

Empowering Primigravida Women Through Slow Deep Breathing Education for Preoperative Anxiety Self-Management Before Cesarean Delivery

Achmad Sairul Mardiyaini

Universitas Nurul Jadid, Indonesia

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Corresponding Author:

Achmad Sairul Mardiyaini

Universitas Nurul Jadid

Email:

achmadsairulmardiyaini@unuja.ac.id

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ABSTRACT

Background: Anxiety is common among primigravida women preparing for cesarean delivery, particularly when they have no previous childbirth or surgical experience. Slow Deep Breathing is a simple non-pharmacological relaxation technique that may support anxiety self-management.

Objectives: This program aimed to strengthen primigravida women's ability to perform Slow Deep Breathing independently and to describe changes in anxiety-related manifestations before cesarean delivery.

Methods: The activity involved two primigravida women with cephalopelvic disproportion who experienced anxiety related to their first cesarean delivery. The intervention was conducted for three consecutive days and included anxiety assessment, creation of a calm environment, written education using a leaflet, explanation, demonstration, guided practice, independent repetition, and evaluation.

Results: Both participants initially reported fear and worry and showed restlessness, tension, sleep disturbance, tremor, and elevated blood pressure. At the final evaluation, both participants appeared more relaxed and calm, were able to repeat the breathing technique independently, and showed improvement in anxiety-related manifestations. Blood pressure decreased from 150/90 to 133/80 mmHg in Participant 1 and from 155/91 to 127/84 mmHg in Participant 2. Interpretation remains cautious because the participant number was limited.

Conclusions: Slow Deep Breathing education supported anxiety self-management and may complement routine maternity nursing care before cesarean delivery.



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Introduction

Pregnancy and childbirth involve substantial physiological, emotional, and social adjustment. Although anxiety may occur at different stages of pregnancy, the period immediately preceding delivery can create additional psychological demands because women are faced with concerns regarding their own health, fetal well-being, pain, unfamiliar procedures, and the outcome of childbirth. Perinatal anxiety remains an important maternal-health concern, particularly in low- and middle-income countries. A systematic review and meta-analysis estimated that approximately 29% of women in low- and middle-income countries experienced self-reported antenatal anxiety symptoms. The World Health Organization therefore recommends integrating perinatal mental-health support into maternal and child health services rather than separating psychological care from routine maternity services.

Anxiety may be particularly relevant when cesarean delivery is anticipated. A recent global systematic review found a substantial prevalence of preoperative anxiety among women undergoing cesarean section and identified primiparity as one of the factors associated with increased anxiety. For women experiencing their first pregnancy, lack of previous childbirth and surgical experience may contribute to uncertainty regarding anesthesia, surgery, maternal safety, and neonatal outcomes. Pregnancy-specific anxiety has also been associated with decisions surrounding cesarean delivery among primiparous women, demonstrating the importance of addressing psychological as well as physical preparation for childbirth (Sun et al., 2019).

The clinical foundation for the present activity was derived from maternity nursing care involving two primigravida women with cephalopelvic disproportion who were preparing for cesarean delivery. Both participants expressed worry about undergoing cesarean section for the first time. The documented anxiety manifestations included worry, restlessness, tension, sleep disturbance, elevated blood pressure, and tremor. Cephalopelvic disproportion in the source context required preparation for operative delivery, creating an additional situational stressor for women already adapting to their first childbirth experience.

Anxiety during pregnancy should not be considered only an unpleasant emotional response. Evidence indicates associations between antenatal anxiety and several adverse pregnancy outcomes, although the strength and causality of these relationships vary across studies (Grigoriadis et al., 2018). Anxiety can also manifest physiologically through increased sympathetic activity, muscle tension, changes in heart rate and blood pressure, disturbed sleep, difficulty concentrating, and increased perception of threat. These responses can make the preoperative experience more stressful and may interfere with women's ability to process information and participate actively in their care.

Patient education represents an important component of preoperative anxiety management. Educational interventions can reduce uncertainty by explaining procedures, expectations, and coping strategies. Studies involving women preparing for cesarean delivery have reported lower anxiety after structured preoperative education compared with routine care (Eslami et al., 2020; Alsufyani et al., 2024). A systematic review and meta-analysis similarly found that preoperative multimedia education was associated with reduced anxiety among women undergoing cesarean delivery (Abuzaid et al., 2024).

Education may become more useful when women are also given a practical coping skill they can initiate independently. Relaxation approaches have therefore been increasingly considered within non-pharmacological anxiety management. A systematic review of non-pharmacological interventions during pregnancy, childbirth, and postpartum identified relaxation and several other behavioral interventions as potentially beneficial approaches for maternal anxiety (Domínguez-Solís et al., 2021). More recently, a systematic review and meta-analysis of 32 studies involving 3,979 pregnant women found that relaxation interventions—including deep breathing, progressive muscle relaxation, music, mindfulness, and guided imagery—were associated with reductions in maternal anxiety and stress (Abera et al., 2024).

Slow Deep Breathing is particularly suitable for nursing-based education because it is inexpensive, portable, requires no specialized equipment, and can be practiced after relatively brief instruction. Controlled slow breathing may influence autonomic regulation and vagally mediated heart-rate variability while also promoting subjective relaxation (Zaccaro et al., 2018; Laborde et al., 2022). Meta-analytic evidence also suggests that breathing-focused interventions can reduce self-reported anxiety and stress in adults, although intervention protocols and populations vary considerably (Leyro et al., 2021; Fincham et al., 2023).

Evidence specific to pregnancy supports the relevance of relaxation training. Gökbulut et al. (2024) reported that deep relaxation exercises reduced fear of giving birth among pregnant women, while a randomized controlled trial among primiparous women preparing for cesarean delivery found that a relaxation intervention significantly reduced preoperative anxiety (Nosrati Abarghooe et al., 2022). These findings support nursing strategies that combine education with repeated practice rather than limiting care to reassurance alone.

The source nursing intervention followed this principle. Participants received written information, explanation of the procedure, demonstration, supervised practice, and encouragement to repeat Slow Deep Breathing independently. KIA ACHMAD SAIRUL MARDLIYAINI Accordingly, the present manuscript reframes that educational process as a patient-empowerment approach emphasizing practical anxiety self-management before cesarean delivery.

Methods

Program Design/Approach

The program used a **case-based patient-education and skills-training approach** focused on Slow Deep Breathing for anxiety self-management. The educational process emphasized active participation so that participants did not merely receive information but were also able to practice and repeat the breathing technique independently. The process was organized as:

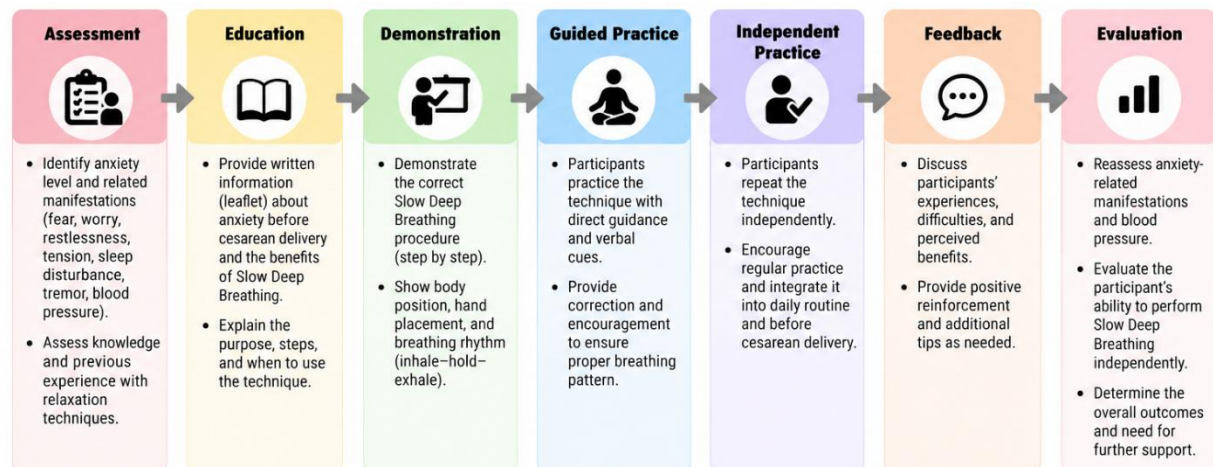


Figure 1. Educational and skills-training process for Slow Deep Breathing in preoperative anxiety self-management.

The program was conducted through seven sequential stages: assessment, education, demonstration, guided practice, independent practice, feedback, and evaluation. Participants were initially assessed for anxiety-related manifestations and physiological responses, including blood pressure, pulse rate, respiratory rate, and observable signs of tension. Education was then provided using written information on anxiety and Slow Deep Breathing, followed by a step-by-step demonstration of the breathing technique. Participants subsequently practiced the technique under facilitator guidance and progressed to independent practice once they were able to follow the procedure correctly. Feedback was provided to reinforce appropriate performance, correct difficulties, and encourage continued practice. The final stage included reassessment of anxiety-related manifestations, physiological responses, and participants' ability to perform Slow Deep

Breathing independently. The original clinical intervention also documented simultaneous obstetric and medical management, including pharmacological treatment, alongside the relaxation intervention. Therefore, Slow Deep Breathing was implemented as a complementary strategy and was not intended to replace routine cesarean preparation, blood-pressure management, pharmacological treatment, or other clinically indicated obstetric interventions

Community Partner and Target Population

The activity was conducted in the maternity service of RSUD Sidoarjo during July–August 2022. The intervention was implemented in the maternity/VK unit as part of supportive nursing care for women preparing for cesarean delivery. KIA ACHMAD SAIRUL MARDLIYAINI

Two primigravida women, aged 27 and 28 years, with cephalopelvic disproportion participated in the activity. Both women were experiencing their first pregnancy and expressed anxiety related to undergoing cesarean delivery for the first time. Their obstetric and medical conditions were managed by the responsible healthcare team, while the educational intervention focused specifically on strengthening their ability to manage anxiety through Slow Deep Breathing.

Needs Assessment

The needs assessment was conducted through interviews, clinical observation, assessment of anxiety-related manifestations, and monitoring of physiological parameters. Both participants expressed concern about the upcoming cesarean delivery and demonstrated manifestations of anxiety, including worry, restlessness, tension, sleep disturbance, tremor, and elevated blood pressure.

These findings indicated the need for a simple, non-pharmacological strategy that could be taught within the maternity-care setting and subsequently practiced independently. Slow Deep Breathing was selected because it could be demonstrated directly, practiced under supervision, and repeated by participants whenever anxiety or tension was experienced.

Community Service Intervention/Activities

The Slow Deep Breathing intervention was delivered through a structured sequence consisting of assessment, education, demonstration, guided practice, independent practice, feedback, and evaluation.

First, anxiety-related manifestations and physiological responses were assessed before the breathing exercise. Monitoring included blood pressure, pulse rate, respiratory rate, temperature, and muscle tension. A quiet and comfortable environment was prepared to minimize unnecessary stimulation and promote relaxation.

Second, participants received written educational information using a leaflet. The facilitator explained the purpose, benefits, limitations, and procedural steps of Slow Deep Breathing before beginning the practical exercise.

Third, the facilitator demonstrated the Slow Deep Breathing technique step by step. Participants were encouraged to assume a comfortable position, relax the body, inhale slowly and deeply through the nose while allowing abdominal expansion, briefly hold the breath, and then exhale gradually through the mouth while maintaining a calm and relaxed focus. The breathing sequence was repeated while participants were encouraged to remain relaxed and focus their attention away from anxiety-provoking thoughts.

Fourth, participants practiced the technique under facilitator guidance. The facilitator provided verbal instructions, observed the breathing pattern, and reinforced the appropriate steps. Participants subsequently repeated the procedure independently after observing the demonstration. Documentation from the first intervention session showed that both participants were able to imitate and repeat the Slow Deep Breathing technique.

Fifth, the intervention was reinforced over three consecutive days for each participant. During subsequent sessions, participants repeated the technique and their anxiety-related manifestations and physiological responses were reassessed to monitor changes over time.

Slow Deep Breathing was implemented as a complementary anxiety-management strategy alongside routine obstetric and medical care. It was not intended to replace cesarean preparation, blood-pressure management, pharmacological treatment, or other interventions considered necessary by the healthcare team.

Table 1. Components of the Slow Deep Breathing Education Program

Component	Main Activity	Educational Strategy	Expected Outcome
Anxiety assessment	Identification of worry, tension, restlessness, sleep problems, and physiological responses	Interview and observation	Anxiety-related needs identified
Preparation	Creation of a quiet and comfortable environment	Environmental modification	Participant ready for relaxation
Education	Explanation of anxiety and Slow Deep Breathing	Verbal education and leaflet	Participant understands purpose and benefits
Demonstration	Step-by-step Slow Deep Breathing	Facilitator demonstration	Participant observes correct technique
Guided practice	Participant performs breathing with guidance	Supervised practice	Technique performed more accurately
Independent practice	Participant repeats the technique	Return-demonstration	Participant develops self-management ability
Feedback	Correction and reinforcement	Individual feedback	Confidence and technique strengthened
Evaluation	Reassessment of anxiety manifestations and vital signs	Observation and physiological assessment	Changes documented

Slow Deep Breathing Procedure

The breathing technique was adapted from the procedure documented in the nursing intervention. Participants were encouraged to relax in a comfortable position and minimize unnecessary muscle tension. They inhaled slowly and deeply through the nose while allowing abdominal expansion, briefly maintained the breath, and then exhaled gradually through the mouth while focusing on relaxation. The sequence was repeated while participants were encouraged to maintain calm attention and reduce intrusive thoughts related to the upcoming procedure. The source SOP recommends repeated cycles and evaluation of the participant's subjective response after completion.

Program Evaluation

Evaluation focused on three domains: the participant's ability to perform Slow Deep Breathing, anxiety-related manifestations, and physiological indicators. Practical ability was assessed through observation during demonstration and repetition. Anxiety evaluation was based on subjective reports and clinical manifestations documented in the nursing evaluation, including worry, restlessness, tension, tremor, and sleep disturbance.

Physiological monitoring included blood pressure, pulse rate, and respiratory rate before and after breathing practice. A standardized psychometric anxiety instrument such as the State-Trait Anxiety Inventory was not documented in the source material; therefore, no numerical anxiety score has been invented for this manuscript.

Data Analysis

Data were analyzed descriptively. Clinical observations and physiological measurements were summarized across the three intervention days. Because the activity involved only two participants and did not employ a validated quantitative anxiety scale or comparison group, inferential statistical analysis was not appropriate.

Results

Participant Characteristics

Two primigravida women with cephalopelvic disproportion participated in the program. Participant 1 was 28 years old and Participant 2 was 27 years old. Both were experiencing their first pregnancy and expressed anxiety related to undergoing cesarean delivery for the first time. At the initial assessment, both participants reported worry regarding the upcoming cesarean delivery and demonstrated observable anxiety-related manifestations. Restlessness and tension were evident in both participants, while Participant 1 also demonstrated tremor and Participant 2 reported difficulty sleeping. These manifestations were accompanied by elevated blood-pressure values during the initial assessment.

Participation in Slow Deep Breathing Training

Both participants actively participated in the Slow Deep Breathing education and skills-training process. They received information regarding the purpose, benefits, and procedural steps of the technique, observed a facilitator demonstration, and subsequently practiced the breathing exercise under guidance. Both participants were able to imitate the demonstrated procedure and repeat Slow Deep Breathing independently following supervised practice.

Repeated practice was reinforced during three consecutive days. The participants demonstrated increasing familiarity with the breathing sequence and were encouraged to use the technique whenever they experienced worry or tension related to the upcoming cesarean delivery.

Changes in Anxiety-Related Manifestations

A progressive improvement in anxiety-related manifestations was observed across the three-day intervention period. During the first evaluation, Participant 1 continued to express fear regarding cesarean delivery and remained restless, tense, and concerned about the surgical procedure. By the second day, anxiety-related manifestations had decreased, although concern regarding the infant remained. At the final evaluation, Participant 1 reported feeling better, appeared more relaxed and calm, and no longer demonstrated the prominent manifestations observed at baseline.

A similar pattern was observed in Participant 2. During the first evaluation, the participant remained worried about cesarean delivery and demonstrated restlessness, tension, and sleep disturbance. By the second day, these manifestations had partially improved, although concern regarding the infant remained. At the final evaluation, Participant 2 reported feeling healthier, appeared relaxed and calm, and no longer expressed the previous level of worry.

Overall, both participants showed a transition from prominent preoperative worry and behavioral manifestations of anxiety toward a calmer and more relaxed condition after repeated education and Slow Deep Breathing practice. Because anxiety was evaluated clinically rather than using a standardized psychometric scale, these outcomes are presented descriptively.

Changes in Physiological Indicators

Physiological indicators were monitored before and after Slow Deep Breathing practice throughout the intervention period. Both participants demonstrated lower blood-pressure, pulse-rate, and respiratory-rate values at the final assessment compared with their initial measurements.

Table 2. Physiological Indicators at Initial and Final Assessments

Participant	Indicator	Initial Assessment	Final Post-Session Assessment	Change
Participant 1	Blood pressure	150/90 mmHg	133/80 mmHg	-17/-10 mmHg
	Pulse rate	80 beats/min	78 beats/min	-2 beats/min
	Respiratory rate	20 breaths/min	19 breaths/min	-1 breath/min
Participant 2	Blood pressure	155/91 mmHg	127/84 mmHg	-28/-7 mmHg
	Pulse rate	90 beats/min	84 beats/min	-6 beats/min
	Respiratory rate	20 breaths/min	19 breaths/min	-1 breath/min

Immediate changes were also observed after individual breathing sessions. During the first session, Participant 1's blood pressure decreased from 150/90 to 147/87 mmHg, accompanied by a

reduction in pulse rate from 80 to 76 beats/min and respiratory rate from 20 to 19 breaths/min. Participant 2 similarly showed a reduction from 155/91 to 152/89 mmHg during the first session.

By the final intervention day, Participant 1's post-session blood pressure was 133/80 mmHg, with a pulse rate of 78 beats/min and respiratory rate of 19 breaths/min. Participant 2's final session showed a reduction from 130/84 mmHg before Slow Deep Breathing to 127/84 mmHg afterward, with a pulse rate of 84 beats/min and respiratory rate of 19 breaths/min.

These physiological findings should be interpreted as descriptive changes observed during the intervention period rather than evidence of an independent treatment effect. Both participants simultaneously received routine obstetric and medical care; therefore, changes in blood pressure and other physiological indicators cannot be attributed solely to Slow Deep Breathing.

Discussion

The educational intervention demonstrated that primigravida women experiencing anxiety before cesarean delivery were able to learn and independently repeat Slow Deep Breathing following explanation, demonstration, and supervised practice. Both participants progressed from prominent worry and observable anxiety manifestations to a calmer state by the final evaluation. These findings support the practical feasibility of incorporating a simple breathing-based self-management skill into nursing care for women preparing for cesarean delivery.

The importance of addressing anxiety during pregnancy is supported by broader evidence. Perinatal anxiety is common, particularly in low- and middle-income settings, and can affect maternal well-being and the overall childbirth experience (Nielsen-Scott et al., 2022). The WHO recommends that mental-health promotion, recognition, and support be integrated into routine maternal and child health services. This integration is particularly relevant in maternity nursing because nurses frequently interact with women during periods of uncertainty immediately before delivery.

Primigravida status may create specific psychological vulnerability because the woman does not have previous personal experience with childbirth or cesarean procedures. Recent evidence suggests that primiparity is associated with increased preoperative anxiety among women undergoing cesarean delivery. In the present activity, both participants explicitly associated their worry with undergoing cesarean delivery for the first time, which supports the need for anticipatory education and coping support.

Education itself is an important component of anxiety management. Eslami et al. (2020) demonstrated that familiarizing women with cesarean procedures and the operating-room environment reduced preoperative anxiety. Alsufyani et al. (2024) similarly reported improved anxiety outcomes after educational sessions for women undergoing cesarean delivery. A meta-analysis of randomized trials also found that multimedia preoperative educational sessions reduced anxiety in women undergoing cesarean section (Abuzaid et al., 2024).

These findings help explain why the present intervention did not consist only of breathing instruction. Participants were first informed about the intervention, its purpose and expected benefits, and were provided written information. This combination may reduce uncertainty while simultaneously providing a behavioral coping strategy. Contemporary evidence on preoperative anxiety management also supports integrating screening, patient education, relaxation, and individualized non-pharmacological approaches (Sui et al., 2026).

The breathing component is supported by physiological and psychological evidence. Slow breathing can modify cardiorespiratory regulation and increase indices of parasympathetic activity and heart-rate variability (Zaccaro et al., 2018; Laborde et al., 2022). These autonomic effects provide a plausible physiological basis for subjective relaxation, although they should not be interpreted as proving that every observed reduction in blood pressure is caused by breathing exercises.

Meta-analytic evidence also suggests that breathing interventions are associated with reductions in anxiety. Leyro et al. (2021) found respiratory-focused interventions produced greater improvement in anxiety symptoms than control conditions, although intervention protocols and

study populations varied. Fincham et al. (2023) similarly reported small-to-moderate improvements in stress and anxiety across randomized trials of breathwork. A systematic review of breathing-exercise interventions also concluded that breathing exercises can support anxiety and stress reduction, while emphasizing the need for larger and higher-quality trials (Morgan et al., 2025).

Evidence among pregnant women is particularly relevant. Abera et al. (2024) synthesized 32 studies and found relaxation interventions during pregnancy were associated with lower maternal anxiety and stress. Gökbulut et al. (2024) reported that deep relaxation exercise could reduce aspects of pregnancy-related anxiety, particularly fear of childbirth. These results support the inclusion of relaxation training within maternity nursing education.

Studies focusing specifically on women undergoing cesarean delivery show similar patterns. Nosrati Abarghoee et al. (2022) found that a relaxation intervention significantly reduced anxiety among primiparous women before cesarean section. More recent randomized evidence also indicates that providing information alongside relaxation exercise can reduce preoperative anxiety among primigravida women undergoing planned cesarean delivery (Yesildag et al., 2026).

An important aspect of the present program was return-demonstration. Participants did not merely observe the facilitator but were documented as imitating and subsequently repeating the breathing technique. This is particularly relevant to empowerment because the goal of patient education is not simply knowledge acquisition but development of a skill that the participant can initiate without direct professional assistance.

The physiological findings should nevertheless be interpreted cautiously. Both participants demonstrated lower blood-pressure values and modest changes in pulse and respiratory rate over the course of the intervention. Slow breathing may influence autonomic regulation, but blood pressure during the peripartum period can also be affected by pregnancy-related hypertension, medical therapy, pain, delivery, medications, emotional reassurance, maternal and fetal condition, and recovery from surgery. The source documentation confirms that both women received concurrent clinical treatment in addition to Slow Deep Breathing. Therefore, attributing the physiological changes exclusively to the breathing intervention would be inappropriate. A similar caution applies to the improvement in anxiety. The original evaluation notes that anxiety decreased as maternal and neonatal outcomes became known. Consequently, Slow Deep Breathing should be interpreted as one component of a broader supportive-care process rather than as the sole causal factor.

Despite this limitation, teaching self-regulation skills remains valuable. Pregnancy and surgery involve many elements that patients cannot directly control. Providing a safe technique that women can initiate themselves may increase active participation and offer a practical response when worry or tension occurs. This approach is consistent with the broader principle of patient empowerment: healthcare professionals provide knowledge, skills, support, and feedback so that patients can participate meaningfully in management of their own symptoms.

Implications, Sustainability, and Limitations

The intervention can be integrated into antenatal education, preoperative preparation, maternity wards, and nursing counseling for women experiencing situational anxiety. Nurses may use a brief sequence of assessment, explanation, demonstration, supervised practice, return-demonstration, feedback, and reevaluation.

Sustainability may be strengthened by using a simple leaflet or visual guide and encouraging women to practice the technique independently when they experience tension. Family members may also be informed so they can provide a calm environment and remind the mother to use the technique when appropriate.

Several limitations must be considered. The activity involved only two participants and did not include a control group. Anxiety was assessed through clinical manifestations and nursing evaluation rather than a validated quantitative scale such as the State-Trait Anxiety Inventory or Amsterdam Preoperative Anxiety and Information Scale. Concurrent medical treatment and changes in maternal

and neonatal status may also have influenced anxiety and physiological outcomes. Consequently, the findings should be interpreted descriptively and cannot establish causal effectiveness.

Future community service activities should involve a larger group of pregnant women, use standardized pre-test and post-test instruments, assess competency through a structured skills checklist, and include short-term follow-up to determine whether women continue to use Slow Deep Breathing independently.

Relevance for Practice

Slow Deep Breathing is a practical nursing intervention because it is simple, inexpensive, portable, and can be practiced independently after appropriate instruction. Nurses can integrate the technique into preoperative maternity education by assessing anxiety, explaining the purpose of controlled breathing, demonstrating the procedure, supervising participant practice, evaluating return-demonstration, providing feedback, and reassessing anxiety-related manifestations. The intervention should complement, rather than replace, appropriate medical, obstetric, anesthetic, and psychological care.

Conclusion

Slow Deep Breathing education provided through explanation, demonstration, guided practice, repetition, and feedback supported the ability of two primigravida women to independently apply a relaxation strategy while preparing for cesarean delivery. Across three days of intervention, both participants demonstrated reduced worry and behavioral manifestations of anxiety, appeared more relaxed and calm, and showed improvement in several physiological indicators. Because the participants simultaneously received routine clinical care and the activity involved only two women without a control group or standardized anxiety scale, the findings should be interpreted descriptively. Nevertheless, Slow Deep Breathing may provide a feasible complementary strategy for strengthening anxiety self-management and patient participation in maternity nursing care.

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Author Contribution

Achmad Sairul Mardiyaini contributed to the clinical needs assessment, planning and implementation of the Slow Deep Breathing intervention, participant assessment, data collection, evaluation, literature review, interpretation of findings, and preparation of the original manuscript.

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Declaration of Conflicting Interest

The authors declare no conflict of interest related to the implementation of this community service program or the publication of this manuscript.

Declaration of Use of AI in Scientific Writing

The authors declare that generative AI and AI-assisted technologies were used solely to support language editing, grammatical refinement, and improvement of the clarity and readability of the manuscript. The authors reviewed, verified, and revised all AI-assisted content and remain fully responsible for the accuracy, integrity, interpretation, and final content of the manuscript.

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