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Prenatal Yoga Program to Support Safe and Comfortable Labor at Sangkrah Public Health Center: A Pre–Post Study

Dyah Krisnawati [1]*, Sri Anggarini [2], Fresthy Astrika [3], Hardiningsih [4], Herliana Riska [5], Indhun diyah [6]
[1,2,3,4,5,6] Universitas Sebelas Maret, lndonesia
[1]*dksatiapratiwi14@staff.uns.ac.id**, [2]*anggarini@staff.uns.ac.id*, [3]*fresthy@staff.uns.ac.id ,*
[4]*hardiningsih@staff.uns.ac.id*, [5]*herlianariska@staff.uns.ac.id*, [6] *indhundyah@staff.uns.ac.id*

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ABSTRACT

Background: Pregnancy induces significant physical, hormonal, and psychological changes that may cause discomfort and anxiety, particularly in the third trimester. Prenatal yoga serves as an accessible non-pharmacological approach to enhance maternal readiness and emotional well-being.. Objective: This study aimed to analyze the effectiveness of prenatal yoga education and training in improving knowledge among third-trimester pregnant women at the Sangkrah Public Health Center, Surakarta. Methods: A quantitative one-group pre–post test design was applied to 30 pregnant women in their third trimester. Data were collected using structured questionnaires before and after the prenatal yoga sessions. Statistical analysis was performed using SPSS version 25, employing descriptive statistics, the Kolmogorov–Smirnov test for normality, and the Paired Sample t-Test to assess differences in knowledge scores. Results: The average pre-test score was 19.27 ± 2.81, and the post-test average increased to 27.40 ± 1.98, indicating an improvement of 8.13 points. The data were normally distributed ($p = 0.200$), and the paired sample t-test showed a significant difference between pre- and post-test scores ($t = 15.72$; $p = 0.000 < 0.05$). These findings demonstrate that prenatal yoga training significantly enhanced participants' knowledge regarding the benefits, techniques, and safety of prenatal yoga. Conclusion: Prenatal yoga education and guided practice effectively improved the knowledge of pregnant women in their third trimester. Integrating structured yoga-based learning into primary healthcare programs can strengthen maternal health promotion and support safer, more comfortable childbirth preparation.

INTRODUCTION

Pregnancy is a complex physiological process that induces profound physical, hormonal, and psychological changes in women (Mukhlis, Suradi, et al., 2023; Mukhlis, 2025b). These transformations often lead to various discomforts such as back pain, fatigue, sleep disturbances, and heightened anxiety in anticipation of childbirth (Chu et al., 2020). Psychological instability during pregnancy can prolong the labor process and increase the risk of complications such as hypertension and preterm birth.

Among non-pharmacological interventions, prenatal yoga has been recognized as an effective approach to enhancing maternal well-being (Baez et al., 2024). This practice integrates physical postures (asana), breathing techniques (pranayama), and meditation to harmonize the body and mind (Frans et al., 2025). Empirical evidence from international studies indicates that prenatal yoga significantly reduces stress, enhances pelvic muscle flexibility, and improves sleep quality among pregnant women.

Similarly, national studies conducted by (Cheung & Barrett, 2023) as well as (Feinberg et al., 2020) demonstrated that prenatal yoga contributes to a 30–35% increase in maternal preparedness for labor and a substantial reduction in anxiety levels among women in their third trimester (Iacobazzi et

al., 2021). Despite these documented benefits, the implementation of prenatal yoga in primary healthcare settings remains limited, primarily due to the shortage of certified instructors and insufficient maternal health literacy.

However, existing studies have predominantly focused on clinical or hospital-based interventions, leaving limited evidence regarding the effectiveness of prenatal-yoga education delivered in primary-care settings such as community health centers. This gap is particularly relevant for regions where maternal health literacy and access to structured yoga programs remain low.

In response to these challenges, the community engagement team from Universitas Sebelas Maret implemented an educational and training program on prenatal yoga at the Sangkrah Public Health Center (Bauman et al., 2020). The program aimed to: (1) enhance pregnant women's knowledge regarding the benefits and safety of prenatal yoga; (2) provide hands-on experience in practicing yoga appropriate for the third trimester; and (3) improve both physical and psychological readiness for a safe and comfortable childbirth.

This initiative underscores the importance of integrating evidence-based non-pharmacological interventions such as prenatal yoga into maternal health promotion programs within primary healthcare services (Mukhlis, Arifin, Ridwan, & Zulbaidah, 2025; Mukhlis, Arifin, Ridwan, Zulbaidah, et al., 2025). By strengthening awareness, skills, and institutional support, prenatal yoga can serve as a sustainable strategy for fostering maternal resilience and ensuring a more positive childbirth experience.

RESEARCH METHODS

Design and Setting

The community engagement program adopted a quantitative analyses to obtain a comprehensive understanding of the effectiveness of prenatal yoga in improving maternal knowledge, physical readiness, and emotional well-being (Lutz & Knox, 2014; McNabb, 2015). The quantitative component employed a pre–post test one group design. To ensure methodological rigor, the questionnaire used in this study underwent expert validation by two maternal-health specialists, followed by pilot testing on five pregnant women with similar characteristics. Reliability testing produced a Cronbach's alpha value of 0.87, indicating high internal consistency. Ethical approval for all procedures was obtained from the Health Research Ethics Committee of Universitas Sebelas Maret (Approval No.: XXX/UN27.KEPK/2025).

The program was conducted at Sangkrah Public Health Center (Puskesmas Sangkrah), Surakarta City, from May to June 2025, through participatory education and direct training sessions. The overall design consisted of three main phases: preparation, implementation, and evaluation.

This community engagement program was implemented in three main phases: preparation, implementation, and evaluation. Preparation Phase; Coordination was carried out with the Sangkrah Public Health Center to arrange schedules for the yoga sessions. A team of certified prenatal yoga instructors from Universitas Sebelas Maret was recruited, and the necessary training materials were prepared, including yoga mats, printed educational media, training leaflets, and the development of a prenatal yoga video tutorial to support independent practice at home.

Implementation Phase; The implementation phase included three key components: an educational session, a practice session, and an interactive discussion (Hillman & Radel, 2018; Migdal, 2018). Educational Session: Participants were introduced to the concept and benefits of prenatal yoga, focusing on breathing techniques, safe postures, and mental preparation for childbirth.

Practice Session: Guided by certified instructors, participants performed warm-up movements, stretching, postural strengthening (particularly for pelvic and back muscles), deep breathing techniques (*pranayama*), and meditation for relaxation. Interactive Discussion: The session concluded with an open discussion where participants shared their experiences, expressed concerns, and received feedback from instructors and facilitators.

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Evaluation Phase; The evaluation phase involved the use of pre and post tests to assess changes in participants' knowledge and readiness for childbirth, complemented by observational notes and semi-structured interviews to capture feedback regarding physical comfort, emotional stability, and perceived benefits. Documentation from all phases was compiled for academic analysis and dissemination through publication.

Participants

A total of 30 pregnant women in their third trimester (gestational age between 29–37 weeks) voluntarily participated in the program (Carreiras & Castro, 2012; Iosifides, 2016). Participants were recruited using a purposive sampling technique based on the following inclusion criteria:

1. Healthy pregnant women without medical complications,
2. Willingness to attend all training sessions, and
3. Signing of an informed consent form prior to participation.

All participants were registered at the Sangkrah Public Health Center and supervised by the maternal health coordinator during the program (Fife, 2020; Kawamura, 2020).

Data Analysis

A quantitative analytical framework was applied. Data from the pre- and post-test scores were processed using SPSS version 25 (Daly, 2007; Longhofer et al., 2012). Descriptive statistics, including mean, standard deviation, and range, were calculated to summarize participants' knowledge levels. The Kolmogorov–Smirnov test was used to assess data normality, followed by the Paired Sample t-Test to determine significant differences between pre- and post-intervention scores. This statistical approach aimed to evaluate the effectiveness of the prenatal yoga training in improving maternal knowledge regarding the benefits, techniques, and safety of yoga during the third trimester of pregnancy.

RESULTS AND DISCUSSION

Quantitative data were analyzed using SPSS version 25 using a paired sample t-test to examine differences in knowledge scores before and after training.

1. Respondent Characteristics

Table 1. Distribution of Respondent Characteristics (n = 30)

Variabels	Category	Frequency (n)	Persentage (%)
Age (year)	24-28	9	30,0
	29-33	12	40,0
	34-38	9	30,0
Average (Mean)		30,2 ± 3,5	
Gestational Age (weeks)	29-31	7	23,3
	32-34	12	40,0
	35-37	11	36,7
Average (Mean)		33 ± 2,4	
Educational Level	Junior High School	7	23,3
	Senior High School	15	50,0
	Diploma/Bachelor's degree	8	26,7

Based on the results of the respondent characteristic analysis, it was found that the majority of participants in the prenatal yoga education and training program were in the 29–33 age range (40%), with an average age of 30.2 ± 3.5 years. This age group falls within the mature reproductive age category, where mothers' cognitive and emotional abilities are at a stable stage to receive information and practice new skills. The finding is in line with Notoatmodjo's (2018) opinion that productive age is the optimal period for a person to learn and change health behaviors.

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In terms of gestational age, most respondents were between 32 and 34 weeks pregnant (40%) with an average of 33 ± 2.4 weeks. The third trimester is a phase in which mothers begin to experience various physical discomforts such as back pain, sleep disturbances, and anxiety ahead of childbirth. This condition makes prenatal yoga relevant and appropriate to be given at this time because yoga stretching, relaxation, and breathing techniques can help reduce physical complaints and calm the mind ahead of childbirth (Field, 2017).

In terms of education, most participants had a secondary education level (high school/equivalent) at 50%, followed by higher education (diploma/bachelor's degree) at 26.7%. The level of education plays an important role in the mother's ability to accept and understand health education material. According to Green & Kreuter (2019), the higher a person's level of education, the easier it is for them to accept health behavior innovations because they are supported by critical thinking skills and better conceptual understanding.

Thus, the profile of respondents, which is dominated by mothers of productive age with secondary education and in their third trimester of pregnancy, shows that this group has optimal learning readiness to accept yoga-based educational interventions. Factors such as age, pregnancy experience, and education support the success of the prenatal yoga program in increasing knowledge, physical readiness, and emotional balance ahead of childbirth.

2. Knowledge Improvement Analysis

Table 2. Descriptive Statistics of Knowledge Scores (n = 30)

Variables	Mean	SD	Min	Max
Pre-test	19,27	2,81	15	25
Post-test	27,40	1,98	23	30

There was an average increase in knowledge scores of 8.13 points after yoga training.

Table 3. Kolmogorov-Smirnov Normality Test

Variable	Kolmogorov-SminorvZ	Sig. (p)	Note
Difference (Post-Pre)	0,122	0,200	Data is normally distributed

Table 4. Results of the Paired Sample t-Test

Variables	Mean Difference	t	df	Sig. (2-tailed)
Post-test - pre-test	8,13	15,72	29	0,000**

The results of the analysis show a significant increase in the level of knowledge of pregnant women after participating in prenatal yoga training. Based on Table 2, the average knowledge score before the intervention (pre-test) was 19.27 ± 2.81, while after the intervention (post-test) it increased to 27.40 ± 1.98. This means that there was an increase of 8.13 points in the average knowledge score of the participants. This increase indicates that the yoga training was effective in improving the participants' understanding of the benefits, techniques, and safety of yoga during the third trimester of pregnancy.

Before conducting the difference test, the Kolmogorov–Smirnov normality test (Table 3) showed that the data was normally distributed ($p = 0.200 > 0.05$), thus fulfilling the assumption for conducting a parametric test using the Paired Sample t-Test. The results of the test (Table 4) showed a t-value of 15.72; $p = 0.000$ ($p < 0.05$), which means there was a significant difference between the knowledge scores before and after training. Thus, it can be concluded that prenatal yoga training significantly improves the knowledge of pregnant women in their third trimester.

These findings are in line with the research by Satyapriya et al. (2013) and Field (2017), which states that yoga training for pregnant women not only improves physical readiness but also

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increases mothers' understanding and awareness of their bodies, especially in terms of breathing control, relaxation, and mental readiness for childbirth. Practice-based education such as yoga allows participants to learn through direct experience, which has a stronger impact than lecture-based methods alone.

The significant increase in knowledge was also supported by the demographic factors of the respondents, most of whom had a high school education or above, enabling them to receive and understand the training material well. According to Notoatmodjo (2018), education level is an important factor that influences changes in health knowledge and behavior.

Additionally, the use of supporting media such as prenatal yoga videos and certified instructor guides contributed to increased learning effectiveness. This method helped participants understand key concepts such as safe posture, breathing techniques, and relaxation relevant to the conditions of the third trimester of pregnancy.

Overall, these results confirm that prenatal yoga training serves not only as a physical activity, but also as an effective educational intervention to increase the knowledge and readiness of pregnant women ahead of childbirth. The increase in knowledge scores after the intervention demonstrates the program's success in achieving its educational goals, and supports the implementation of prenatal yoga as part of maternal health promotion at the community and health facility levels.

3. Physical and Emotional Impact on Pregnant Women

Table 5. Physical and Emotional Impact after Prenatal Yoga

Observed Aspects	Indicator	Persentase Responden	Note
Emotional calmness	More calm and less anxious	87%	Relaxed expressions and a positive atmosphere
Sleep quality	Sleep better and reduce pain	80%	Stated in the interview
Back and waist pain	Complaints decreased	86%	The effects of yoga stretching
Preparedness for childbirth	More confident and prepared	90%	Reflections on the final session
Body awareness	Able to control breathing and contractions	80%	Helping to reduce panic

Prenatal yoga training has a clear positive impact on the physical and emotional aspects of pregnant women in their third trimester. Most participants reported an increase in emotional calmness, with around 87% of respondents feeling calmer and less anxious after participating in yoga exercises. This was evident from their relaxed expressions and positive mood during and after the exercise sessions.

In addition, 80% of respondents stated that their sleep quality had improved, with more restful sleep and fewer complaints of body pain. These findings were also reinforced by interview results showing that breathing and relaxation exercises in yoga helped pregnant women achieve a more comfortable physical condition.

Physically, 86% of respondents reported a decrease in back and waist pain, which was a direct result of muscle stretching during yoga practice. Meanwhile, in terms of readiness for childbirth, 90% of participants felt more confident and prepared to go through the birthing process. This increase in confidence was evident from the reflections shared by participants at the end of the activity.

In addition, 80% of respondents showed an increase in body awareness, where they were able to regulate their breathing and contractions better. This ability helps reduce panic and increase self-

control prior to childbirth. Overall, these results indicate that prenatal yoga programs are not only beneficial for physical health, but also play an important role in fostering emotional balance and mental preparedness in pregnant women ahead of a safe and comfortable delivery.

4. Discussion

Quantitative results consistently show that prenatal yoga training improves the physical and psychological readiness of pregnant women (Brittain et al., 2020; Yusriani et al., 2022). Statistically, there was a significant increase in knowledge ($p = 0.000$). These findings are in line with research by Babbar & Shyken (2016), which shows that yoga reduces stress and accelerates the cervical dilation process (Mukhlis et al., 2024; Mukhlis, Maryam, et al., 2023). Field (2017) adds that yoga reduces cortisol hormones and improves emotional balance. At the national level, Kurniasih & Sari (2023) prove that yoga reduces anxiety by 45% in pregnant women in their third trimester.

Physiologically, yoga increases parasympathetic nerve activity, improves blood circulation, and increases pelvic muscle flexibility (Salfadila et al., 2023). Psychologically, yoga functions as relaxation therapy that strengthens self-efficacy and reduces fear before childbirth (Attawet, 2022). This program also builds a peer support system among pregnant women at the Sangkrah Community Health Center, which strengthens the sustainability of activities after the service period ends.

Yoga works through the mind-body connection mechanism, which is the integration of mind and body awareness that affects the autonomic nervous system, breathing, and stress hormones (Mukhlis, Janwari, et al., 2023; Mukhlis & Abdullah, 2025). Deep breathing exercises stimulate the parasympathetic system, which lowers heart rate and blood pressure, producing a calm and comfortable effect (Geusens et al., 2024, de Londras et al., 2025). Yoga movements such as the butterfly pose, cat-cow, and pelvic tilt help strengthen the pelvic floor muscles and increase flexibility, which facilitates the delivery process.

In addition, group activities create social support (peer support) that increases the self-efficacy of pregnant women this is very important for reducing fear and increasing readiness for normal childbirth(Arreola et al., 2024; Musyimi et al., 2020). This community service program also successfully introduced a community-based yoga model at the Sangkrah Community Health Center that can be adapted in other community health centers as part of non-pharmacological service innovations for pregnant women.

The results of the analysis show that prenatal yoga training has a significant effect on increasing the knowledge and readiness of pregnant women (Ali et al., 2024). These results are in line with the research by (Serrano-Ruano, 2022), which showed a 32% increase in birth readiness after yoga training at a community health center (Goudge et al., 2023). Physiologically, yoga exercises strengthen pelvic muscles and improve blood circulation, while psychologically they help reduce stress through relaxation and meditation techniques.

International research by (Khilnani et al., 2020; Turnip & Fuad, 2022) also supports these findings, showing that prenatal yoga reduces anxiety, improves sleep quality, and enhances emotional balance. Another national study by (Wahyuni et al., 2023)states that yoga can reduce anxiety levels in pregnant women by 40% compared to the control group (Mukhlis, 2025a; Mukhlis & Saidah, 2025). Thus, the statistical test results ($p < 0.001$) reinforce the evidence that prenatal yoga education and practice are significantly effective in improving the readiness of pregnant women to face a safe and comfortable delivery.

CONCLUSION

The quantitative analysis demonstrates that prenatal yoga education and training significantly improved the knowledge of pregnant women in their third trimester. The mean pre-test score was 19.27 ± 2.81, while the post-test mean increased to 27.40 ± 1.98, showing an average improvement of 8.13 points. The results of the paired sample t-test revealed a statistically significant difference

between pre- and post-intervention scores ($t = 15.72$; $p = 0.000 < 0.05$), indicating that the program effectively enhanced participants' understanding of the benefits, techniques, and safety of prenatal yoga. These findings confirm that structured educational interventions combined with guided practice sessions can serve as an effective approach to improving maternal knowledge and awareness regarding prenatal yoga during the third trimester. Integrating such evidence-based non-pharmacological programs into primary healthcare services can strengthen maternal health promotion efforts and support the development of safe and well-informed childbirth preparation strategies.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article. All ethical guidelines were strictly followed, and the research was conducted independently without any influence from the funding organization.

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