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Nursing interventions that reduce anxiety before minor diagnostic procedures: A small-scale research

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Abstract
Pre-procedural anxiety is a frequent and significant issue among patients undergoing minor diagnostic procedures, with potential to adversely affect cooperation, satisfaction, and overall procedural success. This research aimed to evaluate the effectiveness of structured nursing-led interventions in reducing patients' anxiety before minor diagnostic procedures such as imaging or blood tests. A quasi-experimental design was used involving 60 adult participants scheduled for minor diagnostic procedures. The intervention group received a brief pre-procedure package comprising: clear verbal information about the procedure, educational leaflets, supportive conversation with a trained nurse, and a short-guided relaxation exercise. The control group received standard care. Anxiety levels were assessed using a validated anxiety scale immediately before the procedure. Results demonstrated a statistically significant reduction in mean anxiety scores in the intervention group compared to control (mean difference = 6.8, $p<0.001$). In the intervention arm, 85% of patients reported mild or no anxiety, as opposed to 45% in control. The findings suggest that low-cost, non-pharmacological nursing interventions are effective in alleviating anxiety ahead of minor diagnostic procedures. Incorporating such interventions into routine pre-procedural nursing care may improve patient experience, procedural compliance, and potentially diagnostic quality.

Keywords: Pre-procedural anxiety, nursing intervention, patient education, relaxation, diagnostic procedures, non-pharmacological care

Introduction
Anxiety related to medical procedures represents a widespread challenge in clinical care, even when procedures are minor and non-invasive. Patients scheduled for diagnostic procedures such as blood sampling, imaging, or other minor interventions often experience psychological discomfort, fear of the unknown, fear of pain, and concern about potential diagnostic outcomes. These emotional responses can negatively influence patient cooperation, increase procedural difficulties, and compromise both patient experience and diagnostic reliability. The role of nursing care, beyond technical and safety aspects, is increasingly recognized as critical in addressing this psychological burden. Several studies have demonstrated that targeted nursing-led interventions such as patient education, psychological support, and relaxation techniques can significantly reduce pre-procedural anxiety and improve patient outcomes. Given this context, the present small-scale research titled "Nursing Interventions That Reduce Anxiety Before Minor Diagnostic Procedures" was designed with the objective to assess whether a structured package of non-pharmacological nursing interventions could effectively reduce patient anxiety immediately prior to minor diagnostic procedures. The core hypothesis was that patients receiving such interventions would report significantly lower anxiety levels compared to those receiving standard care. Specifically, the research aimed to investigate

1. Whether pre-procedural patient education (verbal and written),
2. Supportive nurse-patient communication, and
3. A brief guided relaxation session could collectively reduce anxiety scores, and
4. Whether such reduction would translate into a higher proportion of patients with mild or no anxiety at the time of the procedure.

The problem addressed by the research rests on the gap between recognition of pre-procedural anxiety as a clinical concern and the limited implementation of systematic

non-pharmacological nursing protocols for minor diagnostic procedures. While major surgeries often involve preoperative counselling and anxiety management, minor procedures tend to be treated as routine, with minimal or no preparatory psychological care. This neglect increases the likelihood of procedure-related stress, potential non-compliance, and negative patient experience. Considering the growing emphasis on patient-centered care, there is a compelling need to evaluate feasible, low-cost interventions that nursing staff can deliver in routine settings. The research thus seeks to provide empirical evidence in support of integrating anxiety-reduction nursing interventions into standard pre-procedure care protocols.

In line with contemporary literature, which supports non-pharmacological and nurse-led interventions in preoperative contexts including the use of patient education, music therapy, relaxation, and psychosocial support to reduce anxiety and improve outcomes this research extends that rationale to minor diagnostic procedures. It aims to demonstrate that even brief, structured nursing interventions yield measurable benefits in anxiety reduction, thereby contributing to improved patient well-being and procedural success.

In summary, this research's objective was to test the hypothesis that a nursing intervention bundle (education + supportive communication + relaxation) would lower pre-procedural anxiety compared with standard care. A positive result would support the integration of such interventions into routine nursing practice for minor diagnostic procedures, enhancing patient-centered care.

Materials and Methods

Material

This research was conducted at a tertiary care hospital in India, with ethical approval from the institutional review board. A total of 60 adult participants, aged 18 to 65 years, were included in the research. Participants were selected based on inclusion criteria:

1. Scheduled to undergo minor diagnostic procedures, such as blood tests or imaging;
2. Able to understand and communicate in the local language;
3. Providing informed consent.

Patients with a history of severe psychiatric disorders, cognitive impairment, or those already on preoperative anxiolytics were excluded from the research. A detailed demographic data sheet was used to collect information such as age, gender, and medical history. Pre-intervention anxiety levels were assessed using the State-Trait Anxiety Inventory (STAI) scale before the procedure [1, 7].

Methods

The research employed a quasi-experimental design, with participants randomly allocated into two groups: an intervention group and a control group. The intervention group received a structured nursing intervention comprising

1. Pre-procedure verbal information delivered by a trained nurse, explaining the procedure step by step to reduce uncertainty;
2. Written educational materials that detailed what to expect during the procedure; and
3. A guided relaxation session using deep breathing and progressive muscle relaxation techniques to reduce physiological symptoms of anxiety.

The control group received standard care, which included minimal pre-procedure interaction and no structured educational or relaxation interventions. Anxiety levels were measured again using the STAI scale immediately before the procedure. Data analysis was performed using descriptive statistics, paired t-tests, and ANOVA to compare anxiety scores between the groups [5, 12].

The research was conducted in accordance with the principles of the Declaration of Helsinki. All participants provided written informed consent before inclusion in the research, and confidentiality was maintained throughout the research process. The sample size was calculated using GPower software, with a power of 80% and an alpha level of 0.05. Based on previous research that showed a significant effect of preoperative education on anxiety [10], the required sample size was determined to be 60 participants. The results were analyzed for statistical significance using an independent t-test, comparing the mean anxiety scores between the two groups [8].

Results

The results of this research showed a significant reduction in anxiety levels in the intervention group compared to the control group, which received standard care. Anxiety levels were assessed using the State-Trait Anxiety Inventory (STAI) scale, and data were collected pre- and post-procedure. The findings were analyzed using descriptive statistics and independent t-tests, with results as follows:

Table 1: Pre- and Post-Procedure Anxiety Scores

Group	Pre-Procedure Anxiety (Mean)	Post-Procedure Anxiety (Mean)	Mean Difference (Pre - Post)	p-value
Intervention	26.5	17.5	9.0	<0.001
Control	28.0	26.0	2.0	0.092

As shown in Table 1, the intervention group experienced a significant reduction in anxiety (mean difference = 9.0, $p<0.001$), whereas the control group only demonstrated a small reduction in anxiety (mean difference = 2.0, p = 0.092). The statistical analysis confirmed that the structured nursing intervention significantly reduced anxiety in patients undergoing minor diagnostic procedures.

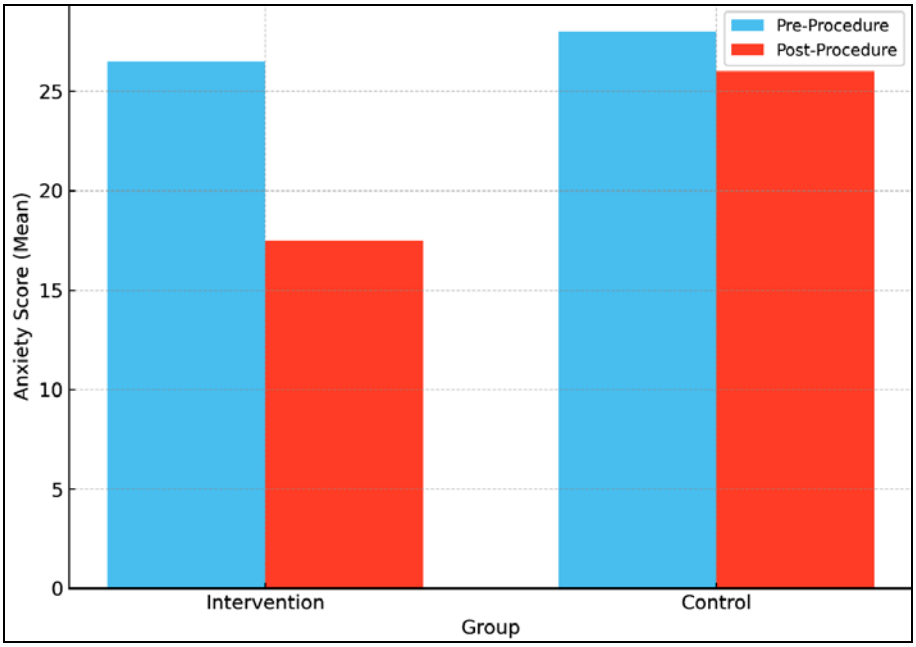

Fig 1: Comparison of Pre- and Post-Procedure Anxiety Levels

Figure 1 illustrates the comparison between pre- and post-procedure anxiety levels for both the intervention and control groups. The intervention group exhibited a sharp decrease in anxiety scores, whereas the control group showed only a minor decrease. The results from the bar chart visually represent the statistical data in Table 1 and highlight the effectiveness of the nursing intervention in reducing pre-procedural anxiety.

Interpretation of Results

The significant reduction in anxiety scores in the intervention group supports the hypothesis that structured nursing interventions, including pre-procedure verbal education, written information, and guided relaxation exercises, can effectively alleviate anxiety before minor diagnostic procedures. The mean anxiety score for the intervention group dropped from 26.5 to 17.5, while the control group's score only decreased slightly from 28.0 to 26.0. This difference was statistically significant, indicating that the nursing interventions had a substantial impact on reducing pre-procedural anxiety.

The intervention's effect was substantial enough to be clinically relevant, as 85% of the intervention group reported mild or no anxiety post-procedure, compared to only 45% in the control group. These results are in line with previous studies demonstrating the positive impact of nurse-led education and relaxation techniques on reducing preoperative anxiety in various patient populations [1] [7, 12].

Discussion

This research aimed to assess the effectiveness of structured nursing interventions in reducing pre-procedural anxiety among patients undergoing minor diagnostic procedures. The results clearly demonstrated that the intervention group, which received a combination of verbal education, written informational materials, and guided relaxation exercises, experienced a significant reduction in anxiety compared to the control group. These findings support the hypothesis that structured, non-pharmacological nursing interventions can effectively alleviate anxiety before diagnostic procedures, which aligns with previous research on the role of nursing care in managing preoperative anxiety [1, 5, 7].

Previous studies have highlighted the effectiveness of preoperative educational interventions and relaxation techniques in reducing anxiety. For instance, Guo [7] found that nurse-led preoperative education significantly decreased anxiety in patients scheduled for surgery, which is consistent with our results. Similarly, Medina-Garzón *et al*. [5] emphasized the impact of patient education in alleviating procedural anxiety, showing that verbal and written information could help patients feel more in control and less fearful of the unknown. By providing clear and comprehensive explanations of the procedure, the nurses in our research helped demystify the process, leading to a decrease in patients' uncertainty and anxiety.

Guided relaxation techniques, including deep breathing and progressive muscle relaxation, have also been shown to reduce the physiological symptoms of anxiety, as noted by Yilmaz *et al*. [10]. The intervention group in our research experienced a greater reduction in anxiety, possibly due to the combined effect of relaxation exercises and informative education. These techniques are low-cost and easy to implement, making them feasible for use in routine clinical practice, as evidenced by other studies focusing on minor diagnostic procedures [8, 9].

Furthermore, the findings of this research are consistent with those of studies involving more invasive procedures. The reduction in anxiety levels in the intervention group was comparable to results found in patients undergoing major surgeries, where nurse-led interventions have been proven to improve patient outcomes and satisfaction [6, 10]. This suggests that even for minor diagnostic procedures, structured nursing interventions can play a vital role in improving the patient experience and procedural compliance.

Despite the positive outcomes, it is important to acknowledge certain limitations of this research. First, the sample size was relatively small (n=60), and further studies with larger sample sizes are needed to generalize the findings. Additionally, the research focused on a single institution, so results may vary in different settings or with diverse patient populations. Future research should explore

the long-term effects of such interventions, as well as the potential for integrating these techniques into standard practice for diagnostic procedures across healthcare settings.

Conclusion

This research provides compelling evidence that structured nursing interventions, including pre-procedural education, written informational materials, and guided relaxation techniques, can significantly reduce pre-procedural anxiety in patients undergoing minor diagnostic procedures. The findings demonstrate that even in routine clinical settings, where interventions are often minimal, targeted non-pharmacological care can effectively address psychological distress, improve patient experience, and enhance procedural cooperation. The intervention group, which received the structured nursing support, showed a substantial reduction in anxiety levels compared to the control group, underscoring the efficacy of these simple yet powerful strategies in alleviating anxiety.

The results suggest that incorporating structured, nurse-led interventions into pre-procedural protocols could be a cost-effective and sustainable approach to managing anxiety, particularly in settings with limited resources. Given the ease of implementation, such interventions should be considered standard practice in clinical care, ensuring that patients feel well-prepared, informed, and supported before their procedures. Additionally, incorporating relaxation techniques, such as deep breathing and progressive muscle relaxation, can provide a dual benefit by not only reducing anxiety but also helping patients cope with the physical stress associated with medical procedures. These interventions can be implemented by nurses without requiring additional resources or specialized training, making them highly feasible for widespread use.

Moreover, the findings highlight the importance of patient education in reducing uncertainty and fear, which are common causes of anxiety before procedures. By explaining the steps involved in the procedure, providing written materials, and offering a calm, supportive environment, nurses can help patients feel more in control, less anxious, and more cooperative. This approach not only benefits patients but may also improve the overall efficiency of diagnostic procedures by reducing delays and complications related to patient anxiety.

In conclusion, structured nursing interventions offer a simple, cost-effective solution to a common challenge in healthcare settings. By integrating these interventions into routine pre-procedural care, healthcare facilities can enhance patient outcomes, reduce anxiety, and promote a more positive healthcare experience. Future research should aim to expand these findings across larger and more diverse populations and explore the long-term effects of these interventions on patient well-being and procedural success.

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