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Leaflet-based preoperative education, knowledge, and anxiety among patients undergoing spinal anesthesia

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Abstract

Background: Patients undergoing spinal anesthesia are at risk of experiencing anxiety because they remain conscious throughout the surgical procedure. A lack of understanding regarding medical procedures may trigger fear and stress responses that affect both the physiological and psychological conditions of patients. Uncontrolled anxiety may disrupt hemodynamic stability and delay recovery. Limited information can also reduce patient cooperation during treatment. Preoperative education is therefore needed to improve patient knowledge and reduce anxiety, one of which can be delivered through leaflets/leaflet-based education that presents information in a concise, clear, and easily understandable format.

Purpose: To examine the effect of leaflet-based preoperative education on patients' knowledge and anxiety levels among individuals undergoing surgery with spinal anesthesia.

Method: A quantitative pre-experimental design with a one-group pretest–posttest approach. A purposive sampling technique was used to recruit 68 respondents. Data were collected using a knowledge questionnaire and the Amsterdam Preoperative Anxiety and Information Scale (APAIS). Data were analysed using the Wilcoxon signed-rank test with a significance level of $\alpha = 0.05$.

Results: The findings demonstrated an increase in patients' knowledge and a decrease in anxiety levels following leaflet-based preoperative education. Before the intervention, most respondents had poor knowledge and moderate to severe anxiety levels. After the intervention, respondents showed improved knowledge and reduced anxiety levels. The Wilcoxon signed-rank test yielded a statistically significant difference in both knowledge and anxiety scores before and after the intervention ($p < 0.001$).

Conclusion: Leaflet-based preoperative education significantly improves patients' knowledge and reduces anxiety levels among individuals undergoing spinal anesthesia.

Keywords: Anxiety; Knowledge; Leaflet Education; Preoperative; Spinal Anesthesia.

INTRODUCTION

Spinal anesthesia is one of the regional anesthesia techniques often used in various surgical procedures because it works quickly and has a high success rate. This technique involves injecting local anesthesia into the subarachnoid space, which blocks pain in certain areas of the body. Despite its advantages, patients undergoing spinal anesthesia often feel anxious before the surgery. This condition arises due to uncertainty about the anesthesia

procedure, worries about complications, and fear of the upcoming surgical procedure (Sutantri, Rosidah, & Dewi, 2024). Preoperative anxiety is one of the psychological problems often experienced by patients before undergoing surgery. Uncontrolled anxiety can affect a patient's physiological and psychological condition by increasing the activity of the sympathetic nervous system and the hypothalamic–pituitary–adrenal (HPA) axis, which leads to higher stress

hormone levels and worsens the anxiety response (Hasanah, Amiatun, Lusmilasari, & Haryanti, 2025). This condition has the potential to disrupt the patient's readiness for surgery and affect the perioperative process.

One factor related to a patient's anxiety level is their knowledge about the anesthesia procedure they will undergo. Patients who have a good understanding of the surgery and anesthesia are generally more prepared for the operation compared to those with limited knowledge. On the other hand, a lack of information can cause uncertainty and increase worries about the medical procedure, which contributes to preoperative anxiety (Kristiani, Setiani, & Mahayanti, 2024). Providing preoperative education is one way to increase knowledge and reduce patient anxiety. Education helps patients understand the anesthesia procedure, the necessary preparations, and what they will experience during the perioperative process. One commonly used educational tool is a leaflet. A leaflet is an information medium in the form of a sheet that contains brief, clear, and easy-to-understand information, which can also be reread by patients as needed. Additionally, leaflets are relatively low-cost and can be easily tailored to the characteristics of the target audience (Zulkifli & Tjahningrum, 2026). Previous research shows that preoperative education using printed materials is effective in improving patients' readiness to undergo anesthesia and surgery. Providing education through leaflets significantly reduces preoperative anxiety in patients receiving spinal anesthesia (Lestari, Murdiyanto, & Setyowati, 2025). Anesthesia education using flipchart media is effective in reducing anxiety levels in pre-cesarean section patients ($p < 0.05$) (Haryanti, Lusmilasari, Madyaningrum, Hasanah, & Amiatun, 2023). These findings suggest that printed educational media can potentially increase patients' psychological readiness before undergoing surgery.

Even so, most previous studies have focused more on reducing anxiety levels as the main outcome. Research that evaluates both the increase in knowledge and the decrease in anxiety at the same time in preoperative patients undergoing spinal anesthesia is still limited. This research gap highlights the need for further studies on the effectiveness of education using leaflets on both aspects simultaneously. A preliminary study at the Central

Surgery Installation of Muhammadiyah Gamping Hospital showed that 484 patients underwent spinal anesthesia procedures during the period from August to October 2025, with an average of 161 patients each month. The high number of patients undergoing spinal anesthesia highlights the importance of providing effective education to improve knowledge and reduce anxiety before surgery. This study was conducted to evaluate the effectiveness of education using leaflets on the knowledge and anxiety levels of preoperative patients undergoing spinal anesthesia. The results of this study are expected to serve as a basis for developing more effective preoperative education to improve the quality of anesthesia nursing services.

RESEARCH METHOD

A quantitative descriptive method. The research variables are education using leaflets, knowledge level, and preoperative anxiety level in patients undergoing spinal anesthesia. The population in this study includes all preoperative patients who will undergo surgery with spinal anesthesia at Muhammadiyah Gamping Hospital. The study sample consisted of 68 respondents selected using purposive sampling based on the established inclusion and exclusion criteria. The research instruments used were a knowledge questionnaire about spinal anesthesia and the Amsterdam Preoperative Anxiety and Information Scale (APAIS) to measure preoperative anxiety levels. The knowledge questionnaire was adopted from previous research Riantini (2022) and consists of 10 question items with true and false answer choices. The instrument has undergone validity testing through face validity by two experts (expert judgment), and all items were deemed appropriate for the measurement objectives, making it suitable for use as a research instrument. Anxiety levels were measured using the APAIS developed, which consists of 6 statement items using a Likert scale ranging from 1 to 5, namely 1 = not, 2 = not really, 3 = a little, 4 = somewhat, and 5 = a lot. In Indonesia, the content validity of this instrument has been tested. Through a panel discussion of experts, it was confirmed that all the statements in the Indonesian version of APAIS are relevant to the concept of preoperative anxiety. Besides being valid, this instrument has been proven reliable with a Cronbach's Alpha value of 0.825 for the anxiety aspect (items 1, 2, 4, and 5) and 0.863 for the

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information needs aspect (items 3 and 6). The data analysis used was univariate analysis presented as frequency distribution, while bivariate analysis used the Wilcoxon Signed Rank Test to determine differences in knowledge levels and anxiety levels

before and after education using leaflets/leaflet-based education with a significance level of $p < 0.05$. This study has received ethical approval from the Ethics Committee of Muhammadiyah Gamping Hospital with number 054/KEP-PKU/II/2026.

RESEARCH RESULTS

Table 1. Frequency of Respondents (N=68)

Variable	Results	P-Value
Age (n/%) (Mean±SD) (Range) (Year)	(43.9±10.9) (17-65)	
17-25	6/8.8	
26-35	6/8.8	
36-45	24/35.3	
46-55	23/33.8	
56-65	9/13.2	
Gender (n/%)		
Male	35/51.5	
Female	33/48.5	
Education (n/%)		
Elementary School	12/17.6	
Junior High School	20/29.4	
Senior High School	36/52.9	
Pre-test Knowledge (n/%)		
Good	0/0.0	0.000
Fair	28/41.2	
Poor	40/58.8	
Post-test Knowledge (n/%)		
Good	13/19.1	
Fair	35/51.5	
Poor	20/29.4	
Pre-test Anxiety (n/%)		
Mild	0/0.0	
Moderate	49/72.1	
Severe	19/27.9	
Post-test Anxiety (n/%)		
Mild	15/22.1	
Moderate	43/63.2	
Severe	10/14.7	

The respondents had a mean age of 43.9 ± 10.9 years, with an age range of 17–65 years. Most

respondents were aged 36–45 years (24; 35.3%), followed by those aged 46–55 years (23; 33.8%).

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Male respondents accounted for 35 (51.5%) of the sample, while 33 (48.5%) were female. More than half of the respondents had completed senior high school education (36; 52.9%), followed by junior high school (20; 29.4%) and elementary school (12; 17.6%). Before the intervention, the majority of respondents had poor knowledge (40; 58.8%) and moderate anxiety (49; 72.1%). After receiving leaflet-based preoperative education, respondents demonstrated improved knowledge, with 13 (19.1%) categorized as having good knowledge and 35 (51.5%) having fair knowledge, while the proportion with poor knowledge decreased to 20 (29.4%). Anxiety levels also improved after the intervention, with 15 respondents (22.1%) experiencing mild anxiety, whereas the proportions with moderate and severe anxiety decreased to 43 (63.2%) and 10 (14.7%), respectively. The Wilcoxon signed-rank test showed a statistically significant difference in knowledge scores before and after the intervention ($p < 0.001$).

DISCUSSION

The characteristics of the respondents in this study include gender, age, and education level. Most respondents are in the age range of 36–45 years (35.3%) and 46–55 years (33.8%), and are mostly high school graduates (52.9%). This shows that the majority of respondents are adults who have the ability to receive and understand health information well. Education level also plays a role in a person's ability to accept new information, which can affect the success of the education provided. Individuals with higher education levels tend to have better skills in accessing, processing, and understanding health information compared to those with lower education levels (Ma'sum, Laiyinah, & Fhatonah, 2025). Also, people of productive age tend to be more adaptive in accepting new information, so it can help boost their knowledge after receiving education (Nabhani, Sulastri, & Setyorini, 2024).

The research results showed that before being given education using leaflets, most respondents had a low level of knowledge (58.8%) and none of the respondents had good knowledge. After receiving the education, knowledge increased, shown by the emergence of a good knowledge category at 19.1%, an increase in the fair knowledge category to 51.5%, and a decrease in the low knowledge category to 29.4%. The Wilcoxon test results showed a

significance value of 0.000 ($p < 0.05$), which means there is a significant effect of leaflet education on improving the knowledge of preoperative patients with spinal anesthesia. This increase in knowledge shows that leaflets are an effective educational tool for conveying information about spinal anesthesia procedures. Presenting information in a concise, systematic, and easy-to-understand way allows patients to gain a better understanding of the procedure they will undergo. In addition, leaflets can be read repeatedly, which helps reinforce the information. Leaflets/leaflet-based education are effective in increasing respondents' knowledge because the information can be read repeatedly, making it easier to understand and remember (Yadav, Rai, Devi, Singh, Singh, & Dixit, 2025).

Most patients have a good understanding of anesthesia procedures and emphasized the importance of preoperative education in improving patient comprehension (Riantini, 2022). Leaflet-based education can significantly improve knowledge after the intervention is given (Rahayu, 2024). The similarity between that study and this one lies in the use of leaflets as an educational medium that can enhance respondents' understanding. However, there are differences in the subjects and educational materials used. The previous study focused on a different health topic, while this study specifically examines preoperative patients' knowledge about spinal anesthesia. Therefore, this study provides evidence that the effectiveness of leaflets applies not only to general health education but also to preoperative anesthesia education. Even though there was an increase in knowledge after the intervention, 29.4% of respondents were still in the low knowledge category. Differences in knowledge outcomes are likely influenced by individual characteristics, such as education level, age, previous experience, and ability to absorb information. Knowledge is formed through learning and experiences that are carried out repeatedly, so previous experiences can strengthen a person's understanding of the health information they receive. This shows that the success of education is not only determined by the media used, but also by the characteristics and readiness of the individual receiving the education (Arintwe, Willson, Batenhorst, & Cartledge, 2020).

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In addition to increasing knowledge, this study also showed a decrease in preoperative patients' anxiety levels. Before receiving education, all respondents experienced anxiety, with most falling into the moderate anxiety category (72.1%) and severe anxiety (27.9%). After receiving the leaflet education, anxiety decreased, marked by 22.1% of respondents experiencing mild anxiety, a drop in the proportion of severe anxiety to 14.7%, and fewer respondents with moderate anxiety. The Wilcoxon test results showed a significance value of 0.000 ($p < 0.05$), which means that the leaflet education has a significant effect on reducing preoperative patients' anxiety.

The high level of anxiety before the intervention shows that the surgical procedure and spinal anesthesia are still perceived as something scary by patients. A lack of understanding about the anesthesia process, the effects they will feel, and the condition during surgery can create uncertainty that eventually triggers anxiety. After getting clear information through leaflets, patients become more familiar with the procedure they will undergo, so their fear and uncertainty decrease. Providing education before surgery can reduce patient anxiety because the information given can reduce uncertainty and increase the patient's readiness to face the procedure (Shalahuddin, Salsabila, Rukmasari, Rosidin, Eriyani, Pebrianti, & Maulana, 2025).

Even though there was a decrease in anxiety after providing education, there were still respondents who fell into the moderate and severe anxiety categories (Merkouris, Brasinika, Patsiavoura, Siniosoglou, Tsipsios, Triantafyllis, & Tsamakis, 2025). This shows that preoperative anxiety is not only influenced by a lack of information, but also by other factors like age, previous surgical experience, type of surgical procedure, and the support patients receive from family or healthcare providers. Patients who have never undergone surgery before tend to have higher anxiety because they don't have a clear idea of the procedure they will go through (Wahyuni, 2020). The lack of information about the surgical procedure and anesthesia can increase patient anxiety, while providing clear education can help reduce that anxiety (Prasetyo, 2019).

Education using leaflets is effective in reducing preoperative anxiety in patients undergoing spinal

anesthesia. The similarity between that study and this one lies in the use of leaflets as a medium for preoperative education and the focus on reducing anxiety in patients about to undergo spinal anesthesia. Focused on anxiety, while this study looks at two variables at once: preoperative patient knowledge and anxiety (Sari, Khalsiah, Fatmawati, Ahmady, Sari, & Ardilla, 2024). A significant decrease in anxiety after patients were given anesthesia education using printed materials before surgery. However, that study was conducted on pre-caesarean patients and used flip sheets, whereas this study used leaflets on preoperative patients with spinal anesthesia (Sulastri & Gautama, 2025). The similarity in the results shows that providing structured information can reduce patients' uncertainty, leading to lower anxiety. The differences also suggest that various types of educational media can be used to reduce anxiety in preoperative patients. An important finding in this study is that an increase in knowledge occurs alongside a decrease in anxiety levels. This condition suggests that better knowledge about spinal anesthesia procedures can reduce uncertainty, which is one of the main causes of preoperative patient anxiety. Patients who understand the procedures they will undergo tend to feel more prepared, calmer, and more confident when facing surgery. Patients who receive adequate information and education about surgery and anesthesia tend to have lower anxiety levels compared to patients who get less information. Therefore, increasing knowledge through educational leaflets has the potential to positively impact patients' psychological readiness before surgery (Bagheri, Salari, Malaijerdi, & Nazari, 2023).

Compared to previous studies that generally only assessed the effect of education on knowledge or anxiety separately, this study contributes by showing that education using leaflets can both increase knowledge and reduce anxiety levels in preoperative patients undergoing spinal anesthesia. These findings indicate that preoperative education not only plays a role in enhancing the cognitive aspects of patients but also affects their psychological aspects. This study shows that education using leaflets can improve knowledge and lower anxiety in preoperative patients with spinal anesthesia. The results of this study can serve as a reference for healthcare workers in providing preoperative education as a means to

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improve patient readiness before surgery (Wika, Asrina, Mahmud, Yusriani, Idris, & Sumiaty, 2026).

CONCLUSION

Leaflet-based education has been shown to be an effective intervention for improving knowledge and reducing anxiety levels in preoperative patients undergoing spinal anesthesia. Therefore, leaflet education can be utilized as a practical educational medium to support patient preparation and enhance readiness before surgery.

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