



Implementation of an integrated leaflet and video education program (LEAVIN): A quality improvement initiative in perioperative nursing

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ABSTRACT

Background: Preoperative anxiety is common among surgical patients and may affect psychological readiness before anesthesia. At a regional public hospital in East Jakarta, pre-anesthesia education was previously delivered verbally without structured printed or audiovisual media.

Purpose: to describe the development and implementation of Integrated Leaflet and Video Education (LEAVIN) and report preliminary changes in preoperative anxiety following its use.

Methods: This quality-improvement initiative used a one-group pre-test–post-test design without a comparison group and was conducted from February to April 2026. A baseline needs assessment using three structured screening items informed by the domains of the Amsterdam Preoperative Anxiety and Information Scale (APAIS) was conducted among 21 preoperative patients. LEAVIN consisted of a printed flip-sheet leaflet and a three-minute educational video accessible through a QR code. The media were reviewed by two anesthesiologists, two anesthesia nurses, and one hospital management representative. The preliminary evaluation involved 12 elective surgical patients recruited from the outpatient clinic and inpatient wards. Anxiety was measured before and after education using the Numeric Rating Scale for Anxiety (NRS-A).

Results: At baseline, 52.4% of patients feared anesthesia, 61.9% reported persistent worry about anesthesia, and 52.4% wanted more information. The mean NRS-A score decreased from 6.42 ± 2.50 before education to 5.58 ± 1.93 after education. Seven patients (58.3%) showed decreased anxiety scores, five (41.7%) showed no change, and none reported increased anxiety.

Conclusion: LEAVIN was feasible to implement and was followed by reduced anxiety scores in most evaluated patients. Larger controlled studies using validated multidimensional anxiety instruments are needed.

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1. Background

Surgical procedures, although necessary to restore health, are commonly perceived by patients as threatening events. Preoperative anxiety has been reported to affect approximately 48–80% of patients awaiting surgery [1], and a systematic review and meta-analysis of patients in low- and middle-income countries estimated a pooled prevalence of 55.7% [2].

Unmanaged preoperative anxiety is associated with adverse physiological and clinical

consequences. Heightened sympathetic and hypothalamic–pituitary–adrenal axis activity related to anxiety can destabilise hemodynamic parameters, increase anesthetic and analgesic requirements, delay emergence from anesthesia, and impair postoperative wound healing [3]. Anxious patients may also be less able to attend to and retain perioperative information delivered by clinicians, which can further compound their distress and reduce satisfaction with care,

underscoring the importance of systematic anxiety assessment by perioperative nurses [3],[4].

Pharmacological premedication using anxiolytics remains widely used to manage preoperative anxiety, but it carries risks of sedation, respiratory depression, and delayed recovery; this has directed growing clinical and research attention toward non-pharmacological strategies, including structured patient education, relaxation techniques, music therapy, and virtual reality [5].

The rationale for combining printed and audiovisual media is that each modality addresses different educational needs. A leaflet provides concise, low-cost, portable, and repeatable information that patients and family members can review before surgery [6], [7], [8], whereas video-based education offers standardized audiovisual explanations that may help patients visualize anesthesia procedures, preparation, and recovery more clearly [9], [10], [11], [12]. Therefore, the integration of both media is expected to provide complementary benefits: the leaflet supports repeated reading and recall, while the video enhances procedural understanding through visual and auditory cues [10], [12]. In LEAVIN, the QR-code format links the printed leaflet with the educational video, allowing patients and families to access both formats as a single, practical educational package within routine perioperative nursing care.

Several quasi-experimental studies conducted in Indonesian surgical settings have reported significant reductions in preoperative anxiety following leaflet- or video-based education [6], [7], [8], [9], [10], [12], [13], [14], and comparable findings have been documented internationally [11], [15]. According to Dale's Cone of Experience, audiovisual media is theorised to support markedly higher information retention than verbal or written media alone because it engages multiple sensory channels simultaneously [10], which has motivated efforts to combine printed and audiovisual modalities, such as smartphone- or QR-code-based applications, within a single educational package [10], [12].

Evidence on this topic is nonetheless not entirely uniform: trials of multimedia- or virtual-reality-based education have sometimes found improvements in patient satisfaction without a corresponding statistically significant reduction in validated anxiety scores [16], suggesting that the effectiveness of educational media may be moderated by the specific instrument used,

patients' baseline coping style, and the structure of the educational content itself.

In Indonesia, background mental-health vulnerability in the general population may further predispose surgical patients to heightened preoperative anxiety [17]. At a government hospital serving East Jakarta, internal monitoring and a preliminary needs assessment indicated that pre-anesthesia education was still delivered verbally without supporting visual or audiovisual media, while anxiety levels among preoperative patients remained high.

Although leaflet-based and video-based preoperative education have each been evaluated extensively, evidence on an integrated approach that combines a printed leaflet with a short video accessible through a quick-response (QR) code—allowing both media to be used interchangeably according to patient preference—within routine perioperative nursing practice in an Indonesian regional hospital remains limited. This study therefore describes the development of an integrated leaflet and video pre-anesthesia education (LEAVIN) at a Regional Public Hospital in East Jakarta and reports the preliminary effect of its implementation on preoperative anxiety.

2. Methods

2.1 Research design

This study was a nursing quality-improvement initiative employing a one-group, pre-test-post-test design without a comparison group. The reporting of this initiative was informed by the Standards for Quality Improvement Reporting Excellence (SQUIRE) 2.0 framework for healthcare quality-improvement studies [18]. The initiative was conducted as part of a structured professional work-based learning programme for a newly appointed civil-servant anesthesia nurse. This pre-experimental design has previously been used to evaluate similarly scoped, single-unit preoperative education innovations in Indonesian hospitals [6], [7].

2.2 Setting and sample

This quality-improvement initiative was conducted at a regional public hospital in East Jakarta, Indonesia, from February to April 2026. Two sequential, non-overlapping patient groups were involved. First, a baseline needs assessment was conducted among 21 preoperative patients between 5 and 11 February 2026 to identify anesthesia-related fear, worry, and information needs. Second, a preliminary implementation

evaluation was conducted among 12 preoperative patients who received LEAVIN education and completed pre- and post-education NRS-A assessment.

The 12 patients in the evaluation phase were recruited from the outpatient clinic and inpatient wards. Seven patients were recruited from the outpatient clinic and five from inpatient wards. Patients were eligible if they were scheduled for elective surgery under general or spinal anesthesia, were conscious, able to communicate, and able to receive education through a printed leaflet and video. Patients with cognitive or sensory impairment that could interfere with comprehension of the educational materials were excluded. All patients included in the evaluation underwent elective surgery; no emergency surgical patients were included.

The sample size was not determined through formal power analysis because this project was implemented as a time-limited quality-improvement initiative rather than a confirmatory clinical trial. All eligible patients who received LEAVIN education and had complete pre- and post-education NRS-A documentation during the implementation period were included in the evaluation. Consistent with methodological guidance for pilot and feasibility studies, the evaluation sample was considered acceptable for assessing feasibility and early descriptive changes, but not for establishing definitive intervention effectiveness [19], [20].

2.3 Intervention

The LEAVIN intervention consisted of a printed flip-sheet leaflet and a three-minute educational video accessible through a QR code. The educational content was developed based on the baseline needs assessment and covered general anesthesia, spinal anesthesia, pre-anesthesia preparation, intra-anesthesia monitoring, possible anesthesia-related side effects, post-anesthesia recovery, and a deep-breathing relaxation technique.

The intervention was provided to preoperative patients recruited from the outpatient clinic and inpatient wards before surgery. Family members were also involved in the education process when present. All patients included in the evaluation watched the full educational video and received the printed leaflet, allowing them and their families to review the material repeatedly before surgery.

The educational media were reviewed through expert review by five validators, consisting of two anesthesiologists, two anesthesia nurses, and one hospital management representative with a Master of Hospital Administration background. The expert review focused on the clinical accuracy of anesthesia-related content, clarity of language, suitability for patient education, feasibility of implementation in routine perioperative care, and alignment with hospital service procedures. No formal quantitative content-validity index was calculated; this is acknowledged as a limitation of the media validation process.

2.4 Instruments and data collection

Two types of assessment were used at different stages of the quality-improvement initiative because each stage had a different purpose. For the baseline needs assessment, three structured screening items informed by the domains of the Amsterdam Preoperative Anxiety and Information Scale (APAIS) were used to identify anesthesia-related fear, worry, and information needs among preoperative patients [21], [22]. These items were used only to identify educational needs and were not analyzed as a full APAIS score.

For the preliminary pre-post evaluation, anxiety was measured using the Numeric Rating Scale for Anxiety (NRS-A), a single-item 0–10 self-report scale. Patients rated their anxiety immediately before and after receiving LEAVIN education. The use of NRS-A at this stage was based on its brevity, simplicity, and feasibility for immediate assessment within a busy perioperative workflow [23]. Therefore, the use of APAIS-informed screening items in the baseline phase and NRS-A in the evaluation phase reflected different measurement purposes: APAIS-informed items were used to guide educational content development, whereas NRS-A was used to monitor immediate anxiety changes after the education was delivered. However, because NRS-A is a single-item measure and does not provide multidimensional assessment comparable to multi-item anxiety instruments, its use is acknowledged as a measurement limitation.

Data were collected as part of routine pre-anesthesia nursing education and documentation. Patient identifiers were anonymized before analysis and reporting.

2.5 Data analysis

Data were analyzed using descriptive statistics, including frequency, percentage, mean,

standard deviation, and score change. Patient characteristics were summarized descriptively. Pre- and post-education NRS-A scores were compared descriptively, and the number and proportion of patients whose anxiety scores decreased, remained unchanged, or increased after LEAVIN education were calculated.

Because the evaluation sample was small and NRS-A scores were treated as ordinal data, an exploratory Wilcoxon signed-rank test was performed to compare pre- and post-education anxiety scores. The analysis was interpreted cautiously because this quality-improvement initiative did not include randomization or a comparison group.

2.6 Research ethics

This project was reviewed and approved internally by the hospital administration as a quality-improvement and service-improvement initiative. Institutional permission for implementation was obtained before the activity was conducted. Verbal informed consent was obtained from all participating patients before

education and anxiety assessment. Patient data were anonymized before analysis and reporting. Because this activity was classified as an internal quality-improvement initiative and was not registered as a formal human-subjects research protocol, no separate institutional ethics committee approval number was obtained. This is acknowledged as a limitation, and future studies evaluating LEAVIN using a larger controlled research design should obtain formal ethical clearance before data collection.

3. Results

A total of 21 preoperative patients participated in the baseline needs assessment conducted between 5 and 11 February 2026. Using structured screening items informed by APAIS domains, 52.4% of patients reported fear of being anesthetized, 61.9% reported persistent thoughts or worry about the anesthesia procedure, and 52.4% expressed a need for more information about anesthesia before surgery (Table 1).

Table 1. Baseline Pre-Anesthesia Needs Assessment among Preoperative Patients (n = 21)

Item	Frequency (n)	Percentage (%)
Fear of being anesthetized	11	52.4
Persistent thoughts or worry about the anesthesia procedure	13	61.9
Need for more information about anesthesia	11	52.4

Note. The screening items were informed by the domains of the Amsterdam Preoperative Anxiety and Information Scale (APAIS), but were not analyzed as a full APAIS score.

Based on these findings, LEAVIN was developed as an integrated pre-anesthesia educational package consisting of a printed flip-sheet leaflet and a three-minute video accessible through a QR code. The educational content included general anesthesia, spinal anesthesia, pre-anesthesia preparation, intra-anesthesia monitoring, possible anesthesia-related side effects, post-anesthesia recovery, and deep-breathing relaxation. The media were reviewed through expert review by five validators before implementation in routine pre-anesthesia education.

The preliminary implementation evaluation involved 12 elective surgical patients who completed pre- and post-education NRS-A assessment. The mean age of participants was 34.17 ± 6.89 years, with an age range of 27–49 years. Most participants were female (66.7%) and had a bachelor-level educational background (66.7%). Seven patients (58.3%) were recruited from the outpatient clinic and five patients (41.7%) from inpatient wards. Three patients (25.0%) had previous surgery experience, while nine patients (75.0%) had no previous surgery experience. Eight patients (66.7%) received spinal anesthesia and four patients (33.3%) received general anesthesia (Table 2).

Table 2. Characteristics of Patients Included in the LEAVIN Evaluation (n = 12)

Characteristics	n (%) / Mean $\pm$ SD
Age, years	34.17 ± 6.89
Age range, years	27–49
Female	8 (66.7%)

Male	4 (33.3%)
Bachelor degree	8 (66.7%)
Senior high school	4 (33.3%)
Outpatient clinic	7 (58.3%)
Inpatient ward	5 (41.7%)
Elective surgery	12 (100.0%)
Previous surgery experience	3 (25.0%)
No previous surgery experience	9 (75.0%)
Spinal anesthesia	8 (66.7%)
General anesthesia	4 (33.3%)
Excisional biopsy	4 (33.3%)
Sectio caesarea	2 (16.7%)
Appendectomy	2 (16.7%)
Debridement	1 (8.3%)
Perineal repair	1 (8.3%)
Herniotomy	1 (8.3%)
Hemorrhoidectomy	1 (8.3%)

The mean NRS-A score decreased from 6.42 ± 2.50 before LEAVIN education to 5.58 ± 1.93 after education, with a mean reduction of 0.83 points. The median NRS-A score decreased from 6.5 before education to 5.5 after education. Seven patients (58.3%) showed decreased anxiety scores, five patients (41.7%) showed no change, and no patient reported increased anxiety after receiving LEAVIN

education. An exploratory Wilcoxon signed-rank test suggested a reduction in NRS-A scores after LEAVIN education ($p = 0.016$). However, because of the small sample size and absence of a comparison group, this finding should be interpreted as preliminary and not as confirmatory evidence of effectiveness (Table 3).

Table 3. Pre- and Post-LEAVIN NRS-A Scores among Preoperative Patients (n = 12)

Patient code	Pre-LEAVIN NRS-A	Post-LEAVIN NRS-A	Change	Interpretation
P01	5	5	0	Unchanged
P02	5	5	0	Unchanged
P03	8	7	-1	Decreased
P04	4	3	-1	Decreased
P05	5	5	0	Unchanged
P06	8	6	-2	Decreased
P07	9	8	-1	Decreased
P08	8	6	-2	Decreased
P09	3	3	0	Unchanged
P10	9	8	-1	Decreased
P11	10	8	-2	Decreased
P12	3	3	0	Unchanged

Note. NRS-A = Numeric Rating Scale for Anxiety. Negative change indicates a reduction in anxiety score.

4. Discussion

This quality-improvement initiative showed that preoperative patients had substantial anesthesia-related fear, worry, and information needs before receiving structured education. In the baseline needs assessment, more than half of the patients reported fear of anesthesia, persistent worry about the anesthesia procedure, and a need for more information. These findings support the

relevance of structured pre-anesthesia education in routine perioperative nursing practice, particularly in settings where education had previously been delivered verbally without standardized printed or audiovisual media.

Following implementation of LEAVIN, the mean NRS-A score decreased from 6.42 before education to 5.58 after education. Seven of twelve patients showed reduced anxiety scores, five

patients showed no change, and no patient reported increased anxiety after the intervention. The exploratory Wilcoxon signed-rank test suggested a reduction in anxiety scores after LEAVIN education. However, this finding should be interpreted cautiously because the evaluation involved a small sample, no randomization, and no comparison group. Therefore, the findings indicate preliminary improvement in anxiety scores after education, but they do not establish definitive intervention effectiveness.

The observed reduction in anxiety is consistent with previous studies reporting that structured preoperative education may reduce anxiety by improving patient understanding, reducing uncertainty, and supporting psychological readiness before surgery [1], [2], [3], [4], [5]. Educational interventions are particularly relevant because anxiety before surgery is often associated with uncertainty about anesthesia, surgical procedures, possible complications, and postoperative recovery. By providing information on general anesthesia, spinal anesthesia, pre-anesthesia preparation, intra-anesthesia monitoring, side effects, recovery, and breathing relaxation, LEAVIN was designed to address both informational and emotional components of preoperative anxiety.

The novelty of LEAVIN lies in the integration of a printed flip-sheet leaflet and a QR-code-linked short educational video within one pre-anesthesia education package. This combined format may offer complementary benefits. The leaflet provides concise, portable, low-cost, and repeatable information that patients and families can review before surgery, whereas the video provides standardized audiovisual explanation that may help patients visualize anesthesia procedures and preparation more clearly [6], [7], [8], [9], [10], [11], [12]. The QR-code format also allows patients and family members to access the video independently after receiving the printed leaflet, supporting repeated exposure to the educational content and reducing reliance on one-time verbal explanation by health workers.

The involvement of family members in the education process may also be relevant in perioperative nursing practice. In this initiative, family members were included when present, and all evaluated patients watched the complete three-minute educational video. Family involvement may help reinforce patient understanding, provide emotional support, and improve recall of

instructions before surgery. This feature is important in hospital settings where patients may experience anxiety, limited attention span, or difficulty retaining information during the preoperative period.

The use of APAIS-informed screening items in the baseline phase and NRS-A in the evaluation phase reflected different assessment purposes. The APAIS-informed items were used only to identify educational needs related to anesthesia-related fear, worry, and information needs; they were not analyzed as a full APAIS score. In contrast, NRS-A was used for the immediate pre-post evaluation because it is brief, simple, and feasible within routine perioperative workflow. This approach was practical for a quality-improvement initiative, but it also limits measurement precision because NRS-A is a single-item scale and does not capture the multidimensional nature of preoperative anxiety.

Several limitations should be acknowledged. First, the evaluation included only 12 patients and was conducted as a time-limited quality-improvement initiative. The small sample size was acceptable for a preliminary pilot evaluation focused on feasibility and early descriptive changes, but it is not sufficient to confirm effectiveness. Second, the study used a one-group pre-test-post-test design without a comparison group; therefore, the reduction in anxiety cannot be attributed solely to LEAVIN. Third, anxiety was measured using NRS-A rather than a validated multidimensional instrument such as the full APAIS or STAI. Fourth, the educational media were reviewed through expert review, but no formal quantitative content-validity index was calculated. Fifth, this initiative did not evaluate longer-term clinical outcomes, such as hemodynamic stability, postoperative pain, patient satisfaction, or recovery indicators.

Future studies should evaluate LEAVIN using a larger sample, formal sample size calculation, a comparison group receiving standard verbal education, and validated multidimensional anxiety instruments. A randomized or well-designed quasi-experimental study would help determine whether LEAVIN produces clinically meaningful reductions in preoperative anxiety beyond routine care. Further evaluation should also examine patient satisfaction, family understanding, postoperative recovery indicators, and the feasibility of implementing LEAVIN across different surgical units.

5. Conclusion

LEAVIN, consisting of a printed flip-sheet leaflet and a three-minute QR-code-linked educational video, was feasible to implement as part of routine pre-anesthesia education at a regional public hospital in East Jakarta. The intervention was followed by a reduction in NRS-A scores in more than half of the evaluated patients, with no patient reporting increased anxiety after education. The integration of printed and audiovisual media allowed patients and families to review anesthesia-related information repeatedly before surgery. However, because this was a small quality-improvement evaluation using a one-group pre-test-post-test design without a comparison group, the findings should be interpreted as preliminary and should not be considered definitive evidence of effectiveness. Further controlled studies with larger samples, formal sample size calculation, and validated multidimensional anxiety instruments are needed to confirm the effectiveness of LEAVIN in reducing preoperative anxiety.

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