

# Effectiveness of prenatal yoga on pregnant women's anxiety and duration of labour

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## Abstract

The birth process involves physical and psychological mechanisms. Anxiety creates physical and psychological tension, interfering with the birth process. The study aimed to analyze the effectiveness of Yoga on pregnant women's anxiety and labor duration. This study used an experimental design with a Randomized Controlled Trial (RCT) involving 60 pregnant women divided into two groups: Yoga and walking (30 participants each). The variables studied were pregnant women's anxiety and the duration of labor. The sampling technique was conducted using block randomization. Data were analyzed using the Independent T-test. The Yoga group attended 30-minute sessions twice weekly, while the walking group engaged in the same frequency and duration of walking until giving birth. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) before and one month after the intervention in both groups. The duration of labor was measured using partographs and medical records during delivery for both groups. Data were analyzed using the Shapiro-Wilk test and independent t-test. Pregnant women in both the Yoga and walking groups experienced reduced anxiety scores, with a decrease of 11.6%, and statistically significant p-values of <0.05. The duration of labor was significantly shorter in the Yoga group (mean: 2.65 hours, SD: 1.01) compared to the walking group (mean: 4.01 hours, SD: 2.54), with a mean difference of 1.36 hours and a p-value of <0.05. Prenatal Yoga in the third trimester reduces pregnant women's anxiety and shortens the duration of labor. It can be suggested as an alternative exercise for pregnant women to improve maternal health during pregnancy and childbirth.

## Introduction

Pregnancy is a period that requires adaptation in facing the new role of motherhood, causing various kinds of changes both physically and psychologically.<sup>1</sup> Many pregnant women experience fear and anxiety about the childbirth process.<sup>2</sup> Anxiety can lead to both mental and physical tension,<sup>3</sup> causing muscles and joints to become stiff, which in turn disrupts uterine contractions and interferes with the delivery process.<sup>4</sup> Up to 65% of prolonged labor events can be attributed to inefficient uterine contractions triggered by anxiety, hindering uterine activity.<sup>5</sup> One indicator of emotional stress is elevated cortisol levels.<sup>6</sup> The increase in plasma cortisol levels in the second trimester of pregnancy and before delivery increases and decreases after delivery, but hypercortisolism occurs up to 5–7 days after delivery.<sup>7</sup> This highlights the vulnerability of pregnant women to anxiety, which can be linked to impaired contractions and labor disruptions.<sup>8</sup> The labor process, including the choice of delivery method and late referral, is one of the potential risk factors for maternal mortality, alongside nutri-

tional status, anemia, medical history, age, ANC examination, occupational status, and pregnancy complications.<sup>9</sup> Lack of knowledge about signs and symptoms can lead to low awareness and, subsequently, the mismanagement of pregnancy and childbirth complications.<sup>10</sup> Physical exercise is one approach to alleviate anxiety and help pregnant women prepare for childbirth.<sup>11,12</sup> Engaging in physical activity by moving can enhance a woman's sense of control during labor.<sup>13</sup> Various forms of physical exercise for pregnant women include walking, cycling, swimming, pregnancy-specific exercises, hypnobirthing, and Yoga.<sup>14,15</sup> Practicing Yoga during pregnancy can reduce a woman's anxiety during labor, shorten the labor stage, and alleviate labor pain.<sup>16</sup> Prenatal Yoga has been shown to reduce labor pain and potentially improve birth outcomes.<sup>17</sup> Therefore, this study aims to analyze the effectiveness of prenatal Yoga in reducing maternal anxiety levels and shortening the duration of labor during pregnancy.

## Materials and Methods

### Research design

The research design used in this study was experimental, employing a Randomized Controlled Trial (RCT). The research involved two groups: a treatment group that received prenatal Yoga and a control group that participated in walking exercises. This study assessed the anxiety levels of pregnant women in both the treatment and control groups before and after exercising, two times per week for one month. Respondents continued their exercises until the time of delivery, and the duration of labor in both groups was recorded. The research was conducted in Bandung, West Java, Indonesia, focusing on pregnant women in the third trimester who engaged in a 30-minute exercise session twice weekly. The research took place at the Public Health Center and a Private Midwifery Practice in the City and District of Bandung, Indonesia.

### Study participants

The subjects in this study were pregnant women who met the inclusion and exclusion criteria and voluntarily agreed to participate by signing the Informed Consent sheet. The target population for this study comprised all pregnant women in the city of Bandung, Indonesia. The study population encompassed pregnant women in their third trimester who attended the Public Health Center and Private Midwifery Practice in the City and District of Bandung, Indonesia. The sample for this study consisted of pregnant women who underwent pregnancy and childbirth-related check-ups at the Public Health Center and Private Midwifery Practice in the City and District of Bandung, Indonesia, and who met the inclusion criteria. Sample size determination employed the formula for unpaired numerical categorical research. In this study, a confidence level of 95% ( $Z\alpha=1.96$ ) and a Power test of 90% ( $Z\beta=1.28$ ) were selected. The sample size comprised 60 pregnant women, divided into two groups: Yoga and walking, with 30 individuals in each group. Block randomization was used to assign each sample to either the treatment or control group.

The inclusion criteria encompassed planned pregnancy, being in the third trimester of gestation, and a willingness to participate as a respondent. Simultaneously, the exclusion criteria included pregnant women with pregnancy-related complications. Research subjects were excluded from the study if they met one or more of the following criteria during the study: not adhering to recommended exercises, experiencing an illness requiring treatment, or withdrawing from the study before its completion.

## Variable, instrument and data collection

### Variable

In this study, the independent variable was the structured prenatal Yoga exercises performed by pregnant women in the treatment group. These exercises were conducted twice weekly for 30 minutes. The control group engaged in walking exercises for the same duration and frequency. The dependent variables included the anxiety levels of pregnant women and the duration of labor. Pregnant women's anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS). Anxiety levels were measured both before the intervention and one month after the intervention in both the Yoga and walking groups. Meanwhile, the duration of labor was measured using a partograph and medical records at the time of labor in both the Yoga and walking groups.

### Instrument

The research instrument utilized a questionnaire that had previously undergone validity and reliability testing and was found to be valid and reliable. Pregnant women's anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS). The questionnaire employed to measure anxiety symptoms is a tool that had been designed and utilized in previous research. This instrument underwent validity and reliability testing, with item construct validity values based on Pearson correlations ranging from 0.529 to 0.727, and a Cronbach's  $\alpha$  reliability coefficient of 0.756 was obtained. Consequently, the Hamilton Anxiety Rating Scale fulfills the criteria for being a reliable (meeting acceptable criteria) and valid (meeting good criteria) assessment tool.

### Data collection

The research procedure began by selecting research subjects based on the inclusion and exclusion criteria. Subsequently, the researcher provided information by explaining the research objectives and procedures to the research subjects. Following this, consent to participate in the research was sought through the signing of the informed consent sheet.

The next step involved the collection of anxiety data using a questionnaire. Subjects were then randomly assigned to either the treatment group or the control group. The treatment group received Yoga exercises, while the control group engaged in walking exercises. After the respondents had participated in the exercises for one month, anxiety was measured again using a questionnaire as a posttest. The exercises continued until just before delivery, at which point the duration of labor was measured in both groups.

### Intervention

The treatment group received Yoga exercises twice a week for 30 minutes, led by a certified prenatal Yoga instructor. All respondents in this group followed the same Yoga exercise sequence and were trained by the same Yoga instructor. The Yoga sequence included centering, pranayama, stabilization, side stretching, pelvic floor muscle training in preparation for labor, restorative exercises, and savasana. Anxiety levels were assessed both before the commencement of regular Yoga practice and after one month of practice. Yoga sessions continued until just before delivery. The duration of labor was evaluated based on partographs and medical records. The control group engaged in walking exercises twice a week for 30 minutes. Anxiety evaluation was conducted both before the start of regular exercise and after one month of walking sessions. The walking regimen continued until just before delivery. The length of labor was assessed using partographs and medical records.

### Data analysis

The data were analyzed using univariate and bivariate analysis. The data normality test, conducted using the Shapiro-Wilk test, indicated that the data followed a normal distribution. Subsequently, bivariate analysis was performed using the Independent T-test statistic to assess the effectiveness of Yoga and walking in relation to anxiety and the duration of labor, with a significance value of  $p < 0.05$ .

### Ethical clearance

The research has obtained ethical clearance from the Health Research Ethics Committee of the Health Polytechnic of the Ministry of Health in Bandung, with the ethical approval number No. 01/KEPK/EC. Throughout the research, the researcher adhered to ethical principles, including obtaining informed consent, respecting human rights, promoting beneficence, and ensuring non-maleficence.

## Results

An overview of the characteristics of the research subjects participating in this study can be found in Table 1. It can be concluded

that the characteristics of the research subjects exhibit no significant differences, indicating homogeneity and enabling comparison. The results revealed no differences in the study subjects' age and occupation between the Yoga group and the walking group ( $p > 0.05$ ), suggesting that the data followed a normal distribution. However, a difference in parity was observed between the Yoga and walking groups ( $p < 0.05$ ). The table below provides further details on the characteristics of the research subjects.

The table below illustrates the differences in anxiety between the treatment and control groups. Table 2 reveals that before treatment, there was no significant difference in the anxiety scores of mothers between the two groups (those regularly practicing Yoga or walking). However, after one month of regular Yoga and walking sessions, a significant difference in anxiety scores was observed between the two groups ( $p < 0.05$ ). The prenatal Yoga group exhibited an average anxiety reduction of 11.10%, which was greater than the reduction in anxiety scores in the control group. The intervention demonstrated a significant difference in anxiety reduction between the Yoga and walking groups, with statistical test results indicating a value of  $p < 0.05$ . The Yoga group experienced a decrease in anxiety scores.

Table 3 indicates that the average length of labor in the treatment group was shorter than in the control group. The difference in the mean length of labor between the prenatal Yoga and walking

**Table 1.** Research subject characteristics based on parity, age, and occupation.

Variable	Prenatal yoga		Walking		p
	n	%	n	%	
Parity					
Primipara	23	76.7	10	33.3	0.001 <sup>a</sup>
Multipara	7	23.3	20	66.7	
Age					
<20 years	1	3.3	1	3.3	0.052 <sup>b</sup>
20-35 years	29	96.7	24	80.0	
>35 years	0	0	5	16.7	
Occupation					
Employe	10	33.3	4	13.3	0.067 <sup>a</sup>
Unemployment	20	66.7	26	86.7	
Total	30	100	30	100	

Test description: <sup>a</sup>Chi-square; <sup>b</sup>Exact Fisher test.

**Table 2.** Differences in anxiety between prenatal yoga and walking groups.

Characteristics	Group		p
	Yoga (n=30)	Walking (n=30)	
Anxiety pre-intervention			
Mean (SD)	54.87 (9.42)	54.90 (17.59)	0.993 <sup>c</sup>
Anxiety post-intervention			
Mean(SD)	43.87 (8.95)	54.33 (17.67)	0.005 <sup>c</sup>
Anxiety reduction			
Mean(SD)	-11.10 (7.61)	-0.57 (1.52)	0.001 <sup>c</sup>

Test characteristic: <sup>c</sup>Independent t-test.

**Table 3.** Differences in length of labour between prenatal yoga and walking groups.

Anxiety	N	Mean (SD)	p
Prenatal Yoga	30	2.65 (1.01)	0.010 <sup>c</sup>
Walking	30	4.01 (2.54)	

Test characteristic: <sup>c</sup>ndependent t-test.

groups was 1.36 hours, signifying that the length of labor in the Yoga group was shorter than in the walking group. The intervention demonstrated a significant difference in the length of labor between the treatment and control groups, with a statistical test result of  $p=0.010$ .

## Discussion

The aim of this study was to investigate the impact of prenatal Yoga on maternal anxiety levels and the duration of labor. The results demonstrated a greater decrease in anxiety scores in the treatment group compared to the control group, with an average anxiety reduction of 11.10% in the prenatal Yoga group. The intervention revealed a significant difference in anxiety reduction between the Yoga and walking groups. Anxiety can manifest through various symptoms, including racing thoughts, jerky movements, and physical changes such as muscle tightness, elevated pulse, and increased blood pressure.<sup>18</sup> Yoga, a relaxation method, reduces muscle tension and enhances overall body equilibrium.<sup>19</sup> It influences neurotransmitters in the brain, promoting serenity (serotonin) and happiness (endorphins) while reducing stress hormones (adrenaline).<sup>14,19,20</sup> Excessive anxiety in the mother can lead to increased stress hormone levels in the body, inhibiting cervical dilation, resulting in prolonged labor, fatigue, and fetal distress, potentially leading to Intra Uterine Fetal Death (IUFD).<sup>21</sup> Prenatal Yoga improves concentration, memory, and addresses concerns such as eye diseases and insomnia.<sup>22</sup> It also reduces anxiety, enhances relaxation, and reduces negative mood aspects. Yoga incorporates breathing techniques (pranayama) and meditation, enhancing its stress-relief properties during pregnancy.<sup>23,24</sup> Ownership of health insurance becomes a determinant of labor and delivery care in healthcare facilities.<sup>25</sup> According to the Indonesian Demographic Health Survey 2007, the types of labor complications include prolonged labor (37%), bleeding (9%), fever (7%), seizures (2%), and other complications (4%).<sup>26</sup>

Yoga is utilized for various immunological, neuromuscular, psychological, and pain-related conditions. Yoga can prepare an individual who is physically strong and mentally calm, ready to embrace motherhood.<sup>27</sup> It aids in achieving physical balance, maintaining a healthy pregnancy, reducing discomfort due to pregnancy adaptations, and facilitating the delivery process.<sup>28</sup> Yoga can increase the levels of Gamma Amino Butyric Acid (GABA), a neurotransmitter that reduces arousal and anxiety, enhances parasympathetic activity, provides a calming effect, and significantly decreases cortisol hormone production.<sup>29</sup> Physical activity through Yoga enhances self-control and the quality of life, promoting a well-balanced state of well-being between physical and mental health.<sup>30</sup>

Furthermore, the average length of labor in the treatment group was shorter than that in the control group. The difference in the mean length of labor between the prenatal Yoga and walking groups was 1.36 hours, indicating that the length of labor in the Yoga group was shorter than in the walking group. The intervention demonstrated a significant difference in the length of labor between the treatment group and the control group. This aligns with the findings of Mohyadin's study, which demonstrated that pregnant women in the third trimester who practiced Yoga experienced a shorter duration for the first phase of labor compared to the control group.<sup>16</sup> There were more vaginal deliveries ( $p<0.037$ ) and fewer cesarean sections ( $p<0.048$ ), and the first stage of labor was

significantly shorter ( $p<0.0003$ ) in the Yoga study group.<sup>17</sup> In Yoga, movement sequences influence not only physical factors but also psychological elements. In other words, Yoga enhances the well-being of the body, mind, and soul. Conversely, walking primarily focuses on physical and motor skills, promoting endurance and physical stamina.<sup>31</sup> Yoga is a physical, mental, and emotional exercise that helps increase joint flexibility and promote mental calmness, preparing pregnant women both physically and mentally for a confident, comfortable, and fear-free experience during the normal delivery process. Prenatal Yoga specifically emphasizes breathing, stretching, posture, and relaxation.<sup>32-34</sup> Deep breathing (pranayama), and meditation. It is considered safe during pregnancy and has been demonstrated to be beneficial for women experiencing anxiety, depression, stress, low back pain, and sleep disturbances.<sup>14,35,36</sup> Yoga can increase women's self-efficacy in facing childbirth. According to the previous study Self-efficacy is significantly related to the behavior of pregnant women in reducing anxiety. A high level of self-efficacy encourages confidence in problem-solving and can effectively reduce anxiety when facing challenges.<sup>37</sup> After all, the practice of Yoga not only enhances posture but also involves effective breathing, meditation, and self-awareness.<sup>38</sup> The results of other studies suggest that prenatal Yoga can be recommended for pregnant women, as it has been shown to increase the rate of vaginal delivery, reduce the need for labor induction, decrease the occurrence of premature events, lower the incidence of episiotomy, and shorten the duration of labor.<sup>22,39</sup> Yoga can enhance concentration, posture, and relaxation during pregnancy. It also facilitates training of respiratory muscles, regulation of breathing, and increased blood flow, all of which contribute to improved uterine contractions during delivery.<sup>36,40</sup> Malasana, Baddha Konasana, and Marichiasana are Yoga postures that stretch the pelvic floor muscles, alleviate pelvic pain, and prepare the body for childbirth.<sup>41</sup> Practicing these movements helps pregnant women become familiar with labor positions, relax their muscles, and facilitate effective pushing techniques.<sup>42</sup> Yoga's upright and moving positions assist in the gravitational descent of the baby's head into the pelvis, stimulating more consistent and muscular contractions, accelerating cervical dilation, and expediting labor.<sup>43</sup>

The limitation of this research that the respondents were restricted to pregnant women in the third trimester. Therefore, further research is needed to determine the effectiveness of Yoga in the first and second trimesters of pregnancy. Additionally, it would be beneficial if the research subjects had homogeneous parity, such as primigravida, who share similar characteristics in experiencing pregnancy for the first time

## Conclusions

Prenatal Yoga in the third trimester effectively reduces anxiety levels in pregnant women and shortens labor time. These findings suggest that including Yoga as an alternative activity during pregnancy can enhance maternal health and have a positive impact on the birthing process. It is advisable for pregnant women, particularly during the third trimester, to consider prenatal Yoga. Healthcare providers can incorporate Yoga sessions into prenatal care to promote relaxation, reduce anxiety, and potentially shorten labor duration. Further studies and inquiries can be conducted to assess the long-term benefits of prenatal Yoga on both maternal and newborn outcomes and to develop guidelines for its safe and practical application in various healthcare settings.

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