of patients with high school education developed negative feelings following counseling when NSQIP tool was not used (p value 0.002). NSQIP usage increased anxiety about anesthesia and surgery and led to higher continual thinking about the procedure.

Duration of counseling was 12 min with NSQIP tool use in comparison to 9.67 min following conventional counseling (p value 0.047).

Conclusion: NSQIP surgical risk calculator is a reliable tool that can be used alongside conventional methods during preoperative period for decision-making and counseling with similar satisfaction scores but a higher incidence of anxiety and continual thinking about procedures.

Introduction

Surgical patients undergo preoperative counseling, which varies in quality and duration. Proper communication during the preoperative consultation can deliver relevant health information and guide the improvement of perioperative health status. The methods, however, are non-standardized, and the explanation of the perioperative course is generally vague or varies from person to person. We hypothesize that high-risk patients who receive preoperative counseling with the help of the NSQIP surgical risk calculator compared to the current standard of care will have higher satisfaction concerning information on the perioperative journey. Till date, no any published data are there regarding use of NSQIP tool among the Nepalese population.

Patient satisfaction is one of the very important tools to monitor health care performance and quality of health plans, emphasizing effective counseling and consent processes. In Donabedian's quality

measurement model, patient satisfaction is defined as a patient-reported outcome measure, while the structures and processes of care can be measured by patient-reported experiences [1]. Standardized questionnaires (either self-reported, interviewer-administrated or by telephone) have been the most common assessment tool for conducting patient satisfaction studies [2].

The Objective of the study was to assess patient satisfaction with the use of NSQIP surgical risk calculator, and anxiety among perioperative patients.

Methods and methodology

This is an interventional (clinical trial) prospective randomized study conducted in a tertiary center. Patients with ASA III or above and/or an age above 65 surgical patients undergoing surgery at Nepal Medciti hospital are included in this study. Based on the study by

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Sheyna SR Alterovitz et al., where population groups are classified as elderly adults between the ages of 65 and 74 years as youngest-old, those between the ages 75 and 84 years as middle-old, and those aged over 85 years as oldest-old, we decided to include elderly adults i.e. population age group above 65 or more [3]. The NSQIP surgical risk calculator helps predict complications with rates, length of hospital stay, making it an appealing tool for complicated cases or among patients with multiple comorbidities to predict postoperative outcomes. Thus study population with an ASA grade of 3 or more and an age above 65 were included in the study. Adults who cannot consent, pregnant women, non-Nepali speakers, and consent only by surrogates are excluded from the study.

Primary outcome measure in this study is to know the difference in patient satisfaction among the two groups assessed by a 7-point Likert scale, 7 being the most satisfied and 1 being the least. Secondary outcome measures studied is the Preoperative anxiety assessment measured by the Amsterdam Preoperative Anxiety and Information Scale (APAIS) questionnaire written in Nepalese language and also duration of counseling with and without use of NSQIP calculator.

The Amsterdam Preoperative Anxiety and Information Scale (APAIS) [4] is used to assess anxiety among the patients. In 1996, the Dutch group Moermann developed APAIS [4] which includes a six items questionnaire that includes four questions regarding fear of anesthesia and surgery and two questions regarding the need for information. Questions based on APAIS were translated into Nepalese, validated, and used among the Nepalese population as in study by Sigdel et al. [5] Five-point Likert scale is used to grade the answers, 1 = not at all to 5 = extremely.

Table 1

Items of the Amsterdam Preoperative Anxiety and Information Scale English and Nepali version.

Original [4]	Nepali Version
1 I am Worried about the anesthetic	के अपरेशन गर्दा बेहोस हुनु परने कुराले तपाइलाई परिलरिहेको छ?
2 The anesthetic is on my mind continually	के अपरेशनको लागि बेहोस हुनुपर्ने कुरा तपाइको दमिगमा नरिन्त आइरहन्छ?
3 I would like to know as much as possible about the anesthetic	के तपाइलाई अपरेशनको लागि बेहोस हुनुपर्ने कुरा सम्बन्धा जतसिक्दो धेरै जानकारी लनि इच्छा पैदा भएको छ?
4 I am Worried about the procedure	के अपरेशन गर्दा चरिफार(शल्यक्रयाि) गर्ने कुराले तपाइलाई परिलरिहेको छ?
5 The procedure is on my mind continually	के अपरेशन गर्दा चरिफार गर्ने कुराले तपाइको दमिगमा नरिन्त आइरहन्छ?
6 I would like to know as much as possible about the procedure	के तपाइलाई अपरेशन गर्दा चरिफार गरनि कुराको बारेमा जतसिक्दो धेरै जानकारी लनि इच्छा पैदा भएको छ?

A Likert scale is a rating scale used to assess opinions, attitudes, or behaviors. A typical Likert scale is a 5- or 7-point ordinal scale used by respondents to rate the degree to which they agree or disagree with a statement [6]. Likert-type questions or statements and a continuum of possible responses are recorded usually with 5 or 7 items and each item is given a numerical score so that the data can be analyzed quantitatively.

Table 2

Seven points Likert scale.

English version	Poor to fair	Fair	Fair to good	Good	Very good	Excellent	Outstanding
Nepali Version	ठकिले लागेन						वशिष्ट लाग्यो
Grade/Score	1	2	3	4	5	6	7

The preoperative counseling and consent process is taken prior to surgery, in Anesthesia PAC clinics/office, not at pre-operative area. Patients usually visit to PAC clinic a day prior, some many days prior to surgery. The preoperative counseling and consent process is carried out with or without the use of the ACS NSQIP Surgical Risk Calculator. In the NSQIP group, taken as an experimental arm group, standard preoperative counseling plus the risks are explained using scores from the NSQIP surgical risk calculator, and consent will be obtained. In the Non-NSQIP group, taken as a control arm group, consent was obtained following standard preoperative counseling as per hospital standards and protocol. APAIS and seven-point Likert scale scoring forms, along with written consent is signed by the patient or first-degree relative if the patient is not able to consent. The duration of counseling is noted after the pre-anesthetic checkup (history, clinical examination, laboratory investigations review and preparation of NSQIP scoring); once the counseling for consent was started until the written consent is signed. Since the study patient group consisted of those aged >65 or ASA III or more, many patients had functional limitations or were handicapped, which prevented or made it difficult for them to complete a questionnaire by themselves. For this reason, the interviewed patient may enlist the help of a relative or friend to answer the questionnaire, and this could be a source of bias [7]. All study participants signed an informed consent form.

Questionnaire development

The research team developed a pool of questions after the literature search to include in the questionnaires regarding preoperative counseling satisfaction, which were forwarded to health professionals and anesthesia department consultants, who provided their feedback regarding the appropriateness of the questions. A pilot study was conducted involving an initial version of the questionnaire to analyze the comprehensibility and clarity of the items. The results were analyzed into an amended questionnaire, and in the final sets of questions, eight questions were selected for this study. Questions included inquiry regarding how comfortable patients were during counseling, satisfaction regarding the plan of anesthesia, explanation regarding complications, choices of anesthesia proposed, informed consent process of anesthesia, understandability of explanations of medical terms, negativity following counseling and risk exaggerations. Seven-points Likert scale where score 1 was for Poor and 7 for the Outstanding, highest level of satisfaction was used to evaluate the scoring system. The questionnaire also contained socio-demographic variables such as age, sex, planned operative procedures, ASA grade score, total duration of counseling, and educational level.

Table 3
Patient demographics characteristics and duration of counseling.

Variables	NSQIP YES	NSQIP NO	Fisher Extract test/ Pearson chi square
Age 65 and above	23	27	0.342
Below 65	7	12	
Sex Male	20	23	0.345
Female	10	16	
Education			
Illiterate	1	2	0.318
Simple Read and write	13	13	
High School	6	15	
Bachelor's degree	5	2	
Masters/Phd	5	7	
ASA Grade			
II	13	16	0.847
III	17	23	
Surgical Dept			
Cardiac surgery	2	1	0.327
ENT	1	4	
Gastrointestinal	15	21	
Gynaecology	2	3	
Orthopedics	3	0	
Urology	7	10	
Duration of counseling	12.27+/- 6.203	9.67+/- 4.574	

Sample size calculation

We conducted a pilot study, comprising ten patients in each group. The mean value of the Likert score in the control arm was 3.11 and in the

Table 4
Patient satisfaction differences among two NSQIP and Non NSQIP groups with 7 point Likert Scoring.

Variables	NSQIP Group(n = 30)			Non NSQIP Group(n = 39)			P value
	1–3 (%)	4–5 (%)	6–7 (%)	1–3 (%)	4–5 (%)	6–7 (%)	
Likert Score							
How comfortable were you during the counseling?	1 (3.33 %)	4(13.33 %)	25(83.3 %)	1(2.5 %)	8(20.5 %)	30(76.9 %)	0.41/0.21/0.25
How satisfied are you with the explanations regarding plan of anesthesia?	1	4(13.33 %)	25(83.3 %)	0	6(15.3 %)	33(84.61 %)	0.13/0.4/0.44
How satisfied are you with the explanations regarding plan of anesthesia	1	10(33.33 %)	19(63.33 %)	2(5.1 %)	16(41.02 %)	21(53.84 %)	0.36/0.25/0.21
How satisfied are you with the choices on type of anesthesia?	2(6.66 %)	7(23.33 %)	21(70 %)	0	12(30.76 %)	27(69.23 %)	0.05/0.24/0.47
Is counseling understandable and are medical terms explained in simple language?	1	8(26.66 %)	21(70 %)	0	8(20.51 %)	31(79.48 %)	0.13/0.27/0.18
How satisfied are you with the informed consent process for Anesthesia?	0	8(26.66 %)	22(73.33 %)	0	9(23.07 %)	30(76.9 %)	0/0.36/0.36
Negative feeling following counseling?	4(13.33 %)	11(36.66 %)	15(50 %)	3(7.69 %)	6(15.3 %)	30(76.9 %)	0.22/ 0.022/0.012
Feelings that risk explained to me are somewhat unnecessary and exaggerated.	4(13.33 %)	11(36.66 %)	15(50 %)	3(7.69 %)	6(15.3 %)	30(76.9 %)	0.22/ 0.022/0.011

Table 5
Anxiety assessment among NSQIP and Non- NSQIP groups with the use of APAIS questionnaire.

Variables	NSQIP Group(n = 30)			Non NSQIP Group(n = 39)			P value
	1–2	3	4–5	1–2	3	4–5	
Anxiety Scale score							
I am Worried about the anesthetics	18(60 %)	5(16.6 %)	7(23.33 %)	33(84.6 %)	4(10.25 %)	2(5.1 %)	0.012/0.21/0.014
The anesthetic is on my mind continually	17(56.66 %)	8(26.6 %)	5(16.6 %)	32(82.05 %)	4(10.25 %)	3(7.6 %)	0.012/0.03/0.12
I would like to know as much as possible about the anesthetic	9(30 %)	12(40 %)	9(30 %)	24(61.53 %)	8(20.5 %)	7(17.9 %)	0.005/0.04/0.11
I am Worried about the procedure	12(40 %)	10(33.33 %)	8(26.6 %)	32(82.05 %)	5(12.8 %)	2(5.1 %)	0.0003/0.022/0.007
The procedure is on my mind continually	16(53.3 %)	9(30 %)	5(16.6 %)	31(79.4 %)	6(15.38 %)	2(5.1 %)	0.012/0.07/0.058
I would like to know as much as possible about the procedure	11(36.6 %)	7(23.3 %)	12(40 %)	19(48.7 %)	14(35.89 %)	6(18.38 %)	0.15/0.12/ 0.025

NSQIP arm was 4.22. The variance was 2.58. With a confidence level of 0.95 and a desired power of 0.8 and the utilization of two-tailed tests for comparison, a sample size of 33 patients in each group would be required to detect a significant difference. <https://epitools.ausvet.com.au/> was used for conducting a pilot study and sample size calculations. Although sample size is low, study is conducted as per the pilot study outcome.

Statistical analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were calculated for the socio-demographic variables. The Student *t*-test, or analysis of variance (ANOVA), with Scheffe's method for multiple comparisons, or the Kruskal-Wallis test, was used for continuous variables, and the Chi-square test or Fisher's exact probability test for categorical variables. Patient satisfaction scores were also compared by using the analysis of variance (ANOVA), or the Kruskal-Wallis test. *P*-value < 0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 21 for Windows statistical software.

Results

Patient demographic characteristics are illustrated in Table 3 with no statistical significance.

The duration of counseling was statistically significant with a *p* value of 0.047, where, 12 min were taken for counseling with the use of NSQIP tool in comparison to 9.67 min following normal counseling process without NSQIP tool.

Demographic variables

There was no statistically significant difference regarding patient satisfaction with or without the use of NSQIP tools. However, the mean score for satisfaction with the informed consent process, choice of anesthesia, and satisfaction regarding explanations of complications was higher when NSQIP tool was not used. The mean score for negative feelings following counseling and exaggerations of risk explained was higher when NSQIP tool was used.

In the NSQIP group, patients were more anxious about anesthetic procedures and wanted to know more about the anesthesia process. Similarly, patients wanted to know more about surgery and its process. The anxiety score was lower when standard counseling without any specific tool was used.

Discussion

A pre-anesthetic evaluation is carried out to evaluate the patient status, assess the associated risk, collect additional patient information, make a plan for anesthesia, pain management, post-operative management, and planning, and is concluded by taking informed consent. The evaluation should be conducted within 48 h before the day of surgery or should be reviewed or updated within 48 h before surgery if conducted before.

Standard perioperative counseling typically involves discussing the surgical procedure, potential risks and benefits, anesthesia options, preoperative preparations, postoperative care, and addressing any concerns the patient might have. It aims to ensure the patient is well-informed and mentally prepared for the surgery.

Several risk scores and risk prediction models are in use in clinical practice, which helps with risk stratification, predicting the post-operative outcomes, mortality and morbidity.

The American Society of Anesthesiology's Physical Status Classification (ASA PS) is a significant predictor of morbidity and mortality in surgical patients [8]. The ASA classification as a risk adjuster for surgical outcomes is controversial, as many believe it is inconsistent and imprecise. It does not take into account any preoperative optimization of the patient, the planned surgery, or the level of postoperative care [9]. As shown by the above results, satisfaction score is similar in comparison to the use of the NSQIP tool, with lesser incidence of anxiety when counseling is done with standard counseling without using any specific tool.

NSQIP tool for counseling

The NSQIP surgical risk calculator is a valuable tool utilized in the medical field for assessing surgical risk. It aids in predicting the likelihood of postoperative complications based on various patient factors, surgical procedures, and medical history. This calculator has become a standard tool for risk stratification, counseling, and perioperative decision-making. By providing quantitative risk estimates, it allows surgeons and medical teams to have informed discussions with patients about potential outcomes, enabling patients to make well-informed decisions about their procedures. Moreover, it guides medical professionals in tailoring perioperative strategies and interventions to minimize risks and optimize patient care.

The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) collects high-quality, standardized clinical data on preoperative risk factors and postoperative complications from >500 hospitals in the US [10,11]. The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®) Surgical Risk Calculator was developed in 2013 as a decision support tool to “provide accurate, patient-specific risk information to guide both surgeon decision-making and informed consent.” [12] It

helps to get information regarding risks associated with specific procedures based on their health status and to develop an approach for clinicians to reasonably and empirically adjust risk estimates based on their clinical judgment and experience. The ACS NSQIP surgical risk calculator offers surgeons the ability to quickly and easily estimate important, patient-specific postoperative risks and present the information in a patient-friendly format [13]. This allows the surgeon and anesthesiologist to discuss these risks, better inform patients and caregivers, help surgeons and patients decide which operation to perform, and even offer insights about whether the operative risk is prohibitive. The surgical risk calculator offers an opportunity to improve shared decision-making and informed consent, and therefore, improve patient care [13]. The NSQIP Surgical Risk Calculator provides a new threshold for assessing quality care for elderly patients undergoing operations and helps predict four specific quality-of-life outcomes, such as complication and mortality rates, and expected effects of surgery on the ability of older patients to function independently. Since August 19, 2019, surgeons have been able to use the ACS NSQIP Surgical Risk Calculator to view geriatric outcomes for patients 65 years of age and older [14]. We can assess the predictive value of six geriatric-specific preoperative factors: living situation, fall history, use of a mobility aid, cognitive impairment, surrogate-signed consent, and palliative-on-admission status [14].

Satisfaction score and NSQIP tool

Satisfaction score regarding comfort during counseling during pre-anesthetic checkup and consent process was similar with and without use of NSQIP surgical risk calculator (83.3 % and 76.9 % respectively). Satisfaction score regarding explanation of plan of anesthesia was 63.33 % with the use of NSQIP and 53.8 % without NSQIP tool, also satisfaction regarding consent process was almost similar with 73.33 % satisfied when NSQIP tool was used and 76.9 % when NSQIP tool was not in use.

Satisfaction score and education

The satisfaction score regarding comfort during counseling and during informed consent process was similar among patients who had an education level above high school and those who could read and write. The negative feeling following counseling with NSQIP tool use was more common among those who could simply read and write (23.33 %) than among patients who attended high school (3.33 %), bachelors (10 %) and masters (13.33 %). It was a similar finding even with simple counseling tool usage: with 25.64 % who had negative feelings were patients who could simply read and write, and less among bachelors (5.12 %) and masters (12.82 %) education levels. However, 30.76 % of patients with high school education developed negative feelings following counseling when NSQIP tool was not used, which is statistically significant (p value 0.002) when compared to NSQIP tool used. Five patients with a simple read and write education level had significant anxiety scores for worry about anesthesia and surgery, respectively in comparison to one patient each with bachelors level education and none with masters level education in NSQIP tool group, which was also similar in non-NSQIP tool group. When compared among two groups, five patients (16.66 %) each with simple read and write education had significant anxiety scores when NSQIP tool was in use in comparison to one patient each (2.56 %) when simple counseling tool was used, which was statistically significant (p value 0.021).

Counseling with NSQIP tool and anxiety

Although NSQIP surgical risk calculator poses various advantages, our study findings show that it elevates anxiety regarding anesthesia (23.33 % vs. 5.1 %), surgery (26.6 % vs. 5.1 %) resulting in continual thinking about anesthesia procedures (16.6 % vs. 7.6 %) and surgical

procedures (16.6 % vs. 5.1 %), among NSQIP group and non NSQIP group respectively. It also shows that patients want to know more about anesthesia procedures (30 % vs. 17.9 %) and surgical procedures (40 % vs. 18.38 %) following counseling after the use of NSQIP calculator, demonstrating that it elevates anxiety.

However, when NSQIP was used, less patients had negative feeling following preoperative counseling (50 % vs. 76.9 %) and less patients felt that the risk explained was somewhat unnecessary and exaggerated (50 % vs. 76.9 %) which might be due use of proper tool with actual data, numbers / values and better demonstration of possible complications and outcome.

Anxiety

Anxiety is a psychological and physiological state characterized by somatic, emotional, cognitive, and behavioral factors [5]. Perioperative anxiety can be defined as an unpleasant feeling of fear and concern and is commonly found among patients in need of or about to undergo surgical procedures [5]. Unfamiliar environments in hospitals and thoughts of undergoing a surgical procedure in operation theater without the presence of surrogates can cause anxiety.

In our study, 23.33 % were worried about anesthesia and 26.6 % were worried about surgical procedures in the NSQIP group, whereas it was only 5.1 % when NSQIP was not in use. The overall preoperative anxiety prevalence rate was 58.5 % in a study by Sigdel et al. [5] which is double the incidence from our study. However, this study was among the cardiac surgery-awaited patients which might have influenced the rate.

In a study by Masood Jawaid et al., using a VAS score for analysis, the mean anxiety score for surgery was 57.65 ± 25.1 and for anesthesia was 38.14 ± 26.05 , high level of pre-operative anxiety was found among females as compared to males, and 56 % of patients thought that their anxiety would be lessened by a detailed explanation regarding the operation and anesthesia [15]. Studies conducted in India revealed that the prevalence of preoperative anxiety varied from 47 % to 70.3 % [16,17], in the United States of America, prevalence was as high as 20.2 % [18]. In our study overall anxiety regarding anesthesia and surgery was 25 % when NSQIP was used, whereas it was only 5.1 % when conventional methods of counseling were carried out during pre-anesthetic checkup.

The overall prevalence of preoperative anxiety in a study by Henok Mulugeta et al. was 61 % (95%CI (55.5–65.7)), as suggested by an STAI score of >44, which showed that most of the patients awaiting elective surgery experienced a high level of preoperative anxiety [19], which was similar to finding of the previous study conducted among Pakistani surgical patients using a similar tool, in which the overall prevalence of preoperative anxiety was 62 % (STAI score of >44), whereas it was only 45.3 % in a study done in Austria [20]. Overall incidence of anxiety is lower in our study, both with and without the use of NSQIP tool.

Anxiety and sex

Nine out of ten female participants in the NSQIP group had higher anxiety scores related to either anesthesia or surgical procedures whereas only six out of 20 male patients had significant anxiety scores. When a simple counseling tool was in use, 2 out of 16 females and 2 out of 23 patients had a significant anxiety score. This shows that female patients are more anxious regarding anesthesia and surgical procedures. Female patients had a statistically significantly higher level of preoperative anxiety than males in a study by Sigdel et al. [5] and Showers et al. [7]. Women are sensitive to fearful events and differences in hormone fluctuations. In addition, females more easily express their anxiety than men, and separation from the family affects women more.

Anxiety and education

The level of anxiety decreases with an increasing level of education [8]. This could be because an increased level of education helps patients prepare and reduce anxiety preoperatively. In addition, a larger proportion of anxious patients with lower education levels may be because of their poor awareness related to anesthesia and surgery. The level of education of participants may affect their satisfaction, as a study by Syed TP found that 82 % of graduate participants were satisfied, while only 55.2 % of undergraduates agreed with the decision [21].

In a study by Syed TP, 22 (45 %) of participants reported that the counselor used medical terminologies, and 21 (39.6 %) patients felt uncomfortable due to lack of privacy and confidentiality [21]. In our study, when NSQIP was in use, 70 % were satisfied with the usage of medical terminologies, whereas satisfaction percent rose to 79.48 % when NSQIP was not in use.

Counseling duration

In an audit done by James JP and Thampi SM, median time for consultation was 18.5 min when seen by consultants and a longer median consultation time of 16 min when seen by trainees [22]. Average time period when no specific tool was in use was 9.67 min and 12.27 min when NSQIP tool was used in our study.

Limitations

Participants who had poor education status or who couldn't read properly required assistance from the surrogates and/or investigator to complete the questionnaire, which was supposed to be filled out by the patients themselves. This is a single-centered study. Sample size could have been extended. Anxiety was assessed during the pre-anesthetic check-up after signing the consent form. Thus, during the day of surgery or before it, the anxiety score could vary. Previous exposure to anesthesia was not taken into consideration.

Conclusion

The NSQIP Surgical Risk Calculator is a reliable tool that can be used alongside conventional methods during preoperative period for decision-making and counseling with similar satisfaction scores but a higher incidence of anxiety and continual thinking about procedures. Further studies will help establish NSQIP as a reliable tool and help improve overall quality services.

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Ethics approval

All study activities were conducted in accordance to the regulations set by the Institutional Review Board along with written informed consent.

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CRediT authorship contribution statement

Bikash Khadka: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Apurb Sharma:** Data curation, Formal analysis, Methodology, Supervision, Validation, Writing – review & editing. **Prajwal RajBhattarai:** Methodology, Supervision, Validation, Writing – review & editing. **Bijay Rayamajhi:** Formal analysis, Validation, Writing – review & editing. **Hemant Adhikari:** Methodology, Validation, Writing – review & editing.

Declaration of competing interest

The authors of this manuscript have no related conflicts of interest to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sopen.2024.01.007>.

References

- [1] Bjertnaes OA, Sjetne IS, Iversen HH. Overall patient satisfaction with hospitals: effects of patient-reported experiences and fulfilment of expectations. *BMJ Qual Saf* 2012;21(1):39–46.
- [2] Urden LD. Patient satisfaction measurement: current issues and implications. *Lippincott's Case Manag* 2002;7(5):194–200.
- [3] Alterovitz SS, Mendelsohn GA. Relationship goals of middle-aged, young-old, and old-old internet daters: an analysis of online personal ads. *J Aging Stud* 2013;27(2): 159–65.
- [4] Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam preoperative anxiety and information scale (APAIS). *Anesth Analg* 1996;82(3):445–51.
- [5] Sigdel S, Ozaki A, Basnet M, Kobashi Y, Pradhan B, Higuchi A, et al. Anxiety evaluation in Nepalese adult patients awaiting cardiac surgery: a prospective observational study. *Medicine* 2020;99(9):e19302.
- [6] Likert R. A technique for the measurement of attitudes. *Arch Psychol* 1932;22 140: 55.
- [7] Showers N, Simon EP, Blumenfeld S, Holden G. Predictors of patient and proxy satisfaction with discharge plans. *Soc Work Health Care* 1995;22(1):19–35.
- [8] Khuri SF, Daley J, Henderson W, Hur K, Gibbs JO, Barbour G, et al. Risk adjustment of the postoperative mortality rate for the comparative assessment of the quality of surgical care: results of the National Veterans Affairs Surgical Risk Study. *J Am Coll Surg* 1997;185(4):315–27.
- [9] Barnett S, Moonesinghe SR. Clinical risk scores to guide perioperative management. *Postgrad Med J* 2011;87(1030):535–41.
- [10] Hall BL, Hamilton BH, Richards K, Bilimoria KY, Cohen ME, Ko CY. Does surgical quality improve in the American College of Surgeons National Surgical Quality Improvement Program: an evaluation of all participating hospitals. *Ann Surg* 2009; 250(3):363–76.
- [11] Ingraham AM, Richards KE, Hall BL, Ko CY. Quality improvement in surgery: the American College of Surgeons National Surgical Quality Improvement Program approach. *Adv Surg* 2010;44:251–67.
- [12] New ACS. NSQIP surgical risk calculator offers personalized estimates of surgical complications. *Bull Am Coll Surg* 2013;98(10):72–3.
- [13] Bilimoria KY, Liu Y, Paruch JL, Zhou L, Kmiecik TE, Ko CY, et al. Development and evaluation of the universal ACS NSQIP surgical risk calculator: a decision aid and informed consent tool for patients and surgeons. *J Am Coll Surg* 2013;217(5): 833–42.e1–3.
- [14] Hornor MA, Ma M, Zhou L, Cohen ME, Rosenthal RA, Russell MM, et al. Enhancing the American College of Surgeons NSQIP surgical risk calculator to predict geriatric outcomes. *J Am Coll Surg* 2020;230(1):88–100.e1.
- [15] Jawaid M, Mushtaq A, Mukhtar S, Khan Z. Preoperative anxiety before elective surgery. *Neurosciences (Riyadh)* 2007;12(2):145–8.
- [16] Saini S, Dayal M. Preoperative anxiety in Indian surgical patients—experience of a single unit. *Indian J Appl Res* 2016;6(9):476–9.
- [17] Bansal T, Joon A. A comparative study to assess preoperative anxiety in obstetric patients undergoing elective or emergency cesarean section. *Anaesthesia Pain Intens Care* 2019:25–30.
- [18] Riddle DL, Wade JB, Jiranek WA. Major depression, generalized anxiety disorder, and panic disorder in patients scheduled for knee arthroplasty. *J Arthroplasty* 2010;25(4):581–8.
- [19] Mulugeta H, Ayana M, Sintayehu M, Dessie G, Zewdu T. Preoperative anxiety and associated factors among adult surgical patients in Debre Markos and Felege Hiwot referral hospitals, Northwest Ethiopia. *BMC Anesthesiol* 2018;18(1):155.
- [20] Wetsch WA, Pircher I, Lederer W, Kinzl JF, Traweger C, Heinz-Erian P, et al. Preoperative stress and anxiety in day-care patients and inpatients undergoing fast-track surgery. *Br J Anaesth* 2009;103(2):199–205.
- [21] Syed TP, Sheikh Z, Hameed F, Malhotra JK. Assessment of patient satisfaction after counseling by a health care provider before emergency cesarean section in a tertiary care hospital. *J Safog Dvd* 2017;9:33–8.
- [22] James JP, Thampi SM. Time spent by patients in a pre-anaesthetic clinic and the factors affecting it: an audit from a tertiary care teaching hospital. *Indian J Anaesth* 2018 Jan;62(1):16–22. https://doi.org/10.4103/ija.IJA_368_17. PMID: 29416146; PMCID: PMC5787885.