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EFFECT OF PRENATAL YOGA ON STRESS LEVELS AND WEIGHT CHANGES AMONG PREGNANT WOMEN: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Background: Maternal stress and inappropriate gestational weight gain are common issues during pregnancy that can raise the risk of negative outcomes for both mother and baby, such as preterm birth, hypertensive disorders, and fetal growth problems. Prenatal yoga is considered a safe, drug-free approach that integrates exercise, breathing, relaxation, and mindfulness to boost mental and physical health. This study aimed to assess how prenatal yoga affects stress levels and weight changes during pregnancy.
Methods: A quasi-experimental study was conducted with a single-group design involving 30 pregnant women in Grogol Village, Sukoharjo, Indonesia. Participants were selected through purposive sampling and attended weekly 45-minute prenatal yoga sessions for a month. Stress was measured using the DASS-21, and gestational weight was assessed according to the Indonesian Integrated Antenatal Care Guidelines. Data analysis involved paired-samples t-tests with a significance level of 0.05.
Results: Prenatal yoga markedly lowered maternal stress, with stress scores dropping after the program ($p = 0.006$). Post-intervention, all participants (100%) showed normal stress levels, up from 83.3% beforehand. Additionally, gestational weight outcomes improved notably ($p < 0.001$), with the percentage of women gaining appropriate weight rising from 43.4% before to 93.3% after the intervention.
Conclusion: Prenatal yoga is a beneficial complementary approach to reduce maternal stress and support optimal gestational weight gain. Incorporating prenatal yoga into routine antenatal care could improve the mother's physical and mental health, leading to better pregnancy outcomes.
Keywords: body weight, pregnancy, prenatal yoga, stress

INTRODUCTION

Maternal health continues to be a global public health priority, particularly in low- and middle-income countries where maternal morbidity and mortality remain unacceptably high. Pregnancy involves a series of physiological, hormonal, and psychological adaptations that may affect a woman's physical and emotional well-being. Throughout pregnancy, women commonly experience stress, anxiety, and emotional fluctuations resulting from physical discomfort, anticipation of childbirth, and adjustment to their new maternal role (Mooventhan, 2019). When stress persists, it may adversely influence both

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maternal and fetal health, increasing the likelihood of preterm birth, low birth weight, gestational hypertension, and impaired fetal development (Evidence et al., 2025).
Besides psychological well-being, maintaining appropriate gestational weight gain is another important determinant of maternal and neonatal health. Gestational weight gain reflects maternal nutritional status and has been recognized as a predictor of favorable pregnancy outcomes (Williams et al., 2019). Both excessive and inadequate weight gain during pregnancy have been associated with a greater risk of obstetric complications, which may negatively affect maternal and infant health (Hutchesson et al., 2020). Consequently, interventions that improve psychological well-being while supporting healthy gestational weight gain are needed as part of comprehensive antenatal care.

Prenatal yoga has gained increasing attention as a safe and non-pharmacological complementary therapy for pregnant women. This intervention combines gentle physical activity with breathing exercises, meditation, and relaxation techniques to promote both physical and mental well-being (Chen et al., 2017). Previous studies have reported that prenatal yoga may reduce maternal stress, improve sleep quality, strengthen self-efficacy, and contribute to better pregnancy outcomes. Nevertheless, evidence on its combined effects on stress reduction and gestational weight management among pregnant women in Indonesia remains limited (Kusaka et al., 2016).

The need for effective interventions is supported by regional health statistics. The Central Java Health Profile (2022) reported prevalence rates of 12.44% for obesity, 9.59% for diabetes mellitus, and 72% for hypertension, all of which remain priority public health issues because of their contribution to maternal and non-communicable disease burdens. Furthermore, data from the Sukoharjo District Health Office indicated a maternal mortality ratio of 9.27 per 1,000 live births in 2023 (Profil, n.d.). These findings emphasize the importance of preventive strategies that promote both maternal physical and psychological health during pregnancy. (Profil, 2022)

Based on these considerations, the present study aimed to evaluate the effect of prenatal yoga on maternal stress levels and gestational weight management among pregnant women in Grogol Village.

RESEARCH METHOD

This study used a quasi-experimental pretest-posttest design. The population consisted of pregnant women in Grogol Village, Sukoharjo. Thirty respondents were selected by purposive sampling and met the inclusion criteria to participate in the study. The inclusion criteria for respondents were: Pregnant women in their second or third trimester, Pregnant women willing to participate voluntarily, Pregnant women in good health. The exclusion criteria for respondents were Pregnant women with psychological or other medical conditions that prevented them from participating in the research process. Stress was measured using a standardized questionnaire, and body weight was measured before and after prenatal yoga intervention. Stress was assessed using the stress subscale of the Depression Anxiety Stress Scale-21 (DASS-21), comprising 7 items. Each item is scored on a 4-point Likert scale (0–3), and the total score is multiplied by two according to the DASS-21 scoring guidelines to obtain the final stress score. Body weight was assessed from pre-pregnancy BMI to the last BMI in the second and third trimesters. According to the Indonesian Integrated Antenatal Care Guidelines (2020), the recommended total gestational weight gain varies according to pre-pregnancy BMI. Underweight women (BMI <18.5 kg/m²) are advised to gain 12.7–18.1 kg, women with normal BMI (18.5–24.9 kg/m²) should gain 11.3–15.9 kg, overweight women (BMI 25.0–29.9 kg/m²) are recommended to gain 6.8–11.3 kg, while women with obesity (BMI ≥30 kg/m²) are advised to gain 5.0–9.1 kg during pregnancy. During the second and third trimesters, the

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recommended weekly weight gain is approximately 0.45 kg/week for underweight and normal-weight women, 0.27 kg/week for overweight women, and 0.23 kg/week for women with obesity. Data is categorized as "Proportionate" if the mother's weight gain meets the standard, and "Not Proportionate" if it does not. Yoga sessions were held once a week for 45 minutes. The study was conducted over one month.

Data were analyzed using a paired sample t-test with a significance level of 0.05. The research was conducted with ethical clearance from the University of Kusuma Husada, number 2950/UKH.L.02/EC/VIII/2025.

RESULTS

Table 1. Body Weight Distribution Before Prenatal Yoga

Information	Frequency (f)	Percentage (%)
Proportionate	13	43,4
Not Proportionate	17	56,6
Total	30	100

Table 1. shows the distribution of participants by gestational weight gain. Of the 30 participants included in the study, 13 (43.4%) had proportionate gestational weight gain, while 17 (56.6%) had non-proportionate gestational weight gain.

Table 2. presents the distribution of participants' body weight after the prenatal yoga intervention. Of the 30 participants, 28 (93.3%) had proportionate body weight, while 2 (6.7%) had non-proportionate body weight.

Table 2. Body Weight Distribution After Prenatal Yoga

Information	Frequency (f)	Percentage (%)
Propotionate	28	93,3
Not Proportionate	2	6,7
Total	30	100

Table 3. The Stress Level Distribution Before Yoga Pregnancy

Stress level	Frequency (f)	Percentage (%)
Normal	25	83,3
Mild	5	16,7
Moderate	0	0
Severe	0	0
Very severe	0	0
Total	30	100

Table 3. presents the distribution of participants' stress levels before the prenatal yoga intervention. Among the 30 participants, 25 (83.3%) had normal stress levels, while 5 (16.7%) experienced mild stress. No participants were classified as having moderate, severe, or very severe stress. These findings indicate that the majority of pregnant women had normal baseline stress levels, with only a small proportion experiencing mild stress before participating in the prenatal yoga program.

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Table 4. The Stress Level Distribution After Yoga Pregnancy

Stress Level	Frequency (f)	Percentage (%)
Normal	30	100
Mild	0	0
Moderate	0	0
Severe	0	0
Very Severe	0	0
Total	30	100

Table 4. presents the distribution of participants' stress levels after the prenatal yoga intervention. All 30 participants (100%) were classified as having normal stress levels following the intervention. No participants experienced mild, moderate, severe, or very severe stress.

Table 5. Result Paired Sample t-Test Stress Level

Variabel	Mean Difference	Std. Deviation	Std. Error Mean	t	df	p-value
Stress level before - Stress level after	0.233	0.43	0.079	2.971	29	0.006
BB1-BB2	0.500	.630	.115	4.349	29	0.000

Table 5. presents the results of a paired-samples t-test comparing stress levels and body weight before and after the prenatal yoga intervention. The analysis showed a statistically significant reduction in stress levels following the intervention, with a mean difference of 0.233 (SD = 0.43, SE = 0.079), t (29) = 2.971, p = 0.006. This finding indicates that prenatal yoga was associated with a significant improvement in maternal stress levels.

Similarly, body weight demonstrated a statistically significant difference between the pre- and post-intervention measurements, with a mean difference of 0.500 (SD = 0.630, SE = 0.115), $t(29) = 4.349$, $p < 0.001$. These results suggest that prenatal yoga was associated with a significant change in maternal body weight during the study period. appropriate.

DISCUSSION

The present study demonstrated that prenatal yoga significantly reduced stress levels among pregnant women in Grogol Village. The results showed a statistically significant reduction in stress scores after three weeks of prenatal yoga intervention (p = 0.006). Before the intervention, 16.7% of respondents reported mild stress; after prenatal yoga, all participants (100%) were categorized as having normal stress levels. These findings indicate that prenatal yoga is an effective non-pharmacological intervention for improving maternal psychological well-being during pregnancy (Gallagher et al., 2020). Pregnancy is accompanied by physiological, hormonal, and emotional changes that may increase susceptibility to psychological distress. Maternal stress during pregnancy has been associated with adverse outcomes, including preterm birth, low birth weight, impaired fetal growth, and postpartum depression. Therefore, interventions that effectively reduce stress are important components of antenatal care services (2020). The yoga interventions significantly reduced stress, anxiety, and depressive symptoms among

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pregnant women (Kwon et al., 2020). Similarly, a previous study reported that prenatal yoga improves emotional regulation and maternal mental health by promoting relaxation and mindfulness (Corrigan et al., 2022). A systematic review conducted by the other researcher further concluded that prenatal yoga contributes to significant improvements in psychological well-being and reduces perceived stress during pregnancy. The mechanism underlying stress reduction through prenatal yoga may be explained by the integration of breathing exercises, meditation, stretching, and relaxation techniques. Controlled breathing stimulates parasympathetic nervous system activity, resulting in decreased cortisol secretion and reduced physiological responses to stress (Field, 2012). Furthermore, yoga encourages mindfulness and present-moment awareness, enabling pregnant women to cope more effectively with concerns related to childbirth and pregnancy-related changes (Mohyadin et al., 2020).

According to Pender's Health Promotion Model, health-promoting behaviors, such as prenatal yoga, enhance self-efficacy and perceived benefits, thereby improving individual commitment to maintaining health (Santi et al., 2023). Increased confidence and perceived control over pregnancy experiences may explain the reduction in stress levels observed among participants in the present study. In addition to reducing stress, prenatal yoga significantly improved gestational weight management. The proportion of mothers with appropriate weight status increased from 93.3% before intervention to 100% after intervention. Statistical analysis revealed a significant difference in weight outcomes before and after prenatal yoga ($p < 0.001$). Appropriate gestational weight gain is an important determinant of maternal and neonatal health. Excessive weight gain increases the risk of gestational diabetes mellitus, hypertensive disorders, cesarean delivery, and postpartum obesity, whereas inadequate weight gain may contribute to fetal growth restriction and low birth weight (Goldstein et al., 2017).

Therefore, strategies that promote healthy weight gain during pregnancy are essential. The improvement in weight status observed in this study may be attributed to the physical activity component of prenatal yoga. Regular physical activity improves metabolic efficiency, energy expenditure, and muscle function, thereby contributing to healthier weight management during pregnancy (Article et al., 2023). Although prenatal yoga is classified as a low-to-moderate intensity exercise, it remains effective in promoting maternal fitness and supporting appropriate gestational weight gain. Previous studies support these findings. A study reported that exercise interventions during pregnancy significantly reduced excessive gestational weight gain and improved maternal health outcomes. The other study demonstrated that structured prenatal exercise programs improved weight control and reduced pregnancy-related complications. Recent evidence also suggests that yoga improves body awareness and encourages healthier lifestyle choices, including dietary behaviors and physical activity patterns (Mascio et al., 2016). Another possible explanation is the relationship between stress reduction and weight regulation. Chronic psychological stress has been linked to elevated cortisol levels, increased appetite, and unhealthy eating behaviors (Field, 2012). By reducing stress levels, prenatal yoga may indirectly support healthier nutritional practices and improve adherence to recommended gestational weight gain guidelines (Ng et al., 2018).

The findings of this study suggest that prenatal yoga may serve as an effective complementary intervention within antenatal care programs (Green et al., 2022). Prenatal yoga is relatively inexpensive, safe, and easy to implement at the community level. Midwives can integrate yoga sessions into routine maternal health services to improve both physical and psychological outcomes among pregnant women (Meredith L. Birsner, MD; and Cynthia Gyamfi-Bannerman, MD & Physical, 2020). The incorporation of prenatal yoga into maternal health promotion programs is particularly relevant in rural

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communities such as Grogol Village, where access to mental health services may be limited. Community-based prenatal yoga programs may contribute to healthier pregnancies, improved maternal quality of life, and better birth outcomes. Consequently, healthcare policymakers should consider incorporating prenatal yoga into comprehensive maternal healthcare strategies.

CONCLUSION

This study demonstrated that prenatal yoga had a significant positive effect on stress reduction and gestational weight management among pregnant women in Grogol Village. Following a three-week prenatal yoga intervention, all participants achieved normal stress levels, and significant improvements were observed in weight monitoring outcomes. Statistical analysis revealed significant differences in both stress levels ($p = 0.006$) and body weight outcomes ($p < 0.001$) before and after the intervention. The findings suggest that prenatal yoga is an effective, safe, and non-pharmacological intervention that supports both psychological and physical well-being during pregnancy. Through breathing exercises, relaxation techniques, stretching, and mindfulness practices, prenatal yoga helps pregnant women cope with emotional stress while promoting healthier weight management during pregnancy. Therefore, prenatal yoga may be recommended as a complementary strategy within antenatal care services to improve maternal health outcomes. Healthcare providers, particularly midwives, are encouraged to incorporate prenatal yoga programs into routine maternal healthcare services to enhance maternal well-being and support healthy pregnancy outcomes. Future studies involving larger sample sizes, control groups, and longer intervention periods are recommended to further validate and strengthen the evidence regarding the benefits of prenatal yoga during pregnancy.

RECOMMENDATIONS

Based on this study's findings, prenatal yoga is recommended as a complementary intervention in antenatal care services to improve maternal psychological well-being and support appropriate gestational weight management. Midwives and healthcare providers should consider incorporating structured prenatal yoga programs into routine maternal healthcare services, particularly for pregnant women experiencing stress or difficulties in maintaining healthy weight gain during pregnancy. Community health centers and local health authorities are encouraged to develop regular prenatal yoga classes as part of maternal health promotion programs. Such initiatives may help reduce maternal stress, improve pregnancy experiences, and promote positive maternal and fetal outcomes. Educational institutions, especially midwifery and nursing programs, should strengthen training related to prenatal yoga and non-pharmacological interventions during pregnancy. This will enhance the competencies of future healthcare professionals in providing holistic maternal care. Future research is recommended to employ randomized controlled trial designs with larger sample sizes and longer intervention periods to further evaluate the effectiveness of prenatal yoga on maternal and neonatal outcomes. Additionally, future studies should explore the influence of prenatal yoga on self-efficacy, quality of life, sleep quality, family support, and pregnancy-related complications to provide a more comprehensive understanding of its benefits.

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