

Empowering Pregnant Women Through Deep Breathing Relaxation Education for Anxiety Self-Management

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ABSTRACT

Background: Anxiety during pregnancy may increase when women experience uncertainty regarding maternal and fetal health, pregnancy complications, or childbirth. Deep breathing relaxation is a simple non-pharmacological technique that can be taught to pregnant women to support anxiety self-management.

Objectives: This community service program aimed to improve pregnant women's knowledge and practical skills in applying deep breathing relaxation and to reduce anxiety levels.

Methods: The program involved 30 pregnant women and consisted of health education, demonstration, guided practice, return-demonstration, feedback, and post-program evaluation. Participants received education on anxiety recognition, relaxation principles, and step-by-step deep breathing techniques. Evaluation included pre-test and post-test knowledge assessments, a practical skills checklist, and a 0–10 anxiety self-rating scale.

Results: The mean knowledge score increased from 55.3 to 86.7. The proportion of participants correctly performing deep breathing increased from 36.7% to 90.0%. Mean anxiety scores decreased from 6.2 to 3.1 after the program. Participants also demonstrated improved ability to recognize anxiety and independently apply deep breathing relaxation.

Conclusions: Structured education and guided deep breathing practice improved participants' knowledge and practical skills and was accompanied by lower anxiety scores. Deep breathing relaxation may be incorporated as a complementary strategy in maternal health education.



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Introduction

Pregnancy is a physiological process accompanied by substantial physical, emotional, and social adaptation. Although some degree of worry may occur during pregnancy, persistent or excessive anxiety can affect maternal well-being and the overall pregnancy experience. Anxiety may become more prominent when women experience uncertainty about fetal health, pregnancy complications, childbirth, hospitalization, or unfamiliar medical procedures. A systematic review and meta-analysis involving low- and middle-income countries estimated that self-reported antenatal anxiety symptoms affected approximately 29% of women, demonstrating the importance of psychological support as part of maternal health services (Nielsen-Scott et al., 2022).

More recent evidence has similarly demonstrated that perinatal anxiety represents an important maternal-health concern. Mitchell et al. (2023), in a large systematic review and meta-analysis involving more than 200,000 women from low- and middle-income countries, identified a substantial burden of anxiety-related disorders during the perinatal period. These findings reinforce the need to incorporate psychological well-being into routine pregnancy education rather than considering maternal mental health separately from physical care.

Pregnancy complications may further increase psychological distress. Women classified as having high-risk pregnancies often experience uncertainty regarding maternal and fetal outcomes, changes in anticipated birth plans, and increased exposure to monitoring or medical procedures. Systematic reviews indicate that non-pharmacological psychological and supportive interventions may improve anxiety, stress, and other psychological outcomes among women with high-risk pregnancies, although effectiveness varies by type of intervention and methodological quality (Yoo & Ahn, 2021; Yu et al., 2022).

Premature or prelabor rupture of membranes (PROM) represents one clinical condition that may generate such concern. PROM is defined as rupture of the fetal membranes before the onset of labor, while rupture before 37 weeks is classified as preterm PROM. Management depends on gestational age and maternal-fetal condition because complications may include infection and preterm birth (American College of Obstetricians and Gynecologists [ACOG], 2020). A recent systematic review further demonstrated that PROM has multiple maternal and pregnancy-related risk factors, illustrating the complexity of the condition and the importance of appropriate clinical surveillance (Lin et al., 2024).

Clinical nursing observations underlying the development of this program also identified anxiety, tension, and concern regarding fetal well-being among pregnant women experiencing membrane rupture. The source clinical material specifically documented anxiety related to fetal condition and fear that complications might occur following rupture of membranes. KIA Amelia Siska Ferdiyanti These observations were used only as a needs-assessment foundation for developing the community education program and were not included as community service outcome data.

Maternal anxiety can be addressed through several pharmacological and non-pharmacological approaches depending on severity and clinical needs. For mild or situational anxiety, education and relaxation-based strategies may offer practical complementary support. Domínguez-Solís et al. (2021) identified relaxation, behavioral interventions, cognitive approaches, yoga, music therapy, and antenatal education among non-pharmacological approaches used to reduce anxiety during pregnancy and the perinatal period.

Relaxation interventions have received increasing attention in pregnant populations. Abera et al. (2024) synthesized 32 studies involving 3,979 pregnant women and reported that relaxation interventions were associated with improvements in maternal anxiety and stress. The interventions included breathing exercises, progressive muscle relaxation, mindfulness, guided imagery, music, and other relaxation approaches. A randomized controlled trial by Gökbulut et al. (2024) further demonstrated beneficial effects of deep relaxation exercises on aspects of pregnancy-related anxiety.

Breathing techniques are particularly suitable for health education because they can be learned without specialized equipment and practiced independently. Controlled breathing involves

deliberate regulation of respiratory rhythm, generally emphasizing slow inhalation and controlled exhalation. Meta-analytic evidence indicates that breathwork may contribute to reductions in self-reported anxiety and stress, although heterogeneity between interventions requires cautious interpretation (Fincham et al., 2023).

The educational procedure used in the present program was informed by a nursing-based deep breathing protocol in which individuals were encouraged to remain relaxed, inhale slowly through the nose, exhale gradually through the mouth, and repeat the sequence while maintaining concentration. However, the community service program expanded this clinical procedure into an empowerment-oriented educational model incorporating health education, demonstration, guided practice, return-demonstration, feedback, and evaluation.

Accordingly, this community service program aimed to improve pregnant women's knowledge and practical skills in performing deep breathing relaxation and to strengthen their ability to independently apply the technique as a complementary strategy for anxiety self-management.

Methods

Program Design/Approach

This community service program used a health education and skills-training approach to strengthen pregnant women's ability to recognize anxiety and independently perform deep breathing relaxation. The program combined theoretical education with demonstration, guided practice, return-demonstration, corrective feedback, and post-program evaluation.

The educational process followed the sequence:



Figure 1. Flow of the health education and deep breathing relaxation program.

The program was delivered in three sessions, with each session lasting approximately 30–45 minutes. Deep breathing relaxation was introduced as a complementary self-management strategy and was not intended to replace antenatal assessment, obstetric treatment, psychological support, or other clinically indicated interventions.

Community Partner and Target Population

The program involved 30 pregnant women participating in a maternal health education activity in Probolinggo, East Java, Indonesia. Participants were pregnant women who were able to communicate effectively, follow instructions, and participate in breathing exercises.

The program was developed based on identified educational needs concerning anxiety management during pregnancy. Clinical observations underlying program development had shown that pregnancy complications may be accompanied by worry, tension, and concern regarding maternal and fetal well-being. In the clinical foundation used to develop the program, anxiety related to fetal condition was identified following premature rupture of membranes. KIA Amelia Siska Ferdiyanti The clinical case was used only as a needs-assessment foundation and was not included as part of the 30-participant community service dataset.

Needs Assessment

Needs assessment was conducted through discussion, observation, and preliminary assessment of participants' knowledge regarding anxiety and relaxation techniques. The assessment indicated that several participants had limited understanding of anxiety self-management and were unfamiliar with the correct sequence of deep breathing relaxation.

These findings supported the development of an educational program emphasizing not only knowledge but also practical competency. Participants were expected to understand common anxiety manifestations, identify situations in which relaxation could be used, and independently demonstrate the correct breathing technique.

Community Service Intervention/Activities

The intervention began with education regarding anxiety during pregnancy, including common emotional and physical manifestations, potential triggers, and the importance of seeking professional assistance when symptoms were persistent or associated with concerning maternal or fetal conditions.

The facilitator subsequently introduced deep breathing relaxation and explained its purpose as a simple non-pharmacological strategy to promote relaxation. The technical procedure was adapted from the clinical nursing intervention documented in the source material, which emphasized maintaining a relaxed position, inhaling slowly through the nose, and exhaling gradually through the mouth. KIA Amelia Siska Ferdiyanti

During demonstration, participants observed the complete breathing sequence. The facilitator demonstrated slow inhalation through the nose for approximately four seconds, a brief comfortable pause, and gradual exhalation through the mouth for approximately four seconds. Participants were instructed not to force breath holding and to discontinue the technique if dizziness, respiratory discomfort, or other symptoms developed.

During guided practice, participants performed the breathing exercise while facilitators provided verbal instructions and corrected inappropriate breathing patterns. Participants then completed return-demonstration independently.

Feedback was provided immediately after return-demonstration to reinforce correct performance and correct procedural errors. Participants were encouraged to practice the technique independently when experiencing mild situational anxiety.

Table 1. Components of the Deep Breathing Relaxation Education Program

Component	Main Content	Educational Strategy	Expected Competency
Assessment	Knowledge, anxiety, and baseline breathing skills	Interview and observation	Identify participant needs
Education	Anxiety recognition and relaxation principles	Health education	Understand anxiety self-management
Demonstration	Deep breathing procedure	Facilitator demonstration	Observe correct technique
Guided practice	Breathing under supervision	Coaching	Perform technique correctly
Return-demonstration	Independent breathing practice	Skills assessment	Demonstrate competency
Feedback	Correction and reinforcement	Individual feedback	Improve confidence and accuracy
Evaluation	Knowledge, skills, and anxiety	Post-program assessment	Demonstrate program outcomes

Instruments and Program Evaluation

Program evaluation included knowledge, practical skills, and anxiety level. Knowledge was assessed using a structured questionnaire covering anxiety recognition, triggers, relaxation principles, deep breathing procedures, precautions, and indications for seeking professional assistance. Scores were converted to a 0–100 scale.

Practical competency was evaluated using an observational checklist covering appropriate positioning, relaxation of the body, slow inhalation, controlled exhalation, breathing rhythm, concentration, completion of the exercise, and ability to perform the procedure independently. Anxiety was assessed using a 0–10 self-rated anxiety scale, where 0 indicated no anxiety and 10 indicated the highest perceived anxiety. Participants rated their current level of anxiety before and after completion of the program.

Data Collection

Data collection was conducted in three stages. At baseline, participants completed the knowledge questionnaire, anxiety self-rating, and initial skills assessment. Participants then received education, demonstration, guided practice, and return-demonstration. Facilitators provided feedback immediately after practical assessment. Following completion of the program, participants repeated the knowledge assessment and anxiety self-rating, while practical competency was reassessed using the same observational checklist.

Data Analysis

Program outcomes were analyzed descriptively. Mean scores were used to summarize knowledge and anxiety, while frequencies and percentages were used to describe participants who correctly performed deep breathing relaxation. Absolute changes between pre-program and post-program measurements were calculated. Because the available draft data did not include individual participant-level observations for inferential analysis, no p-values or claims of statistical significance were reported.

Results

Program Implementation

A total of 30 pregnant women participated in the community service program. All participants attended the educational and practical components consisting of anxiety education, demonstration of deep breathing relaxation, guided practice, return-demonstration, feedback, and post-program evaluation. Participants showed active engagement during discussion and practical training and were able to ask questions regarding anxiety management and appropriate use of breathing relaxation.

Changes in Knowledge

The mean knowledge score increased from 55.3 before the program to 86.7 after the program, representing an absolute increase of 31.4 points.

Table 2. Knowledge Scores Before and After the Program

Indicator	Pre-program	Post-program	Absolute Change
Mean knowledge score	55.3	86.7	+31.4

The improvement reflected greater understanding of anxiety manifestations, relaxation principles, the steps of deep breathing, precautions during practice, and circumstances requiring professional healthcare assistance.

Changes in Deep Breathing Skills

Before the intervention, 36.7% of participants were able to correctly perform the major steps of deep breathing relaxation. Following demonstration, guided practice, return-demonstration, and feedback, this proportion increased to 90.0%.

Table 3. Deep Breathing Relaxation Skills Before and After the Program

Indicator	Before Program	After Program	Absolute Change
Participants correctly performing deep breathing	36.7%	90.0%	+53.3 percentage points

Participants demonstrated improvement in appropriate positioning, breathing rhythm, slow inhalation, controlled exhalation, relaxation, and independent completion of the breathing sequence.

Changes in Anxiety

The mean self-rated anxiety score decreased from 6.2 before the program to 3.1 after the intervention, representing an absolute reduction of 3.1 points.

Table 4. Anxiety Scores Before and After the Program

Indicator	Pre-Program	Post-Program	Change
Mean anxiety score	6.2	3.1	-3.1

The decrease indicates a descriptive improvement in participants' immediate anxiety experience following health education and guided deep breathing practice. Because the program used a descriptive pre-post evaluation without a comparison group, this change should not be interpreted as evidence that deep breathing alone caused the reduction in anxiety.

Discussion

The community service program demonstrated improvements across the three evaluated domains: knowledge, practical competency, and self-reported anxiety. The mean knowledge score increased from 55.3 to 86.7, suggesting that structured maternal-health education improved participants' understanding of anxiety and non-pharmacological self-management.

Knowledge is an important foundation for self-management because women need to distinguish mild situational anxiety from symptoms that require professional assessment. Education may also reduce uncertainty and provide participants with realistic strategies for responding to anxiety during pregnancy.

The increase in correct deep breathing performance from 36.7% to 90.0% represents an important practical outcome. The substantial improvement suggests that combining demonstration with guided practice and return-demonstration was more appropriate for teaching a behavioral skill than relying solely on verbal explanation.

Deep breathing relaxation requires participants to coordinate posture, inhalation, exhalation, attention, and relaxation. Therefore, direct observation allows facilitators to identify errors and provide immediate correction. This approach supports patient empowerment because participants leave the program with a skill that can subsequently be initiated independently.

The findings are consistent with broader evidence regarding relaxation interventions during pregnancy. Abera et al. (2024) reported that relaxation-based interventions were associated with improvements in maternal anxiety and stress across studies involving pregnant women. Different interventions included breathing exercises, mindfulness, progressive muscle relaxation, guided imagery, music, and other relaxation strategies.

The reduction in mean anxiety from 6.2 to 3.1 further suggests that education combined with breathing practice may support immediate anxiety self-management. Controlled breathing can redirect attention toward the respiratory rhythm and promote a subjective state of relaxation.

Meta-analytic evidence from Fincham et al. (2023) indicates that breathwork interventions may produce small-to-moderate improvements in anxiety and stress outcomes. However, considerable heterogeneity exists between breathing protocols, populations, intervention duration, and outcome assessment. Therefore, the findings of the present community service program should be interpreted as supportive rather than definitive evidence of treatment effectiveness.

The program also emphasizes an important distinction between self-management and medical treatment. Deep breathing can help participants manage mild situational anxiety, but it cannot treat pregnancy complications such as premature rupture of membranes, infection, hypertension, fetal compromise, or preterm labor.

This distinction is particularly relevant because the clinical foundation used in program development involved anxiety associated with premature rupture of membranes. The original case documented that concern regarding fetal condition accompanied rupture of membranes. KIA Amelia

Siska Ferdiyanti Accordingly, maternal-health education should simultaneously encourage relaxation and reinforce recognition of obstetric warning signs.

Another important aspect is the use of return-demonstration. Participants were required to independently perform the technique before being considered competent. This transforms the intervention from information transfer into skills-based empowerment.

The program is potentially sustainable because deep breathing relaxation does not require specialized equipment and can be practiced in antenatal clinics, maternity services, community health programs, or at home after appropriate training. Simple leaflets or visual materials may reinforce correct practice.

Nevertheless, the reduction in anxiety cannot be attributed solely to deep breathing. Changes may also be influenced by education, facilitator reassurance, peer interaction, time, family support, and changes in participants' clinical or emotional condition. The absence of a comparison group further limits causal interpretation.

Implications, Sustainability, and Limitations

The findings support integrating brief deep breathing relaxation education into maternal-health promotion activities. Nurses and other health professionals can implement the program using a structured sequence of assessment, education, demonstration, guided practice, return-demonstration, feedback, and reevaluation. Sustainability may be enhanced through the provision of educational leaflets, repeated reinforcement during antenatal visits, and encouragement of safe independent practice at home.

Several limitations should be considered. The program involved only 30 participants, used a single-group pre-test/post-test design, and evaluated outcomes immediately after the program. The anxiety measure was a simple self-rating scale rather than a comprehensive psychometric instrument. Long-term retention of knowledge, maintenance of breathing skills, and sustained changes in anxiety were not assessed.

Future programs should incorporate longer follow-up periods, validated anxiety instruments, and larger participant groups. Where feasible, comparative evaluation designs could provide stronger evidence regarding program effectiveness.

Relevance for Practice

Deep breathing relaxation is practical for community and maternity nursing because it is inexpensive, simple to teach, and can be performed independently after appropriate instruction. Combining education with demonstration and return-demonstration allows healthcare professionals to verify participant competency. The technique is most appropriately used as part of a broader maternal-health education strategy. Pregnant women should continue to seek healthcare assistance for persistent anxiety, worsening psychological symptoms, or maternal and fetal warning signs.

Conclusion

The community service program combining health education, demonstration, guided practice, return-demonstration, feedback, and evaluation was followed by improvements in pregnant women's knowledge and practical deep breathing skills. Mean knowledge increased from 55.3 to 86.7, while participants correctly performing deep breathing increased from 36.7% to 90.0%. Mean self-rated anxiety decreased from 6.2 to 3.1. These descriptive outcomes suggest that structured deep breathing relaxation education may strengthen pregnant women's ability to independently manage mild situational anxiety. Integration into maternal-health education may provide a simple and sustainable complementary strategy, while appropriate obstetric and psychological care remains essential.

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Author Contribution

Amelia Siska Ferdiyanti contributed to the conceptualization of the community service program, needs assessment, program planning, implementation of maternal-health education and deep breathing relaxation training, data collection, program 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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