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Comparison of Finger-Hold Technique and Slow Deep Breathing on Total APAIS Scores and Systolic Blood Pressure in Patients Undergoing Caesarean Section at RSI Purwokerto

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Abstract

Background: Women preparing for caesarean section may experience psychological distress and transient cardiovascular arousal. Finger-hold relaxation and slow deep breathing are low-resource nursing approaches, but head-to-head comparative evidence in this population remains limited.
Objective: To compare short-term changes in the total six-item Amsterdam Preoperative Anxiety and Information Scale (APAIS) score and systolic blood pressure following two relaxation approaches.
Methods: A non-randomized, two-group pretest–posttest study enrolled 44 patients scheduled for elective caesarean section (22 per group). Finger-hold and slow deep breathing each lasted 15 minutes. Total APAIS score includes four anxiety and two information-need items. Within-group changes were assessed with paired t-tests; unadjusted changes between groups were compared using Mann–Whitney U tests. Change was defined as pretest minus posttest.
Results: Mean total APAIS scores decreased from 16.32 to 10.82 in the finger-hold group and from 12.77 to 9.73 in the breathing group. Systolic blood pressure decreased from 127.23 to 117.41 and from 122.09 to 115.41 mmHg, respectively. Table-reported within-group p values were 0.001. The unadjusted between-group comparison was significant for total APAIS change (p=0.003), but not for systolic pressure change (p=0.119). Baseline total APAIS values differed between groups.
Conclusion: Both approaches were associated with short-term score and pressure reductions. Baseline imbalance, non-randomized allocation and the absence of adjusted analyses preclude causal attribution or a conclusion that finger-hold is superior.

Keywords: Amsterdam Preoperative Anxiety and Information Scale; caesarean section; finger-hold relaxation; preoperative nursing; slow deep breathing.

INTRODUCTION

The 2023 Indonesian Health Survey reported that 25.9% of deliveries were performed by caesarean section, highlighting the need for supportive perioperative services (1). Globally, caesarean section accounted for approximately 21% of births in 2018, and the World Health Organization projected that this proportion could approach 29% by 2030 (2). These trends

increase the importance of feasible, patient-centered preparation for surgery.

The preoperative phase is an important component of perioperative care because patients require both physical and psychological preparation before surgery. Women awaiting caesarean section may experience anxiety related to surgery, anesthesia, pain, possible complications, and uncertainty about the procedure (3,4). Preoperative anxiety is an emotional response that may arise when an individual perceives an anticipated threat and can vary according to individual and clinical circumstances (5).

Preoperative anxiety is clinically relevant because psychological stress may be accompanied by physiological changes, including increased blood pressure. The activation of the sympathetic nervous system during anxiety can increase cardiovascular responses, making blood pressure a relevant physiological parameter when assessing patients before surgery (6). Studies among preoperative patients have also reported an association between anxiety and blood pressure, indicating that anxiety management may contribute to psychological comfort and physiological stability before anesthesia and surgery (7).

Anxiety can be managed through pharmacological and non-pharmacological approaches. Non-pharmacological interventions such as guided imagery, slow deep breathing, aromatherapy, music therapy, and relaxation techniques have been used to support anxiety reduction in patients before surgery (8). Finger-hold therapy and slow deep breathing are simple relaxation techniques that can be implemented in the preoperative setting without specialized equipment. Finger-hold therapy involves gently holding the fingers sequentially while maintaining relaxed breathing, whereas slow deep breathing involves consciously regulating respiration through slow and deep breathing patterns (9,10).

Previous studies have reported reductions in anxiety following finger-hold or finger-grip relaxation among preoperative patients, including patients undergoing caesarean section (11,12). Slow deep breathing has also been reported to reduce anxiety among preoperative patients, including patients undergoing caesarean section (13,14).

Published reports frequently evaluate finger-hold relaxation or slow deep breathing separately, in heterogeneous perioperative or non-obstetric populations. Direct comparisons between these active approaches during preparation for caesarean section remain limited. Another measurement gap concerns APAIS scoring: the total six-item score combines anxiety and information-need responses, so improvement in that total cannot automatically be interpreted as change in anxiety alone. This study contributes a direct, short-interval comparison of two nurse-delivered relaxation procedures using the total APAIS score and systolic blood pressure. Given the non-randomized design, the comparisons are descriptive and hypothesis-generating rather than evidence of comparative efficacy (15,16).

This study aimed to compare changes in total APAIS scores and systolic blood pressure after finger-hold therapy and slow deep breathing among patients undergoing elective caesarean section at RSI Purwokerto.

METHODS

Study Design

This quasi-experimental study used a non-randomized, two-group pretest–posttest design. Total six-item APAIS scores and systolic blood pressure were documented immediately before and after finger-hold relaxation or slow deep breathing. Because a usual-care-only group was absent and participants were not randomized, the analysis addresses within-group change and exploratory active-comparator differences, not intervention-specific causal effects.

Setting

The study was conducted in the preoperative room of Al Barokah, RSI Purwokerto. The location was selected because patients remained in the preoperative preparation phase, allowing sufficient time for baseline assessment, administration of the intervention, and post-intervention assessment. Data collection was conducted in November 2025 - March 2026.

Population and Sample

The study included 44 eligible patients, consisting of 22 patients in the finger-hold group and 22 patients in the slow deep breathing group. Total sampling was used because the accessible population during the specified data-collection periods was limited.

Eligible patients were patients scheduled for

elective caesarean section who were conscious, able to communicate adequately, and willing to provide written informed consent. Patients undergoing emergency caesarean section, patients with hand or finger injuries or physical abnormalities that could interfere with finger-hold therapy, patients with severe respiratory problems that could interfere with slow deep breathing, and patients who refused or withdrew from the study were excluded.

After eligibility screening, participants were assigned to two intervention groups of equal size according to the local study protocol. Random sequence generation, allocation concealment, group-assignment criteria, assessor masking and procedures for balancing baseline prognostic factors were not reported in the study methods documentation. Accordingly, group allocation was classified as non-randomized and susceptible to selection and performance bias.

Intervention

The finger-hold group received a 15-minute intervention. The patient was positioned comfortably in a calm environment and instructed to relax and regulate breathing. The patient then gently held each finger sequentially using the opposite palm, beginning with the thumb and continuing through the index, middle, ring, and little fingers. Each finger was held for approximately 2–3 minutes while maintaining relaxed breathing, with the overall intervention lasting approximately 15 minutes. This procedure followed the finger-hold SOP used in the study.

The slow deep breathing group received a 15-minute intervention. The patient was positioned sitting or lying down and instructed to remain relaxed. Both hands were placed over the abdomen, followed by slow inhalation through the nose for approximately six seconds, holding the breath for three seconds, and slow exhalation through the mouth. The patient then returned to normal breathing for three cycles before repeating the slow breathing sequence while maintaining relaxation and concentration. The intervention was continued for approximately 15 minutes according to the study SOP. Both interventions were administered after the pretest assessment and before the posttest assessment.

Instruments

The Amsterdam Preoperative Anxiety and Information Scale (APAIS) comprises six items: four assess anxiety about anesthesia or surgery and two assess the need for information. The recorded outcome in this study was their combined total (possible range 6–30), not the four-item anxiety subscale. We therefore refer consistently to the "total APAIS score" and do not infer a separate anxiety effect. Construct validity and reliability of an Indonesian-language version have been documented (16). The study material did not provide the separate item or subscale scores needed for domain-specific analyses.

Systolic blood pressure was assessed before and after the interventions. The protocol mentions digital and manual sphygmomanometers but does not consistently identify the device used per patient, the calibration status, patient rest time or assessor masking. Consequently, measurement conditions and repeatability could not be independently verified, and observed short-term differences require cautious interpretation.

Patient characteristics were obtained through interview and medical-record review. Family support was assessed using a Likert-type questionnaire and classified as "good" when the recorded score exceeded 50%. Validation evidence for this dichotomization was not reported. These baseline variables were summarized descriptively but were not included in an adjusted intervention comparison.

Data Analysis

Data were summarized using frequencies, percentages, means and standard deviations. Shapiro–Wilk normality testing was reported before paired t-tests were applied for within-group pretest–posttest comparisons. It did not supply distributional diagnostics for the paired differences, so the paired-test assumptions could not be independently checked. Between-group comparisons used Mann–Whitney U tests applied to individual change scores (Δ = pretest minus posttest); positive Δ denotes a reduction. All reported tests were two-sided with a nominal significance threshold of 0.05. The table presents within-group p values as 0.001 for all four within-group comparisons. Because the initial total APAIS means were 16.32 and 12.77 in the two groups, unadjusted changes are vulnerable to baseline imbalance and regression to the mean. ANCOVA or another baseline-adjusted analysis and confidence intervals were not reported. Consequently, inferences remain

exploratory.

Ethical Consideration

Ethical approval was reported from the Research Ethics Committee of Universitas Harapan Bangsa (approval no. B.LPPM-UHB/1174/11/2025). Written informed consent was reported as obtained before participation. Patients were informed of the voluntary nature of participation, and the manuscript reports protection of participant confidentiality.

RESULTS

The analysis included 44 elective caesarean section patients (22 per group). Most were aged 20–35 years, and family support was classified as "good" for every participant; age, education and previous surgery were not identical across groups (Table 1). The finger-hold group began with a higher mean total APAIS score (16.32 ± 5.04) than the slow deep breathing group (12.77 ± 4.73), a descriptive difference of 3.55 points. Pretest systolic blood pressure was 127.23 ± 10.59 and 122.09 ± 10.60 mmHg, respectively. Following the interventions, mean total APAIS scores were 10.82 ± 3.28 and 9.73 ± 3.46; mean systolic pressures were 117.41 ± 9.16 and 115.41 ± 7.51 mmHg (Table 2). The respective absolute mean reductions were 5.50 versus 3.04 APAIS points and 9.82 versus 6.68 mmHg, with paired-test p=0.001 reported for each within-group comparison. Mann–Whitney U tests on pretest-minus-posttest change scores found a between-group difference for total APAIS score (p=0.003) but not for systolic pressure (p=0.119; Table 3). These are unadjusted comparisons. They do not establish intervention superiority, equivalence, or an effect attributable to either intervention in isolation.

Table 1. Baseline Characteristics of Patients by Intervention Group

Variabel	Finger Hold (N: 22) (%)	Slow Deep Breathing (N: 22) (%)
Age		
<20 Years	0 (0.0%)	1 (4.5%)
20-35 Years	17 (77.3%)	19 (86.4%)
>35 years old	5 (22.7%)	2 (9.1%)
Education		
Basic Education	8 (36.4%)	10 (45.5%)
Secondary education	7 (31.8%)	7 (31.8%)
Higher education	7 (31.8%)	5 (22.7%)
Family Support		
Good	22 (100%)	22 (100%)
Poor	0 (0.0%)	0 (0.0%)
Previous surgical experience		
Yes	10 (45.5%)	11 (50.0%)
No	12 (54.5%)	11 (50.0%)

Table 2. Within-group changes in total APAIS score and systolic blood pressure before and after the interventions

		N	Mean	SD	*p-Value*
APAIS total	**Finger Hold**				
	Pretest	22	16.32	5.037	0.001
	Posttest	22	10.82	3.275	
	Slow Deep Breathing				
	Pretest	22	12.77	4.730	0.001
	Posttest	22	9.73	3.463	
Systolic	**Finger Hold**				

Blood Pressure (mmHg)	Pretest	22	127.23	10.593	0.001
	Posttest	22	117.41	9.163	
	Slow Deep Breathing				
	Pretest	22	122.09	10.601	0.001
	Posttest	22	115.41	7.513	

Table 3. Unadjusted between-group comparisons of total APAIS and systolic pressure reductions

	Intervention	N	Mean Rank	Mann-Whitney U	*p-Value*
APAIS reduction	**Finger Hold**	22	28.20	116.50	0.003
	Slow Deep Breathing	22	16.80		
Systolic pressure reduction	**Finger Hold**	22	19.52	176.50	0.119
	Slow Deep Breathing	22	25.48		

Δ = Pretest − posttest (positive Δ indicates a reduction); Mann–Whitney U test for between-group change distributions.

DISCUSSION

Most patients in both intervention groups were aged 20–35 years, representing the reproductive-age category. The distribution of educational level varied across the basic, secondary, and higher education categories. All patients in both groups reported good family support, while previous surgical experience was distributed between patients with and without previous surgery. These characteristics provide contextual information about the study population, but the primary focus of the present study was the change in anxiety and systolic blood pressure following the interventions. Family support may contribute to psychological coping by providing emotional support and opportunities for patients to express concerns before surgery, while previous surgical experience may influence how patients perceive anesthesia, pain, and the surgical environment (3,17).

In the finger-hold group, mean total APAIS decreased from 16.32 ± 5.04 to 10.82 ± 3.28 (reported paired-test p=0.001). This 5.50-point mean change is a within-group, short-interval observation. Because APAIS total includes information-need responses, it should not be interpreted as an isolated reduction in the four-item anxiety construct. No untreated comparator was used.

Repetitive, gentle finger holding may provide focused attention and a calming context; however, specific neurophysiological or reflex-point mechanisms were not tested here. Related finger-hold studies have described lower preoperative anxiety scores, but variation in patient populations, outcome definitions and study design limits direct transfer to these elective caesarean patients (11,12,18).

In the breathing group, total APAIS decreased from 12.77 ± 4.73 to 9.73 ± 3.46 (reported paired-test p=0.001), a mean reduction of 3.04 points. This change similarly reflects the combined anxiety and information domains and cannot be ascribed solely to the 15-minute breathing procedure.

Slow controlled breathing has plausible autonomic and attentional pathways through which perioperative distress may decrease. Yet autonomic indices, respiratory pattern fidelity and expectancy were not measured in this study. Prior studies of breathing relaxation support clinical plausibility, not confirmation of the proposed mechanism in these participants (9,14).

Mean systolic blood pressure fell from 127.23 ± 10.59 to 117.41 ± 9.16 mmHg after finger-hold relaxation and from 122.09 ± 10.60 to 115.41 ± 7.51 mmHg after slow deep breathing (paired-test p=0.001 in each group). The respective mean reductions were 9.82 and 6.68 mmHg. These values describe acute within-group observations rather than sustained blood-

pressure control.

The lower post-intervention pressure may reflect relaxation, repeated measurement, natural variation or other perioperative contextual influences. Supporting reports from hypertensive populations and studies of breathing techniques cannot be directly equated with elective caesarean care (19–21).

Interpretation is further constrained by incomplete information on sphygmomanometer consistency, measurement positioning, observer masking and co-interventions. The absence of a non-intervention control means that the measured change cannot be isolated from time and measurement effects. The study measured systolic, but not a prespecified comprehensive hemodynamic endpoint.

The unadjusted Mann–Whitney comparison of total APAIS reductions yielded p=0.003, and the mean reduction was numerically 2.46 points larger in the finger-hold group (5.50 versus 3.04). However, the finger-hold group began 3.55 APAIS points higher and thus had greater opportunity for decline. Unequal starting scores, non-randomized allocation, regression to the mean and the absence of baseline-adjusted estimates prevent interpreting this finding as evidence that finger-hold is more effective.

A previous comparative report examined finger holding versus deep breathing before cardiac catheterization, rather than among patients awaiting caesarean section (18). Differences in clinical context, baseline distress, protocol delivery and anxiety instruments make its findings only indirect support for this comparison. The present study expands contextual reporting in obstetric perioperative care, but it cannot resolve comparative efficacy.

For systolic pressure, the unadjusted between-group test found no statistically significant difference in change-score distributions (p=0.119). This result does not demonstrate equivalence, non-inferiority or absence of a clinically meaningful difference; no equivalence margin or precision estimate was specified.

Taken together, both interventions were associated with lower total APAIS scores and systolic pressure shortly afterward. Important limitations include the single-center sample of 44 patients, short recruitment interval, unclear allocation procedures, no non-intervention control, baseline imbalance, possible measurement variability, limited intervention-fidelity reporting, no longer-term follow-up and the absence of confidence intervals or baseline-adjusted estimates. Future studies should measure APAIS anxiety and information domains separately, predefine clinically important differences and report adjusted estimates from adequately powered, preferably randomized comparisons.

CONCLUSION

Finger-hold relaxation and slow deep breathing were each associated with short-term declines in total six-item APAIS scores and systolic blood pressure among 44 patients awaiting elective caesarean section. Although the unadjusted distribution of APAIS reductions differed between groups, baseline imbalance and non-randomized assignment preclude causal attribution or a claim of finger-hold superiority. The combined APAIS score also does not isolate anxiety from information need. Better-controlled studies using domain-specific outcomes and baseline-adjusted analyses are required before comparative clinical recommendations can be made.

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Conflict of Interest

The authors declare that they have no financial, professional, or personal conflicts of interest related to this study.

Author Contributions

OK contributed to the conceptualization, methodology, data collection, data analysis, and manuscript drafting. AB provided supervision, reviewed the methodology, and critically revised the manuscript for important intellectual content. EDC contributed to supervision, methodological review, critical revision of the manuscript, and final approval. All authors reviewed and approved the final version of the manuscript.

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