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VIDEO-BASED VISUAL AID VERSUS VERBAL INSTRUCTION FOR PATIENT POSITIONING DURING SUBARACHNOID BLOCK IN THE SITTING POSITION: A PROSPECTIVE RANDOMIZED OBSERVATIONAL STUDY

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ABSTRACT

Background: Subarachnoid block (SAB) is used in nearly 25–30% of regional anaesthetic procedures, and its success relies heavily on optimal patient positioning. Positioning difficulties are common, especially in elderly, obese, or anxious patients, with studies reporting up to 40% of patients requiring repeated attempts. Verbal instructions alone are frequently ineffective, so visual aids such as videos may improve patient understanding and cooperation.
Aim and Objectives: To compare the effectiveness of visual aids versus verbal instructions in assisting patient positioning for the successful performance of SAB, in terms of procedural time, number of attempts required for successful needle placement, first-pass success rate, and overall anaesthesiologist satisfaction in each group.
Materials and Methods: This prospective randomised observational study recruited 60 patients undergoing elective surgery under SAB, randomised into a Verbal Group (verbal positioning instructions) and a Visual Group (a short educational video/illustrated chart demonstrating the ideal sitting decubitus posture). All blocks were performed in the sitting position.
Results: In the Verbal group, 19 patients (63%) required 240–300 seconds, 7 (23%) required 300–360 seconds, and 4 (13%) required 360–420 seconds. In the Visual group, 17 patients (57%) achieved successful placement within 180–240 seconds, 11 (37%) required 240–300 seconds, and none required more than 360 seconds. Overall procedural time was significantly shorter in the Visual group (253.0 ± 49.1 s) than the Verbal group (312.2 ± 56.3 s; $p = 0.001$). A single attempt was sufficient in 66.7% of the Visual group compared with 33.3% of the Verbal group achieving first-pass success ($p = 0.020$), and anaesthesiologist satisfaction was higher in the Visual group (96.7% vs 73.3%; $p = 0.026$).
Conclusion: Visual aids significantly enhance patient comprehension and cooperation with the posture required for SAB. Video-based visual guidance led to shorter procedural time, fewer attempts, and a higher first-pass success rate, improving procedural efficiency and safety, and represents a simple, low-cost adjunct to routine preoperative counselling.

KEYWORDS: Subarachnoid block; Patient positioning; Visual aid; Patient education; Spinal anaesthesia; Anaesthesiologist satisfaction

INTRODUCTION

Subarachnoid block (SAB) is among the most frequently used regional anaesthetic techniques, constituting nearly one-third of regional procedures worldwide (1). Its success depends on optimal patient positioning, which enhances landmark identification and needle placement while reducing complications. Positioning, however, is often difficult in elderly, obese, anxious, or cognitively impaired patients, contributing to prolonged procedure time and multiple attempts, with studies reporting 22–44% of patients requiring more than one attempt (2,3). Repeated needle attempts are not a benign inconvenience: they are an established, modifiable risk factor for post-dural puncture headache and other needle-related complications, underscoring the clinical importance of achieving first-pass success (4). Verbal instructions alone are commonly misunderstood because of anxiety, language barriers, or poor comprehension, leading to failed block rates of 5–17% (5). Visual aids — including diagrams and short videos — have been shown to improve patient understanding and cooperation by 30–50% (6), and structured visual-aid quality-improvement initiatives have been described specifically for neuraxial block positioning in obstetric settings (7). More broadly, multimedia-based patient education has been shown to improve comprehension, satisfaction, and efficiency across a range of pre-procedural and informed-consent settings in anaesthesia and surgery (8,9) This suggests that incorporating structured visual aids into pre-procedural counselling may enhance the safety and efficacy of SAB.

Although several studies have examined visual aids for neuraxial block positioning in obstetric and caesarean-section populations, comparative data in a general elective surgical population positioned in the classic sitting posture remain limited. This study was therefore designed to prospectively compare a short educational video/illustrated chart against standard verbal instruction for patient positioning before SAB, with procedural time, number of attempts, first-pass success, and anaesthesiologist satisfaction as outcomes.

MATERIALS AND METHODS

Study Design, Setting, and Ethical Considerations

This was a prospective, randomised, observational study conducted in the Department of Anaesthesiology at Saveetha Medical College and Hospital (SMCH), Kancheepuram, Tamil Nadu, India, from June 2024 to December 2024. Ethical approval was obtained from the Institutional Human Ethics Committee of Saveetha University, and the study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrolment. The study is reported in accordance with the CONSORT 2010 guideline for randomised trials (10).

Participants

Patients aged 18 years or older and younger than 60 years, of American Society of Anesthesiologists (ASA) physical status I–II, and scheduled to undergo elective surgery under spinal anaesthesia were recruited. Patients were excluded if they refused participation, or had spinal deformities, neurological disorders, hearing or visual impairment, or mental illness/cognitive dysfunction that could affect comprehension of the assigned aid.

Randomisation and Intervention

Patients were allocated to the Verbal group or the Visual group by computer-generated randomisation. In the preoperative holding area, patients in the Verbal group received verbal instructions regarding SAB positioning in a language they understood, while patients in the Visual group received the same information through visual aids — a short educational video and an illustrated chart demonstrating the ideal sitting decubitus posture. All patients received SAB in the sitting position.

After standard monitoring and intravenous access were established, patients positioned themselves on the operating table using only the assigned aid, requesting assistance only if needed. The anaesthesiologist selected the block technique and drugs, prepared the spinal tray aseptically, and began the procedure once the patient had adopted the instructed position; a second, independent observer started the timer at this point.

Outcome Measures

The primary outcome was the total procedural time, defined as the time in seconds from the start of positioning instructions until free flow of cerebrospinal fluid (CSF) was visualised in the subarachnoid space. Secondary outcomes were the number of needle attempts, the first-pass success rate, and overall anaesthesiologist satisfaction with patient positioning, scored on an 11-point scale from 0 (very unsatisfactory) to 10 (most satisfied).

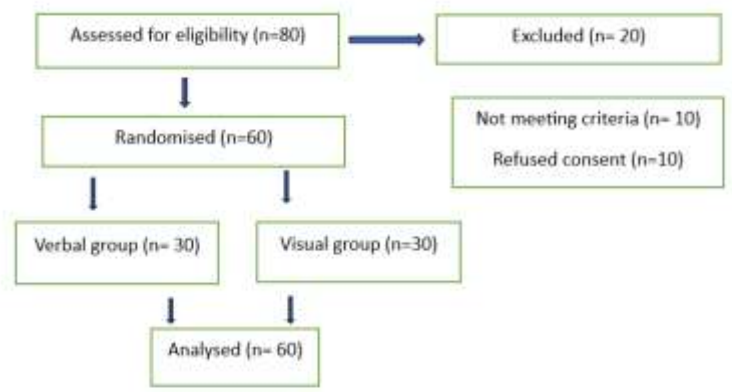

Figure 1. CONSORT flow diagram showing enrolment, randomisation, allocation to the Verbal and Visual groups, and analysis of the 60 participants.

Sample Size Calculation

The sample size was informed by a previously reported study (11) that found a mean procedural time of 401s with verbal instruction and 320s with combined visual-plus-verbal instruction (difference 81s). Assuming a pooled standard deviation of 120 s, a two-sided α of 0.05, and 30 patients per group (60 total), the achieved post-hoc power to detect the observed difference (Cohen's d = 0.675) was approximately 73%. For the secondary binary outcome (proportion requiring ≥ 3 attempts; 22.5% vs 4.2%), the achieved post-hoc power with 30 patients per group was approximately 61%. On this basis, 60 participants (30 per group) were enrolled.

Statistical Analysis
Data were analysed using appropriate descriptive and inferential statistics. Continuous variables were analysed using Student's t-test or the Mann–Whitney U test, depending on the distribution of the data. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Results are reported with suitable summary statistics, and a two-sided $p < 0.05$ was considered statistically significant. All statistical analyses were performed using SPSS software (IBM Corp.).

RESULTS

Demographic Data (Table 1)
A total of 60 patients were assessed for eligibility, randomised, and included in the final analysis (Figure 1). Patient characteristics — age, weight, height, and BMI — are presented as mean ± standard deviation; gender and ASA status are expressed as percentages (Table 1). The two groups were well matched at baseline, with no statistically significant differences in age, gender distribution, BMI, or ASA status (all $p > 0.05$).

Table 1. Demographic and baseline comparison of the Verbal and Visual groups.

Parameter	Verbal group (n=30)	Visual group (n=30)	P value
Mean age (years)	42.73 ± 13.00	40.67 ± 13.05	0.533
Gender, M/F, n (%)	M = 12 (40%) F = 18 (60%)	M = 11 (37%) F = 19 (63%)	0.908
Mean BMI (kg/m²)	24.75 ± 2.36	24.51 ± 2.93	0.709
ASA status, n (%)	ASA I = 2 (6.7%) ASA II = 28 (93.3%)	ASA I = 3 (10%) ASA II = 27 (90%)	1.000*

Values are expressed as mean ± standard deviation or n (%). BMI, body mass index; ASA, American Society of Anesthesiologists physical status classification. *Fisher's exact test used for ASA status because of small expected cell counts; all other comparisons used the independent-samples t-test (continuous variables) or chi-square test (categorical variables). $p < 0.05$ was considered significant; none of the baseline comparisons reached significance, confirming adequate randomisation.

Primary Outcome: Procedural Time
The chi-square test was used to compare the overall distribution of patients across the four procedural-time categories, to determine whether the visual aid produced a significant shift toward faster positioning (Table 2, Figure 2). A markedly higher proportion of the Visual group achieved positioning within 180–240 seconds compared with the Verbal group (57% vs 0%; $p = 0.001$). When overall procedure time was compared (Table 3), the Visual group was faster by approximately one minute (59 seconds) on average.

Table 2. Distribution of patients across procedural-time categories in the Verbal and Visual groups.

Procedure time category	Verbal group (n=30)	Visual group (n=30)	P value
180–240 s	0 (0%)	17 (57%)	0.001
240–300 s	19 (63%)	11 (37%)	0.070
300–360 s	7 (23%)	2 (6%)	0.145
360–420 s	4 (13%)	0 (0%)	0.112

Values are n (%) of patients in each 60-second procedural-time band. P values were derived from the chi-square test comparing the distribution of patients across categories between groups; the overall between-group distribution differed significantly ($p = 0.001$), driven predominantly by the 180–240 s category.

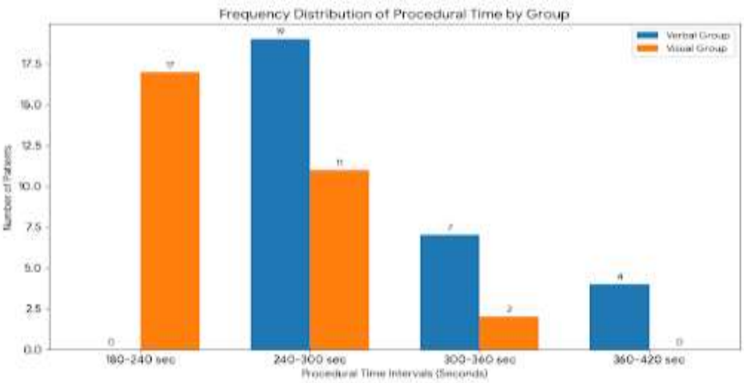

Figure 2. Distribution of procedural time by group. The Visual group (orange) predominates in the fastest time category (180–240 s), whereas the Verbal group (blue) is more prevalent in the slower categories (240–420 s).

Table 3. Overall procedural time (primary outcome) in the Verbal and Visual groups.

Verbal group (n=30)	Visual group (n=30)	P value
312.2 ± 56.3 s (5.20 ± 0.94 min)	253.0 ± 49.1 s (4.22 ± 0.82 min)	0.001

Values are mean ± standard deviation, presented in seconds and minutes. P value derived from the independent-samples t-test. The Visual group completed positioning approximately 59 seconds faster, on average, than the Verbal group.
Secondary Outcomes
The number of attempts was analysed using the Mann–Whitney U test, as these data are discrete counts; the between-group difference was statistically significant ($p = 0.003$). The first-pass success rate was compared using the chi-square test, and anaesthesiologist satisfaction was compared using Fisher's exact test (owing to the small number of “not satisfied” outcomes in the Visual group). Both differences were statistically significant (Table 4).

Table 4. Comparison of the number of attempts, first-pass success rate, and anaesthesiologist satisfaction between the Verbal and Visual groups.

Parameter	Verbal group	Visual group	P value
Number of attempts (mean ± SD)	1.93 ± 0.83	1.33 ± 0.48	0.003
First-pass success rate, n (%)	10 (33.3%)	20 (66.7%)	0.020
Anaesthesiologist satisfaction, n (%)	22 (73.3%)	29 (96.7%)	0.026

Values are mean ± standard deviation or n (%). Number of attempts compared using the Mann–Whitney U test; first-pass success rate compared using the chi-square test; anaesthesiologist satisfaction compared using Fisher's exact test. $p < 0.05$ was considered statistically significant.

Ideal Positioning Technique
For reference, the positioning taught to both groups (delivered verbally to the Verbal group and demonstrated visually to the Visual group) comprised the classic 'angry cat' sitting posture: hips at the edge of the table, feet supported on a stool, arms hugging a pillow forward, shoulders relaxed, the lower back arched outward, and the chin tucked toward the chest to flex the neck and open the interspinous spaces (Figure 3).

Figure 3. Schematic illustration of the ideal sitting posture taught to participants for subarachnoid block: hips at the table edge, feet supported, arms hugging a pillow, lower back arched outward, and chin tucked to flex the neck and widen the interspinous spaces. (Illustrative schematic, not an actual patient photograph.)

DISCUSSION

The success of a subarachnoid block largely depends on correct patient positioning, which facilitates identification of anatomical landmarks and ease of needle insertion (2,6). Inadequate or incorrect positioning may result in multiple needle attempts, prolonged procedural time, post-dural puncture headache, and increased patient dissatisfaction, since repeated dural puncture attempts are themselves a recognised, modifiable risk factor for post-dural puncture headache (4). Effective communication of the required posture is therefore clinically important, not merely a matter of convenience.

Verbal instructions alone may be insufficient because of patient anxiety, language barriers, or poor comprehension. Visual aids may enhance patient understanding and cooperation by providing a clearer demonstration of the desired position, consistent with a broader body of evidence that multimedia-based education improves comprehension, satisfaction, and efficiency across various pre-procedural and informed-consent settings in surgery and anaesthesia (8,9). This study compared the effectiveness of a video/illustrated-chart visual aid with verbal instruction alone in assisting patient positioning for SAB performed in the sitting position.

Hegde et al. 2024 (12) demonstrated that a visual aid improved optimal patient positioning for spinal anaesthesia in cesarean-section patients. In our study, the Visual group similarly showed a marked shift toward faster positioning, with 57% of patients achieving successful placement within 180–240 seconds. Yang et al.13 reported that different educational methods, delivered at different times, reduced the time required for parturients to position themselves for epidural placement; in our study, overall procedural time was likewise shorter in the visual-aid group (253.0 ± 49.1 s). Similarly, Gurunathan et al.14 found that a visual aid reduced procedure time by approximately two minutes and decreased the number of puncture attempts in achieving optimal positioning for spinal anaesthesia.

Mudigere et al. 2025 (11), in a related observational study from the same broad clinical setting, similarly reported that visual aids improved first-pass success and reduced technical difficulty, thereby enhancing anaesthesiologist satisfaction. In our study, the Visual group demonstrated a statistically higher first-pass success rate (66.7% vs 33.3%) and higher anaesthesiologist satisfaction (96.7% vs 73.3%). Because fewer attempts are independently associated with a lower incidence of post-dural puncture headache (4), these findings also carry potential downstream implications for patient safety and post-procedural morbidity, beyond procedural efficiency alone.

Limitations

Although the sample size (n = 60) was sufficient to demonstrate statistical significance for the primary outcome, it remains relatively small, and a larger multicentric study would help validate these findings across a broader population. The study was also single-centre and non-blinded — patients and, to some extent, the treating anaesthesiologist were aware of group allocation, which could introduce performance or observer bias, particularly for the anaesthesiologist-satisfaction outcome. While procedural time and number of attempts are objective measures, the anaesthesiologist satisfaction score is inherently subjective and may be influenced by the clinician's prior experience with, or preference for, the visual tool. Post-dural puncture headache and other downstream complications were not directly measured and remain an important outcome for future trials.

CONCLUSION

The results of this observational study demonstrate that the use of visual aids significantly improves procedural efficiency, increases first-pass success rates, reduces the number of needle attempts, and enhances anaesthesiologist satisfaction during subarachnoid block. These findings support the use of visual aids as a simple, effective, and low-cost adjunct to verbal instruction in routine preoperative preparation, particularly in busy clinical settings, to optimise patient cooperation and procedural success. Larger, multicentric, blinded trials incorporating post-dural puncture headache and other patient-centred outcomes are warranted to confirm and extend these findings.

Declarations

Ethical Approval: This study was approved by the Institutional Human Ethics Committee, Saveetha University (Approval No.: [insert]). Written informed consent was obtained from all participants.

Consent for Publication: Not applicable (no identifiable patient data or images are presented).

Conflict of Interest: Nil.

Funding: No external funding was received.

Data Availability: The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

REFERENCES

1. NYSORA. Spinal anesthesia: technique and clinical use. New York School of Regional Anesthesia; 2023.
2. Brooks SK, Ahmad I, McDonnell J, et al. Patient positioning for spinal anaesthesia: impact on success rate. Anaesthesia. 2014;69(9):1009-1015.
3. Fettes PD, Jansson JR, Wildsmith JA. Failed spinal anaesthesia: mechanisms, management, and prevention. Br J Anaesth. 2009;102(6):739-748.
4. Weji BG, Obsa MS, Melese KG, Azeze GA. Incidence and risk factors of postdural puncture headache: prospective cohort study design. Perioper Med (Lond). 2020;9:32. doi:10.1186/s13741-020-00164-2

5. Kumar A, Chaudhary A, Sinha C, et al. Causes of failed spinal anaesthesia: a clinical review. Indian J Anaesth. 2014;58(3):275-279.
6. Karim HM, Yunus M, Bhattacharyya P, et al. Role of visual aids in improving patient positioning for neuraxial blocks. J Clin Anesth. 2017;38:133-134.
7. Nair PR, Rao AKBN, Moody T. Utilisation of visual aids to optimise patient positioning for neuraxial blocks in obstetrics: a quality improvement initiative. Int J Obstet Anesth. 2018;35:47-52.
8. van den Heuvel SF, Jonker P, Hoeks SE, Ismail SY, Stolker RJ, Korstanje JH. The effect of stand-alone and additional preoperative video education on patients' knowledge of anaesthesia: a randomised controlled trial. Eur J Anaesthesiol. 2025;42(4):313-323. doi:10.1097/EJA.0000000000002109
9. Tipotsch-Maca SM, Varsits RM, Ginzel C, et al. Effect of a multimedia-assisted informed consent procedure on the information gain, satisfaction, and anxiety of cataract surgery patients. J Cataract Refract Surg. 2016;42(1):110-116.
10. Schulz KF, Altman DG, Moher D; CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. BMJ. 2010;340:c332. doi:10.1136/bmj.c332
11. Mudigere GR, Balloor R, Mitali P. Comparison of visual and verbal aid to assist patient positioning in performing subarachnoid block: an observational study. Indian J Clin Anaesth. 2025;12(2):223-228. doi:10.18231/j.ijca.2025.037
12. Hegde SV, Shivashankar A, Nalini KB, Turai A. Optimal patient positioning for spinal anesthesia using a visual aid in cesarean section patients: a randomized control trial. J Anaesthesiol Clin Pharmacol. 2024;40(3):445-450.
13. Yang C, Cheng Y, Hu J, Lu Y, Yu X, Huang S. The effectiveness of different education methods conducted at different times for decreasing the time required for a parturient to position herself for epidural placement. BMC Pregnancy Childbirth. 2022;22(1):554. doi:10.1186/s12884-022-04879-6
14. Gurunathan U, Rapchuk IL, King G, Jacobsen S. Usefulness of a visual aid in achieving optimal positioning for spinal anaesthesia: a randomised trial. Anaesth Intensive Care. 2015;43(1):16-21.