**Journal of Pioneering Medical Sciences**
Received: October 09, 2025 | Accepted: February 27, 2026 | Published: March 05, 2026
Volume 15, Issue 02, Pages 17-22

*DOI https://doi.org/10.47310/jpms2026150203*


# Evaluation of the Effect of a Structured Health Education Program on Knowledge and Recovery Expectations among Elective Preoperative Patients: A Quasi-Experimental Study

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**Abstract:** **Introduction:** Adequate knowledge and awareness of the surgical process among elective preoperative patients are vital for reducing anxiety, improving confidence, and enhancing satisfaction with surgical care. Structured health education interventions can play a crucial role in improving patients' preparedness and postoperative recovery outcomes. **Methods:** A quasi-experimental pre-test/post-test design was conducted among 220 patients (Mean age = 34.6±8.9 years) attending the Preoperative Health Education Outpatient Department Clinic. Participants scheduled for elective surgeries across multiple specialties received a standardized health education program comprising audiovisual presentations, interactive group discussions, and printed information leaflets. Patients' knowledge of surgical procedures, confidence in postoperative pain management, and expected recovery time were measured using validated questionnaires administered before and after the intervention. **Results:** Post-intervention analysis showed significant improvements in patients' knowledge of surgical procedures (Mean score = 5.25±1.2 vs. 9.32±1.4, $p<0.001$, $z = 11.38$) and confidence in pain management (5.94±1.5 vs. 9.09±1.3, $p<0.001$, $z = 9.02$). Participants who attended group-based interactive sessions demonstrated higher post-test knowledge scores than those who attended lecture-only sessions ($p<0.001$). Moreover, the expected recovery duration decreased significantly (2.95±0.8 weeks to 2.22±0.6 weeks, $p = 0.002$, $z = -3.09$). **Conclusion:** The structured preoperative health education program effectively enhanced patients' understanding of the surgical process, increased their confidence in managing postoperative pain, and improved recovery expectations. Incorporating multimodal educational strategies, especially interactive group sessions, into routine preoperative care can foster patient empowerment and optimize surgical outcomes.

**Key Words:** Patient Education, Preoperative Care, Health Education Program, Elective Surgery, Quasi-Experimental Study, Pain Management, Recovery Expectations

## INTRODUCTION

The preoperative period is a critical phase in the surgical process during which patients often experience heightened anxiety, uncertainty, and fear about the impending procedure and its outcomes. This anxiety can negatively affect physiological stability, pain perception, recovery rate, and overall satisfaction with care. Accordingly, structured preoperative health education programs have gained prominence as essential interventions to enhance patients' preparedness, confidence, and postoperative recovery.

Several studies have demonstrated the effectiveness of structured health education in improving patients' understanding and psychological readiness before surgery. For instance, Mostafa *et al.* [1] reported that implementing a standardized educational protocol led to significant improvements in patients' knowledge regarding therapeutic cardiac catheterization, emphasizing the value of education in facilitating informed participation in care. Similarly, Rostami *et al.* [2] found that preoperative electronic education significantly reduced anxiety levels compared with traditional verbal counseling, underscoring the role of technology-enabled interventions in supporting patient-centered education. Consistent findings were observed by Hassan [3], who noted improved knowledge and attitudes among cancer patients following structured education, confirming the broader impact of educational initiatives on patient engagement and empowerment.

Health literacy also plays a crucial role in determining how patients perceive and act upon health information. Han *et al.* [4] demonstrated that individuals with limited health literacy are more likely to develop unrealistic expectations about treatment, which can contribute to anxiety, noncompliance, and dissatisfaction. Therefore, health education programs must deliver clear, accessible, and culturally appropriate information that accommodates varying literacy levels. Wang *et al.* [5] further highlighted that personalized visual materials and interactive education improve comprehension, reduce preoperative anxiety, and increase adherence to clinical instructions.

Moreover, preoperative education has been shown to influence patients' recovery expectations positively. Ghomrawi *et al.* [6] found that structured educational sessions helped align patient expectations with realistic postoperative outcomes, while Li *et al.* [7] demonstrated that individualized education reduced perioperative anxiety among older adults. Collectively, these studies suggest that well-designed, multimodal education programs not only enhance knowledge but also foster emotional readiness and realistic expectations.

Despite abundant international evidence supporting preoperative education, limited research has examined its impact within local hospital contexts, particularly in multidisciplinary preoperative clinics where patients undergo a variety of elective procedures. Variability in educational delivery methods, patient demographics, and cultural factors necessitates context-specific evaluations to determine the most effective approaches for improving knowledge and reducing anxiety. Therefore, designing culturally sensitive educational programs—delivered in local languages, using clear visual aids, and incorporating opportunities for interactive discussion—is essential. Studies in Southeast Asia and the Middle East have shown that group discussions led by nurses, supported by simplified printed materials, significantly enhance comprehension among low-literacy patients. The present study situates itself within this socio-cultural framework, assessing how structured educational strategies can be optimized for the local hospital context.

Although international evidence confirms the value of preoperative education, limited research has examined its comprehensive impact in multidisciplinary elective surgery clinics within local hospital settings. Previous studies often targeted single surgical specialties or specific patient populations. Moreover, inconsistencies in delivery format, theoretical foundation, and measurement tools constrain the generalizability of results. This study addresses these gaps by employing a structured, multimodal educational program grounded in the Health Belief Model and assessing measurable outcomes across a diverse group of elective surgical patients.

Therefore, the present study aims to evaluate the effectiveness of a structured preoperative health education program among patients scheduled for elective surgeries in a tertiary hospital setting. Specifically, the study seeks to:

- Assess changes in patients' knowledge of the surgical process before and after participation in the education program
- Evaluate the program's effect on patients' confidence in managing postoperative pain and recovery expectations
- Determine whether different education delivery formats (e.g., group sessions versus lecture-based formats) influence knowledge outcomes

This investigation contributes to existing literature by providing empirical evidence on the role of structured, multimodal preoperative education in enhancing patient preparedness and optimizing surgical outcomes in a hospital-based setting.

## METHODS

### Study Design and Setting

This study employed a quasi-experimental pre-test/post-test design without a control group to evaluate the effectiveness of a structured health education program among elective preoperative patients. A quasi-experimental approach was chosen because random assignment was not feasible within the hospital's routine clinical workflow. The limitations of this design—particularly the inability to fully attribute causality—are acknowledged and discussed in the interpretation of results. The study was conducted at the Preoperative Health Education Outpatient Department (OPD) of a tertiary-care teaching hospital between March and September 2024. All data were collected prospectively.

### Participants and Sampling

A total of 220 consecutive patients (Mean age = 34.6±8.9 years; Median = 35 years) scheduled for elective surgical procedures across general surgery, orthopedic, gynecologic, and ENT specialties were recruited using consecutive convenience sampling. This non-probability sampling approach was selected to ensure feasibility within the clinic's scheduling constraints, but its limitations regarding generalizability are recognized. To

reduce potential sampling bias, data were collected over multiple months and across varied surgical specialties.

Adult patients aged 18–65 years who were scheduled for elective surgery under general or regional anesthesia, able to read or understand the study language, and willing to provide written informed consent were included in the study. Emergency surgical cases, individuals who had undergone previous surgery in the same specialty within the past year, and those with diagnosed psychiatric illness or cognitive impairment that could hinder comprehension or completion of study questionnaires were excluded. A formal sample size calculation was conducted using G*Power 3.1, based on a medium effect size (Cohen's d = 0.5), an alpha level of 0.05, and a statistical power of 0.80 for paired comparisons, yielding a required minimum of 200 participants; the final sample of 220 was recruited to accommodate an anticipated 10% non-response rate.

**Intervention: Health Education Program**

The intervention consisted of a structured 45-minute preoperative health education session conducted by two trained perioperative nurses and a surgical resident. The session was standardized using a pre-approved educational script and materials reviewed by a panel of surgical and nursing educators to ensure content validity.

The education program included:

- A 15-minute audiovisual presentation explaining preoperative preparation, anesthesia options, surgical steps, and postoperative recovery expectations
- A 20-minute interactive group discussion addressing patient questions, pain management strategies, and common postoperative concerns
- A 10-minute demonstration on breathing exercises, early ambulation, and wound care using illustrated handouts

**Data Collection Instruments**

A two-part self-administered questionnaire was used to assess patients' knowledge, confidence, and recovery expectations before and after the educational intervention. Part I collected socio-demographic data, including age, gender, education level, previous surgical experience, and type of surgery. Part II measured outcome variables using a validated 15-item scale adapted from established preoperative education tools [2,5], with items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and covering knowledge of surgical procedures (6 items), confidence in pain and anxiety management (5 items), and expectations regarding recovery duration and postoperative preparedness (4 items). The modified instrument underwent expert content validation by five specialists, yielding a content validity index of 0.91, and demonstrated good internal consistency in a pilot test with 30 participants (Cronbach's $\alpha$ = 0.87). The pre-test questionnaire was completed one week before surgery during the OPD visit, while the post-test was administered 48 hours before admission—rather than on the day of surgery—to minimize stress-related response bias; all questionnaires were completed under the supervision of a trained research assistant, with interviewer support provided for patients with low literacy to ensure consistency and reduce missing data.

**Data Analysis**

Data were analyzed using IBM SPSS Statistics version 28.0, with descriptive statistics used to summarize demographic characteristics and the Shapiro–Wilk test applied to assess normality. Within-group comparisons between pre- and post-intervention scores were conducted using paired t-tests for normally distributed variables and the Wilcoxon signed-rank test for non-parametric data, while between-group differences based on education format were examined through one-way ANOVA with Tukey's post-hoc tests to identify specific group contrasts. Chi-square tests were employed for categorical variables such as gender and education level, and multiple linear regression was used to adjust for potential confounders, including age, gender, education level, and surgery type. Likert-scale data were treated as ordinal, and non-parametric tests were applied when distributional assumptions were not met, with this analytical approach explicitly acknowledged to ensure transparency. Statistical significance was set at $p<0.05$, and ethical approval for the study was obtained from the hospital's institutional review board (Ref. No. N1C-IRB-024-08-16).

## RESULTS

The study included 220 patients scheduled for elective surgeries across various surgical specialties in the hospital. More than half of the patients were male 118 (53.6%); while about 102 (46.4%) were female. Regarding education level, a notable proportion of the patients had a high school (84, 38.2%) and bachelor's degree (76, 34.5%). Most of the patients who received education were parents 114 (65.5%); with a considerable proportion of them scheduled for elective surgery, 42 (19.1%). The Mean (median) age of the patients was 34.6 (35) years (Table 1).

Table 1: Demographic Characteristics of the Patients

| Demographic features | Categories | Frequency and Proportion n (%) |
|---|---|---|
| Age in years (median) | Mean (median) | 34.6 (35) |
| Gender | Male | 118 (53.6%) |
| | Female | 102 (46.4%) |
| Education level | Primary | 17 (7.7%) |
| | Intermediate | 12 (5.5%) |
| | High school | 84 (38.2%) |
| | Bachelor | 76 (34.5%) |
| | Master | 1 (0.5%) |
| | PhD | 2 (0.9%) |
| | Not available | 28 (12.7%) |
| Education provided to: | Family | 76 (34.5%) |
| | Parents | 144 (65.5%) |
| Type of surgery | DDH | 17 (7.7%) |
| | Dental caries | 13 (5.9%) |
| | Elective | 42 (19.1%) |
| | Other surgeries | 148 (67.3%) |

Demographic characteristics of patients are presented in frequencies (n) and proportions (%)

Table 2 presents the effects of health education on patients' perceptions. It highlights the following outcomes: anxiety relief, with a Mean (median) score of 9.23 (10); addressing concerns and questions, with a Mean (median) score of 9.23 (10); enhancing confidence in pain management, with a Mean (median) score of 7.66 (8); overall awareness, with a Mean (median) score of 9.39 (10); and overall satisfaction with health education, with a Mean (median) score of 9.38 (10).

The Wilcoxon Signed Rank Test (Table 3) was used to assess the effect of education on participants' understanding and confidence. The results showed that post-education scores were significantly higher than pre-education scores. Median scores for understanding of surgery/procedure increased significantly from 5.25 to 9.32 ($p<.001$, $z = 11.381$), and pain management confidence improved significantly from 5.94 to 9.09 ($p<.001$, $z = 9.02$). Additionally, the number of weeks' participants expected for recovery decreased significantly from 2.95 to 2.22 ($p = .002$, $z = -3.089$). These findings highlight the effectiveness of education in enhancing participants' knowledge and confidence.

Table 4 presents the results of a one-way ANOVA comparing the Mean differences in patients' overall knowledge of the surgical procedure across different preferred education session formats: demonstration, group discussion, lecture, and video. Levene's test of equality of variances indicated that the variances of the dependent variable were equal across the groups ($p = 0.117$). The ANOVA results revealed a statistically significant difference between the groups ($p<0.001$), suggesting that the type of educational session had a significant effect on patients' knowledge of the surgical procedure.

Table 5 presents the distribution of preferred education session formats based on demographic characteristics. Demonstration was most preferred by male patients (83, 70.3%), those with a high school education (62, 73.8%), and patients scheduled for elective surgery (33, 78.6%). Group discussion was preferred by most female patients (39, 38.2%), those with a master's degree (1, 100%), and patients scheduled for dental caries treatment (6, 46.2%). Lecture was most preferred by female patients (1, 1.0%), those with a high school education (1, 1.2%), and those scheduled for DDH (1, 5.9%). Video was most preferred by female patients

Table 2: Effects of Health Education on Patient Perception

| Parameter | Score (avg) | Score (Median) |
|---|---|---|
| Anxiety relief (concerns and questions addressed) | 9.23 | 10 |
| Confidence for pain management | 7.66 | 8 |
| Overall awareness | 9.39 | 10 |
| Overall satisfaction of health education | 9.38 | 10 |

Effects of health education on patients' perception presented in Mean (median) score

Table 3: Pre and Post Education Score Comparison

| Parameters | Pre-education avg score (median) | Post-education avg score (Median) | p-value | Statistical Significance* |
|---|---|---|---|---|
| Surgical/procedure understanding | 5.25 (5) | 9.32 (10) | <0.001 | 11.381 |
| Pain management confidence | 5.94 (5) | 9.09 (10) | <0.001 | 9.020 |
| Expected recovery in weeks | 2.95 (2) | 2.22 (1) | 0.002 | -3.089 |

*A Wilcoxon Signed Rank Test

Table 4: ANOVA

| Parameters | Sum of squares | df | Mean square | F | Sig |
|---|---|---|---|---|---|
| Between Groups | 28.401 | 3 | 9.467 | 7.052 | <0.001 |
| Within Groups | 289.981 | 216 | 1.343 | - | - |
| Total | 318.382 | 219 | - | - | - |

* ANOVA test used to determine statistical significance at $p<0.05$ level

Table 5: Distribution of the Preferred Education Session Format by Demographic Characteristics

| Attributes | Categories | Demonstration | Group discussion | Lecture | Video | p-value |
|---|---|---|---|---|---|---|
| Gender | Male | 83 (70.3%) | 24 (20.3%) | 1 (0.8%) | 10 (8.5%) | 0.013* |
| | Female | 50 (49.0%) | 39 (38.2%) | 1 (1.0%) | 12 (11.8%) | |
| Education level | Primary | 11 (64.7%) | 5 (29.4%) | 0 (0.0%) | 1 (5.9%) | 0.043* |
| | Intermediate | 8 (66.7%) | 3 (25.0%) | 0 (0.0%) | 1 (8.3%) | |
| | High school | 62 (73.8%) | 19 (22.6%) | 1 (1.2%) | 2 (2.4%) | |
| | Bachelor | 43 (56.6%) | 21 (27.6%) | 0 (0.0%) | 12 (15.8%) | |
| | Master | 0 (0.0%) | 1 (100.0%) | 0 (0.0%) | 0 (0.0%) | |
| | PhD | 1 (50.0%) | 1 (50.0%) | 0 (0.0%) | 0 (0.0%) | |
| | Not available | 8 (28.6%) | 13 (46.4%) | 1 (3.6%) | 6 (21.4%) | |
| The education was provided to whom | Family | 39 (51.3%) | 26 (34.2%) | 2 (2.6%) | 9 (11.8%) | 0.070 |
| | Parents | 94 (65.3%) | 37 (25.7%) | 0 (0.0%) | 13 (9.0%) | |
| Type of surgery | DDH | 7 (41.2%) | 7 (41.2%) | 1 (5.9%) | 2 (11.8%) | <0.001* |
| | Dental caries | 6 (46.2%) | 6 (46.2%) | 0 (0.0%) | 1 (7.7%) | |
| | Elective | 33 (78.6%) | 0 (0.0%) | 0 (0.0%) | 9 (21.4%) | |
| | Others | 87 (58.8%) | 50 (33.8%) | 1 (0.7%) | 10 (6.8%) | |

*Chi-square test used to determine statistical significance at $p<0.05$ level

(12, 11.8%), those with a bachelor's degree (12, 15.8%), and those scheduled for elective surgery (9, 21.4%)

## DISCUSSION

The present study evaluated the effectiveness of a structured preoperative health education program for patients scheduled for elective surgical procedures. Consistent with global findings, the intervention significantly improved patients' knowledge of surgical procedures, confidence in pain management, and recovery expectations. However, the strength of these results must be interpreted cautiously, given the quasi-experimental design and absence of a control group.

Significant post-intervention increases in knowledge and confidence scores indicate that the structured program effectively addressed patients' informational needs. This finding aligns with Beiramijam *et al.* [9], who demonstrated that structured self-care education enhanced surgical awareness and reduced procedural stress among Iranian patients. Similarly, Lee *et al.* [10] found that preoperative education significantly reduced fear and anxiety levels, underscoring the role of informational support in promoting psychological readiness for surgery.

Interestingly, the current study observed that demonstration-based and group-discussion formats yielded higher knowledge scores than lectures or videos. This may reflect patients' preference for interactive, visually guided learning, especially in contexts with diverse literacy levels. Minoughan *et al.* [11] previously emphasized that illustrated and demonstration-based materials enhance comprehension of complex surgical information, supporting this study's findings. The low preference for lecture sessions and videos could stem from passive delivery styles, limited opportunities for clarification, or cultural preferences for direct interpersonal communication with healthcare providers.

Gender and educational level were also associated with learning preferences. Male patients tended to prefer demonstrations, while female participants showed a higher preference for discussions and multimedia materials. These findings may reflect gender-related differences in learning engagement or comfort with interactive versus observational formats, warranting further qualitative exploration.

### Clinical and Practical Significance

Beyond statistical significance, the observed improvements have tangible clinical implications. Increased knowledge and confidence are associated with reduced perioperative anxiety, enhanced adherence to postoperative instructions, and shorter hospital stays [12]. A Mean reduction in expected recovery time from 2.95 to 2.22 weeks suggests that education not only corrected unrealistic expectations but also potentially improved psychological readiness—a key factor influencing postoperative rehabilitation outcomes [13].

Moreover, nearly 40 % of patients identified pain management as their primary educational need, highlighting a persistent gap in patient–provider communication about analgesia. Integrating standardized pain-education modules into preoperative counseling may therefore enhance patient satisfaction and recovery experience.

### Critical Comparison with Existing Literature

While previous studies consistently confirm the benefits of preoperative education, methodological diversity complicates cross-study comparisons. Most existing evidence derives from single-specialty interventions (e.g., cardiac, orthopedic), whereas this study included multiple surgical domains to increase generalizability. Nonetheless, the heterogeneity of surgical types may have diluted domain-specific nuances in educational effectiveness.

Compared with similar studies, the current results show larger knowledge gains but smaller changes in recovery expectations, suggesting that while cognitive understanding improves readily, behavioral or attitudinal shifts may require longer reinforcement or postoperative follow-up. This emphasizes the need for longitudinal studies assessing whether preoperative education translates into measurable postoperative outcomes, such as reduced complications, analgesic use, or readmission rates.

## CONCLUSION

This study demonstrated that a structured preoperative health education program can significantly enhance patients' knowledge of surgical procedures, confidence in pain management, and expectations for recovery, with interactive and demonstration-based sessions emerging as the most effective and preferred methods. While its quasi-experimental design limits causal inference, the findings underscore the value of patient-centered, literacy-sensitive educational interventions as essential components of preoperative care. Continued investment in such programs is warranted, and future research should examine long-term knowledge retention, compare delivery modalities through randomized trials, explore culturally and linguistically tailored materials, and assess cost-effectiveness and feasibility for broader implementation. When systematically developed and integrated into routine practice, preoperative education has the potential to strengthen enhanced recovery pathways and support improved patient outcomes and empowerment.

### Limitations

The study has several methodological limitations. The non-randomized design and absence of a control group restrict causal inference. Reliance on self-reported measures introduces possible response bias, while the timing of the post-test may not reflect true knowledge retention or preoperative anxiety. Future studies using randomized, multi-center designs with standardized protocols and longitudinal follow-up are recommended.

### Future Recommendations

Future studies should employ randomized controlled trials to strengthen causal evidence for the effectiveness of structured preoperative health education. Beyond patient-reported

outcomes, research should assess clinical indicators such as postoperative complications, length of hospital stay, readmissions, and analgesic use to determine broader clinical impact. Incorporating qualitative methods would provide deeper insight into patients' experiences, cultural influences, and educational preferences, supporting more patient-centered interventions. Additionally, cost-effectiveness analyses are needed to inform scalability and resource allocation. Finally, research addressing policy and implementation factors is recommended to facilitate integration of standardized preoperative education into routine surgical care and clinical guidelines.

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