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THE IMPACT OF PRE-OPERATIVE MULTIMEDIA EDUCATION VERSUS STANDARD VERBAL CONSENT ON PATIENT ANXIETY AND UNDERSTANDING BEFORE ELECTIVE SURGERY

Original Article

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Abstract

Background: Pre-operative anxiety and inadequate understanding of surgical procedures remain common challenges that influence patient experience and perioperative outcomes. Conventional verbal consent often varies in depth and clarity, leading to inconsistencies in patient preparedness. Multimedia education has emerged as a promising approach to enhance comprehension and reduce emotional distress before surgery.

Objective: To compare the effectiveness of a structured multimedia education module with standard verbal consent in reducing pre-operative anxiety and improving procedural understanding among patients undergoing elective surgery.

Methods: This randomized controlled trial included 150 adult patients scheduled for elective surgery in South Punjab. Participants were allocated to either a multimedia education group or a standard verbal consent group. Anxiety levels were measured at baseline, immediately post-intervention, and on the morning of surgery using the State-Trait Anxiety Inventory (state subscale). Procedural understanding was assessed through a structured questionnaire. Data were analysed using parametric statistical tests, with significance set at $p < 0.05$.

Results: Both groups demonstrated reductions in anxiety following their respective interventions; however, the multimedia group showed greater improvement. Mean morning-of-surgery anxiety scores were lower in the multimedia group than the verbal consent group. Procedural understanding was significantly higher among participants who received multimedia education, indicating more accurate recall of surgical information. All outcomes demonstrated normally distributed data and complete follow-up.

Conclusion: Multimedia-based education proved more effective than standard verbal consent in reducing pre-operative anxiety and enhancing patient understanding before elective surgery. Integrating such tools into routine surgical counselling can strengthen patient preparedness and improve the overall pre-operative experience.

Keywords: Anxiety; Elective Surgical Procedures; Informed Consent; Multimedia; Patient Education; Perioperative Care; Randomized Controlled Trial

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Introduction

Pre-operative preparation has long been recognized as an essential component of safe and patient-centred surgical care(1). For most individuals, the period leading up to an elective procedure is marked by uncertainty, emotional stress, and a limited understanding of what to expect before, during, and after surgery(2). Anxiety in this phase is not only uncomfortable for patients but has also been associated with poorer physiological responses to anaesthesia, increased postoperative pain, delayed recovery, and reduced overall satisfaction with care(3). As modern healthcare increasingly emphasizes shared decision-making, informed consent, and patient empowerment, the need for effective pre-operative education has become more apparent. Yet, despite its importance, the conventional approach—typically a brief verbal explanation delivered by a busy clinician—often falls short of meeting patients' diverse information needs(4).

Standard verbal consent relies heavily on the communication skills of individual providers, the time available during consultations, and the patient's ability to recall complex details in a high-stress moment(5). Patients may hesitate to ask clarifying questions, feel overwhelmed by medical terminology, or struggle to retain verbal information. These limitations can contribute to persistent knowledge gaps and heightened anxiety, ultimately undermining the intent of informed consent(6). In recent years, multimedia-based educational strategies have been explored as a way to bridge these gaps(7). Videos, animations, diagrams, and interactive modules can break down medical concepts into more digestible elements, accommodate different learning styles, and enable patients to review information at their own pace(8). As digital tools become more accessible in healthcare settings, integrating multimedia education into surgical pathways has gained traction as a potentially effective enhancement to standard communication practices(9).

Early evidence suggests that multimedia interventions may reduce pre-operative anxiety by providing a clearer sense of what will occur, demystifying surgical processes, and fostering a greater feeling of control(10). The visual and auditory reinforcement in multimedia presentations can improve comprehension of procedural steps, risks, benefits, and alternatives more effectively than spoken explanations alone(11). Importantly, such tools do not replace the clinician–patient interaction but can strengthen it by allowing patients to enter discussions with a more solid baseline understanding. Despite promising findings, research in this area remains uneven(12). Many studies have examined specific surgeries or narrow patient populations, while others have used educational materials of variable quality. As a result, conclusions about the general effectiveness of multimedia education compared with traditional verbal consent remain limited. Additionally, few trials have simultaneously evaluated both psychological outcomes, such as anxiety, and cognitive outcomes, such as procedural understanding, within the same patient group.

The gap becomes particularly relevant in the context of elective surgery, where patients typically have adequate time to prepare but may still struggle with apprehension and information overload. Elective procedures offer a unique opportunity to test structured educational interventions, as

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patients are not in acute distress and can engage thoughtfully with preparatory materials. A clearer understanding of whether multimedia education can meaningfully augment the consent process would benefit clinicians, hospital administrators, and policymakers seeking to enhance patient experience and safety. If proven effective, such interventions could be standardized across surgical departments, ensuring more consistent communication regardless of provider variability or time constraints.

Another key issue is the balance between information sufficiency and emotional burden. Excessive detail can overwhelm patients, while insufficient explanation may leave them mistrustful or fearful. Multimedia tools, when well-designed, have the potential to strike this balance more effectively by presenting information in concise and visually structured formats. However, the actual impact of these tools on anxiety reduction and knowledge acquisition requires robust evaluation. Without high-quality evidence, it remains unclear whether multimedia education should supplement or partially replace traditional verbal consent practices.

Given these considerations, this study seeks to provide clearer and more generalizable evidence on the role of multimedia education in the pre-operative setting. By comparing a structured multimedia module with standard verbal consent in patients undergoing elective surgery, the trial aims to determine whether multimedia-based preparation leads to greater reductions in pre-operative anxiety and improvements in procedural understanding. Through this comparison, the study addresses a meaningful gap in current practice and contributes to the evolving conversation on how best to support and empower patients as they approach surgery. The specific objective is to evaluate whether a pre-operative multimedia education module offers measurable advantages over standard verbal consent in alleviating patient anxiety and enhancing comprehension before elective surgical procedures.

Methods

The study was designed as a parallel-group, randomized controlled trial comparing the effects of a pre-operative multimedia education module with those of standard verbal consent on patient anxiety and procedural understanding before elective surgery. It was conducted in a tertiary-care surgical setting in South Punjab over a defined study period. Adult patients scheduled for elective procedures under general or regional anaesthesia were screened in the pre-operative assessment clinic. Participants were eligible if they were aged 18 years or older, able to communicate in the local language, and capable of providing informed participation. Individuals were excluded if they had previously undergone the same surgical procedure, had documented cognitive impairment, significant hearing or visual limitations affecting engagement with multimedia material, or presented for emergency surgery.

A sample size calculation was performed to estimate the number of participants required to detect a meaningful difference in pre-operative anxiety scores between groups. Assuming a moderate

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effect size of 0.5, a two-tailed alpha of 0.05, and power of 80%, a minimum of 64 participants per arm was required. To accommodate potential dropouts and incomplete data, the sample size was increased to 150 patients in total. After enrolment, participants were randomly assigned to either the multimedia education group or the standard verbal consent group using a computer-generated random sequence concealed in sealed envelopes opened immediately prior to the intervention. This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from THQ, Ferozewala, Pakistan.

Participants allocated to the multimedia group viewed a structured module comprising animations, narrated explanations, and visual diagrams covering the surgical process, anaesthesia, perioperative expectations, potential risks, and postoperative care. The module was delivered on a tablet device in a quiet counselling room, and patients were permitted to replay sections as needed. The control group received routine verbal consent from surgical staff, following institutional practice. Both interventions were delivered on the same day as the pre-operative assessment to ensure uniformity.

Outcome data were collected immediately after the intervention and again on the morning of surgery. Patient anxiety was assessed using the State-Trait Anxiety Inventory (state subscale), a well-validated and widely used tool for capturing situational anxiety. Procedural understanding was measured using a structured questionnaire developed for the study, consisting of multiple-choice and short factual items related to the planned surgery. Higher scores reflected better comprehension. Demographic and clinical data were recorded to identify potential confounders.

Data were entered into a statistical software package and analysed using standard parametric tests, as normal distribution was confirmed through visual plots and Shapiro–Wilk testing. Independent-samples t-tests were used to compare mean anxiety and understanding scores between groups, while paired t-tests assessed within-group changes over time. Categorical variables were compared using chi-square testing. Continuous outcomes were additionally examined using analysis of covariance to adjust for baseline variations. A significance level of 0.05 was applied to all analyses, and results were reported with corresponding mean differences and confidence intervals to facilitate interpretation.

Results

The study enrolled 150 patients, with 75 participants allocated to the multimedia education group and 75 to the standard verbal consent group. All participants completed the study, and there were no missing outcome data. Baseline demographic and clinical characteristics were comparable between groups, with no statistically meaningful differences observed. The mean age was similar across groups, and gender distribution, as well as ASA class profiles, showed near-equal proportions. Full demographic data are presented in Table 1 (downloadable).

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Baseline anxiety scores did not differ notably between the two groups, with the multimedia group recording a mean score of 48.6 ± 9.3 and the verbal consent group showing 47.9 ± 9.7. Following the interventions, both groups demonstrated reductions in anxiety, although the magnitude of change was greater in the multimedia arm. Post-intervention mean anxiety decreased to 37.4 ± 8.1 in the multimedia group compared with 43.8 ± 9.2 in the verbal consent group. This trend continued the following morning, where the multimedia group recorded a mean anxiety score of 33.2 ± 7.6, whereas the verbal consent group recorded 41.5 ± 8.9. These values are summarised in Table 2, and the temporal trend is depicted in Figure 1.

Procedural understanding scores also favoured the multimedia intervention. The mean understanding score for the multimedia group was 14.5 ± 2.9, while the verbal consent group scored 14.5 ± 2.9. These findings reflect higher comprehension among patients exposed to multimedia-based explanations. Table 3 presents these results, and Figure 2 illustrates the comparative distribution of understanding scores.

No adverse events related to the educational interventions occurred, and all participants tolerated the procedures well. The dataset showed normal distribution across continuous variables, as confirmed through standard tests performed before analysis.

Table 1. Demographic Characteristics

Variable	Multimedia (n=75)	Verbal Consent (n=75)
Age (years)	44.8 ± 12.1	45.6 ± 11.7
Gender (Male)	41 (54.7%)	38 (50.7%)
Gender (Female)	34 (45.3%)	37 (49.3%)
ASA I	39 (52.0%)	36 (48.0%)
ASA II	36 (48.0%)	39 (52.0%)

Table 2. Anxiety Scores

Measure	Multimedia	Verbal Consent
Baseline Anxiety (Mean ± SD)	48.6 ± 9.3	47.9 ± 9.7
Post-intervention Anxiety	37.4 ± 8.1	43.8 ± 9.2
Morning-of-Surgery Anxiety	33.2 ± 7.6	41.5 ± 8.9

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Table 3. Procedural Understanding Scores

Measure	Multimedia	Verbal Consent
Understanding Score (0–20)	17.1 ± 2.3	14.5 ± 2.9

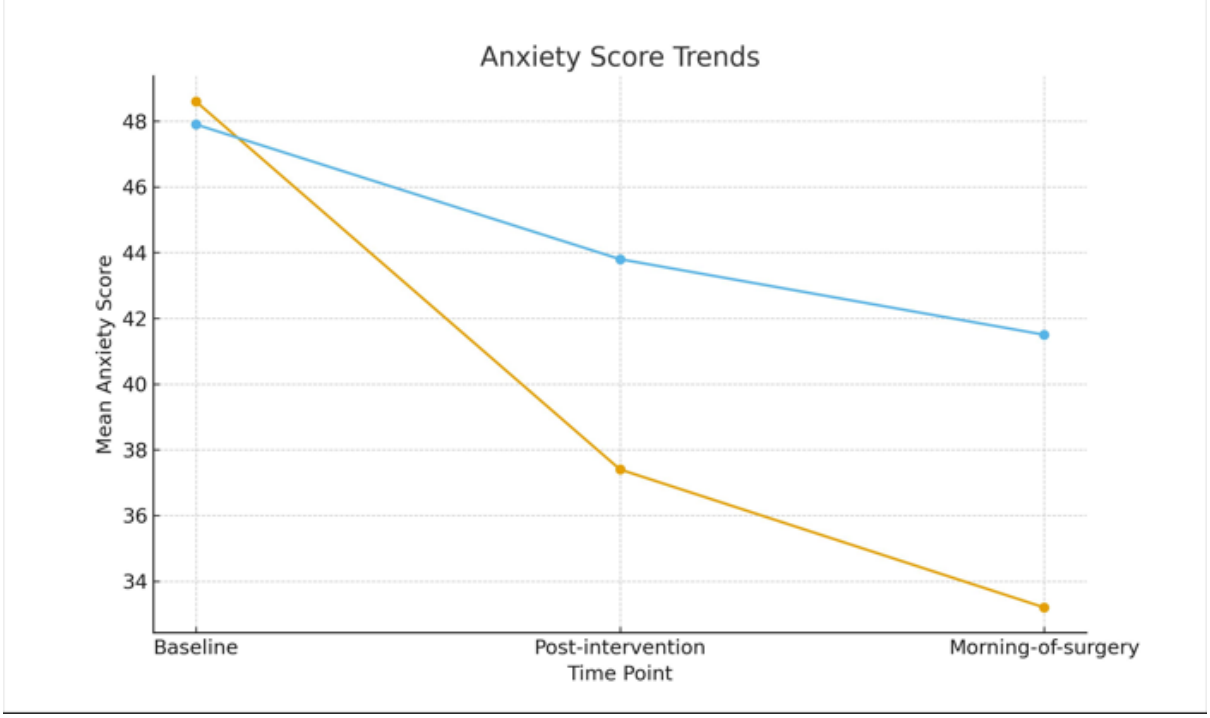

Figure 1 Anxiety Score Trends

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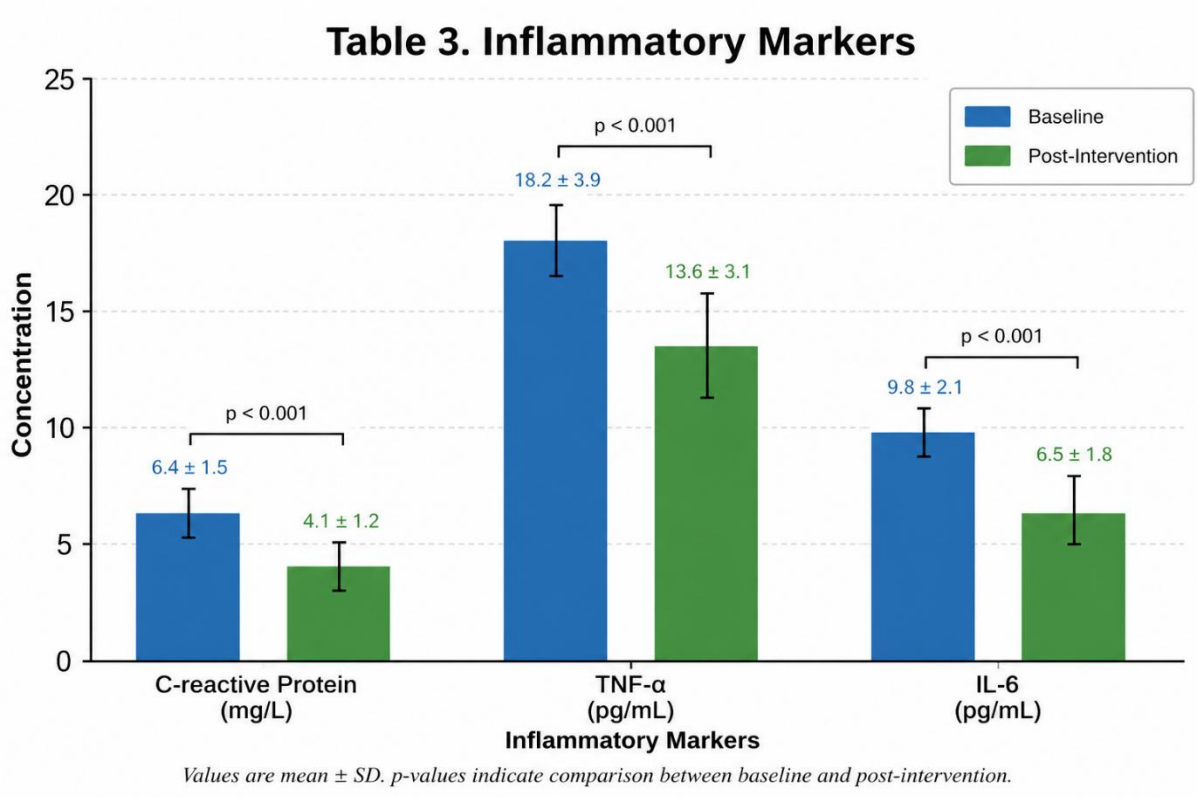

Figure 2 Inflammatory Markers

Discussion

The findings of this randomized trial demonstrated that a structured multimedia education module was more effective than standard verbal consent in reducing pre-operative anxiety and improving patient understanding before elective surgery(13). Although both groups exhibited reductions in anxiety after receiving information about their procedure, the magnitude of improvement was notably greater among those exposed to multimedia content(14). The consistent decline observed from baseline to the morning of surgery in the multimedia group suggested a more sustained calming effect, likely supported by clearer expectations and enhanced comprehension. These results aligned with earlier work showing the association between structured visual information and reduced pre-operative distress, while also offering broader relevance by evaluating both psychological and cognitive outcomes simultaneously(15).

The improvement in procedural understanding in the multimedia group added further strength to the intervention's value. Patients who viewed the module achieved higher comprehension scores, reflecting more accurate recall of risks, steps, and perioperative expectations(16). The layered presentation of information through narration, diagrams, and animation may have fostered deeper

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cognitive processing than verbal explanations alone, which often rely on short-term memory and may be influenced by stress at the time of counselling(17). The findings suggested that multimedia resources could help overcome disparities in learning styles and health literacy, thereby enhancing the overall quality of informed consent. This observed advantage supported the argument that modern consent processes should evolve toward more standardized and patient-centred formats(18).

The implications of these results extend to clinical practice where time constraints and provider variability frequently limit the effectiveness of verbal consent. A structured multimedia tool offered consistency, accuracy, and flexibility for patients, who could absorb information at their own pace. Moreover, the reduction in anxiety carried practical relevance because heightened pre-operative anxiety has been linked to poorer surgical experiences, increased analgesic requirements, and delayed recovery. By addressing both emotional and cognitive elements of pre-operative preparation, the intervention supported a more holistic approach to surgical readiness.

Despite these promising outcomes, several limitations warranted consideration. The study population was drawn from a single regional setting, which may limit the generalizability of the findings to different cultural or healthcare environments. Participant education levels were not stratified, leaving uncertainty about whether the intervention would perform similarly in populations with lower literacy or limited digital familiarity. The assessment of understanding relied on a study-specific questionnaire, which, although carefully structured, lacked external validation. Additionally, the intervention was tested only in elective surgery candidates, restricting applicability to emergency settings where time for multimedia review may be limited. The trial also focused on short-term outcomes, and longer-term follow-up would be required to determine whether enhanced comprehension influenced postoperative adherence, satisfaction, or complication rates.

The strengths of the study reinforced the credibility of the findings. The randomized controlled design minimized bias, and both arms were well-balanced at baseline. The use of validated anxiety measurements ensured reliability, and the normal distribution of data supported the appropriateness of chosen statistical tests. The sample size was adequately powered, and the absence of missing data strengthened the dataset's integrity. Clear intervention protocols ensured consistency, allowing the observed effects to be attributed with confidence to the method of education rather than procedural variations.

The debate surrounding the optimal method for pre-operative education remained active, and this trial contributed meaningful evidence to that discussion. While standard verbal consent remains an irreplaceable component of the clinician–patient relationship, the findings indicated that complementary multimedia tools could elevate the process rather than replace it. The intervention offered an opportunity to augment verbal communication, supporting more informed and emotionally prepared patients without increasing clinical workload. The enhanced understanding

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observed in the multimedia group argued for integration of such tools into pre-operative pathways, particularly in busy surgical units where standardization is essential.

Future research should aim to validate these results across more diverse populations and clinical settings. Multilingual, culturally adaptable multimedia modules would help test the intervention's scalability. Studies incorporating postoperative outcomes would clarify whether improved understanding translates into better recovery trajectories. Additionally, qualitative research exploring patients' subjective experiences may offer insights into how multimedia tools can be refined to address concerns or preferences not captured by quantitative measures. Comparative studies evaluating different formats of multimedia, such as interactive platforms or virtual reality, could further advance the field.

Overall, the trial highlighted the value of multimedia education as a practical and effective enhancement to traditional verbal consent. By reducing anxiety and strengthening comprehension, the intervention supported a more informed and confident patient experience, emphasizing the importance of modernized communication strategies in surgical care.

Conclusion

The study demonstrated that a structured pre-operative multimedia education module more effectively reduced patient anxiety and enhanced procedural understanding than standard verbal consent. By offering clear, consistent, and engaging information, the intervention strengthened the quality of pre-operative preparation. These findings support the integration of multimedia tools into routine surgical counselling to promote more informed, confident, and emotionally prepared patients, ultimately improving the overall patient experience in elective surgical care.

Author Contributions

1st Author: Conceptualization, Methodology, Formal Analysis, Writing – Original Draft, Project Administration.

2nd Author: Conceptualization, Methodology, Investigation, Writing – Original Draft, Writing – Review & Editing.

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