



## Effectiveness of Video-Guided Birth Ball Exercises on Reducing Back Pain in the Third Trimester of Pregnancy

Made Fitri Yuliandari<sup>1</sup>, I Putu Praja Santika Abadi<sup>2</sup>, Komang Dedi Juliawan<sup>3</sup>

<sup>1</sup> Rumah Sakit Tk. II Udayana, Bali, Indonesia

<sup>2</sup> Social Welfare for Elderly Yawaragi no Sato, Chiba-ken, Ichikawa-shi, Japan

<sup>3</sup> Stiftung Lebenshilfe Zollernalb ZAW gGmbH, Balingen, Germany

Corresponding Author: [madefitriy2@gmail.com](mailto:madefitriy2@gmail.com)

### ABSTRACT

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Pregnancy can cause changes that lead to discomfort for expectant mothers. One of the common complaints experienced by pregnant women is lower back pain. This study was conducted at Ayrin Mom and Baby Care with the aim of identifying differences in the intensity of lower back pain among third trimester pregnant women before and after following instruction in the usage of a birth ball through video media. This research employed a pre-experimental design using one-group pretest-posttest approach. The implementation took place from March to April 2025. The intervention, consisting of 30-minute sessions, was carried out twice a week for four weeks. The sample consisted of 32 participants. A non-probability sampling technique was used with purposive sampling. The results showed that the average lower back pain intensity before the birth ball training was 5.19, and after the training, it decreased to 1.84. Statistical analysis showed that the p-value was  $0.000 < 0.05$ , indicating a significant difference in the intensity of lower back pain among third trimester pregnant women before and after the birth ball training with video media at Ayrin Mom and Baby Care. Pregnant women are encouraged to use birth ball as a means of support and to alleviate lower back pain.

### INTRODUCTION

Pregnancy brings about various changes, both physical and psychological, which often lead to discomfort for expectant mothers<sup>1</sup>. In the third trimester, these complaints are more commonly experienced, including frequent urination, constipation, sleep disturbances, and back pain. One of the most frequent complaints made by women in pregnancy is pain in the low back<sup>2</sup>. Pain in the back refers to discomfort that occurs in the lumbar sacral area (spine) and typically increases in intensity as pregnancy progresses<sup>3</sup>. This condition generally occurs as a result of the woman's posture and shifting center of gravity<sup>3</sup>. In general, pain in the back while pregnancy is impacted by postural changes caused by gradual weight gain, which shifts the body's center of gravity forward, making daily activities during pregnancy a potential trigger for back pain<sup>4</sup>.

Reports indicate that the prevalence of pregnancy-related low back pain varies across regions such as Europe, America, Australia, China, Taiwan, and Africa, with rates ranging from 20% to 80%<sup>5</sup>.



In the first trimester, the prevalence is recorded at 16.7%, rising to 31.3% in the second trimester, and reaching 53% in the third trimester<sup>6</sup>. The study conducted by Beddoe et al (2020) found that around 70% of pregnant women experienced low back pain (LBP) that may occur from the first trimester, with the highest incidence occurring in the second and third trimesters<sup>6,7</sup>. Study outcomes revealed that 68% of pregnant women suffered from back pain of moderate intensity, while 32% experienced it with mild intensity<sup>8</sup>.

The impact of pain in the low back experienced by women in the third trimester of pregnancy may lead to long-term discomfort, increasing the probability of suffering from back pain after childbirth as well as chronic pain, which is harder to manage or treat<sup>9</sup>. The effects of back pain can raise the risk of postpartum back pain and developing venous thrombosis, sleep disturbances that lead fatigue and irritability, as well as discomfort that interferes with or disrupts daily activities. Ultimately, this condition may result in the fetal distress, as the mother's health is closely interconnected with the condition of the fetus she is carrying<sup>10</sup>. Management to alleviate back pain complaints in third trimester pregnant women is part of midwifery care provided by midwives through non-pharmacological methods that are simple, inexpensive, effective, and free side effects<sup>11</sup>. Simple non-pharmacological therapy that can help pregnant women reduce back pain problems, one of which is through giving birth ball<sup>9</sup>. Birth ball is one of the distraction methods in overcoming pain, when using a birth ball, pregnant women's attention will be diverted, thereby lowering her awareness of the pain<sup>12</sup>.

The choice of birth ball as an intervention to alleviate back pain complaints in third trimester expectant mothers because birth ball has various advantages that stand out compared to other interventions in managing maternal back pain, starting from its multifunctional nature because it is not only useful for relieving back pain but can also be used for childbirth preparation and pelvic muscle strengthening exercises. Ease of use because it can be done independently at home after being educated by health workers, has minimal risk of injury or side effects and can encourage mothers to actively move which is beneficial for overall fitness<sup>13</sup>. The study by Safitri (2021) indicated that using a birth ball significantly reduced lower back pain in women during the third of pregnancy<sup>14</sup>. The maternal pain scale recorded after the birth ball intervention was lower compared to the pain scale measured before the intervention. Another study conducted by found<sup>15</sup> that the use of a birth ball had an effect on lowering pain levels. Respondents who were given birth ball reported that before the treatment, the pain they experienced interfered with their activities, and after treatment respondents felt pain but did not interfere with activities.

Pregnant women who get the right information about birth ball are more effective in participating in the training process. Education that can be given to pregnant women is in the form of educational materials that will be delivered in a video about birth ball<sup>12</sup>. Video media can help the audience in the process of receiving information that serves to clarify or make it easier to understand the information provided because it involves the senses of sight and hearing, which can be seen repeatedly<sup>12</sup>. Other Research demonstrates that educational videos are more effective than leaflet media in alleviating back pain intensity in third trimester pregnant women at the Surabaya Health Center<sup>12</sup>.

Based on the outcomes of a preliminary study conducted at Ayrim Mom and Baby Care Denpasar in October by measuring the pain level among 10 expectant mothers in the third trimester using the Visual Analogue Scale (VAS), data was obtained on 7 people experiencing moderate pain (scale 4-6) and as many as 3 people experiencing severe pain (scale 7-9), they said that they often experienced back pain such as pain and sometimes felt like they was being stabbed so that he whimpered. Interviewed about how to deal with back pain, 4 mothers said they did not know an effective way to deal with back pain, 1 mother used a breathing relaxation technique and 2 mothers did a method with a swab on the mother's waist carried out by the husband. The application of video-based media to provide learning materials about birth ball and all that has never been done is only conveyed through lecture and discussion methods. The selection of a research site at Ayrim Mom and Baby Care is because





the number of visits by pregnant women can meet the number of samples needed, has supporting facilities such as a large enough room for the implementation of birth ball interventions, has competent health workers in providing education and assistance for birth ball utilization, as well as the accessibility factor of locations that are easily accessible by respondents. Considering these factors, the author would want to carry out a more thorough investigation into the differences in the severity of lower back pain in expectant mothers in their third trimester before and after being trained in the use of birth ball with video media at Ayrin Mom and Baby Care Denpasar.

## METHOD

The study was conducted at Ayrin Mom and Baby Care with the aim of finding out the differences in the severity of lower back pain in expectant mothers in their third trimester before and after being trained on the use of birth ball with video media. This study is quantitative pre-experimental research using a One group Pretest- posttest Design. In this study, the measurement of lower back pain intensity in women during the third trimester of pregnancy was conducted twice, namely before treatment and after treatment. The implementation starts from March – April 2025 and has received ethical clearance. Ethical approval for this study was obtained from the Health Research Ethics Committee of the Poltekkes Kemenkes Denpasar (Health Polytechnic of the Ministry of Health Denpasar) under certificate number: DP.04.02/F.XXXII.25/290/2025. All participants who met the inclusion criteria were provided with a detailed explanation regarding the purpose and objectives of the study. After receiving the information, participants signed an informed consent form as a record of their voluntary agreement. The intervention was given for 30 minutes, carried out twice a week for 4 weeks on a regular basis at Ayrin mom and baby care. The sample was 32 people. Non-probability sampling with the purposive sampling approach was the sample collection technique.

## RESULT AND DISCUSSION

Table 1. Distribution of research subject frequencies

Characteristics	f	%
Age		
20-35 years old	12	37.5
> 35 years old	20	62.5
Total	32	100.0
Education		
Secondary	27	84.4
Higher	5	15.6
Total	32	100.0
Work		
Not working	3	9.4
Self employed	13	40.6
Civil Servant	2	6.2
Private	14	43.8
Total	32	100.0

According to Table 1, the characteristics of respondents in terms of age that the majority are 20 people (62.5%) > 35 years old. Research by Puspita (2023), maternal age is a significant factor in the intensity of back pain, where older pregnant women tend to experience higher pain levels due to decreased muscle elasticity and the cumulative physical stress on the lumbosacral region. At the age of



over 35, the body's ability to compensate for the shift in the center of gravity during the third trimester diminishes, making them more susceptible to musculoskeletal discomfort<sup>16,17</sup>.

In terms of education, most respondents (84.4%) had a Secondary Education background. Education level is a fundamental factor that determines a mother's ability to comprehend and implement health interventions. Education level serves as a vital instrument in cognitive processes; a higher academic background enhances an individual's capacity to assimilate and implement information optimally (Rainuny et al., 2024). This is consistent with a study by Adawiyah & Wijayanti (2021), which states that educational attainment is directly proportional to health awareness, where educated individuals tend to be more responsive to healthy lifestyles and possess better critical and independent thinking abilities<sup>18</sup>.

In addition, most respondents had private jobs, as many as 14 people (43.8 percent). Occupation and daily physical routines are primary contributors to the incidence of Low Back Pain (LBP). The occurrence of back pain in pregnant women is influenced by various multidimensional factors, including age, parity, education level, social support, and physical conditions such as body mass index and history of depression (Sencan, 2017). In addition to these clinical factors, daily physical routines—whether performed at work or at home—contribute significantly to this discomfort. More strenuous activities, such as professional workloads and intensive exercise, are often identified as primary triggers that exacerbate back pain intensity<sup>19,20</sup>.

### Intensity of lower back pain in pregnant women in the third trimester before being trained on the use of *birth ball* with video media

Table 2. Intensity of back pain in pregnant women in the third trimester before intervention

Pre Test Pain Intensity Results				
n	Mean	Min	Max	
32	5.19	3	7	

According to table 2 above, it appears that before the *birth ball method*, the average intensity of lower back pain experienced by women in their third trimester was 5.19 including moderate pain, the lowest value was 3 while the highest value was 7. The findings of this study are consistent with the research conducted by Shanti & Utami (2021), which revealed that the average intensity of low back pain experienced by pregnant women prior to receiving prenatal yoga with birth ball techniques was 6.20, categorized as moderate pain<sup>12</sup>. Similarly, a study by Sumawati et al. (2020) found that the majority (90%) of third trimester pregnant women experienced moderate low back pain before receiving endorphin massage<sup>21</sup>. According to the researcher, back pain in pregnancy is attributed to uterine enlargement and a shift toward lordotic posture, which increases spinal pressure. Additionally, gestational weight gain enhances muscular workload and joint stress, further contributing to the pain.

### Intensity of lower back pain in pregnant women in the third trimester after being trained on the use of *birth ball* with video media

Table 3. Intensity of back pain in pregnant women in the third trimester after intervention

Post Test Pain Intensity Results				
n	Mean	Min	Max	
32	1.84	0	3	





According to table 3 above, it appears that after administering the *birth ball method*, the average intensity of lower back pain experienced by women in their third trimester is 1.84 including the level of mild pain, the lowest value is 0 while the highest value is 3. The results of this study indicate that after the implementation of the birth ball method, the mean intensity of low back pain among third trimester pregnant women decreased from moderate to mild pain levels. The results of this study are consistent with the findings of Shanti & Utami (2021), which demonstrated that the average intensity of low back pain among pregnant women after practicing prenatal yoga with birth ball techniques was 2.11, categorized as mild pain<sup>12</sup>. Another study conducted by Hairunnisyah (2022)<sup>11</sup> found that after the implementation of the birth ball method, the majority (74.2%) of third trimester pregnant women at the Independent Midwifery Practice (PMB) of Yuniarti and Piska Mariati experienced mild back pain. The researcher suggests that the reduction in low back pain intensity following the implementation of the birth ball method is attributed to distraction. Utilizing a birth ball can divert the attention of pregnant women away from their discomfort, thereby decreasing their focus on the pain and enhancing their pain tolerance.

### Results of Difference Analysis

Table 4. Data normality test

Pain Intensity	p-value
Pre test	0.117
Post test	0.110

The normality of the data was tested using *the Shapiro-Wilk test*, based on the results, the pre-test pain level's p-value = 0.117 > 0.05, while the p-value for the post-test pain level = 0.110 > 0.05. These results indicate that the data are normally distributed, so the test used was *the Paired T Test*.

A statistical test was performed using the Paired t-test to examine the hypothesis. Data analysis was implemented to examine the difference in back pain intensity among women in their third trimester of pregnancy before and after being trained in the use of *birth ball* with video media at Ayrin Mom and Baby Care Denpasar, the results of the analysis were as follows:

Table 5. Results of analysis of differences in intensity of back pain in pregnant women in the third trimester before and after being trained

		Paired Differences				p- value
		Mean	Min-Max	Median	SD	
Pain Intensity	Pre	5.19	3-7	5	0.998	0.000
	Post	1.84	0-3	2	0.987	

Based on table 5 above, the Paired t Test results showed a p value of 0.000 < 0.05 indicating a significant difference in lower back pain intensity women in their third trimester of pregnancy before and after being trained on the use of birth ball with video media, in addition to that it can be seen that there was a decrease in lower back pain intensity of 3.35 following the application of the birth ball method.

The findings of this study are consistent with earlier research by Handayani & Wulandari (2020)<sup>22</sup> showing that providing education through video media is more effective than using leaflets in alleviating labor pain intensity during the first period at the Yogyakarta Health Center. Research by Putri & Sjafii (2022)<sup>23</sup> proves that educational videos are more effective than leaflet media in lowering



back pain intensity in expectant mothers in their third trimester at the Surabaya Health Center. Another study conducted by Irawati (2019)<sup>13</sup> found that using a birth ball contributes to a reduction in pain levels. Respondents who were given birth ball indicated that the pain level before being given treatment experienced pain that interfered with activity and after treatment respondents felt pain but did not interfere with activities.

Pregnant women who get the right information about birth ball are more effective in participating in the training process. Education that can be given to pregnant women is in the form of educational materials that will be delivered in a video about birth ball<sup>12</sup>. Video media can help the audience in the process of receiving information that serves to clarify or make it easier to understand the information provided because it involves the senses of sight and hearing, which can be seen repeatedly<sup>24</sup>.

According to Indrayani (2019)<sup>25</sup>, the implementation of birth ball during pregnancy can stimulate postural reflexes and maintain the strength of the muscles supporting the spine. One of the birth ball training movements, sitting on the ball while moving the pelvis, is considered capable of providing comfort to the lower back through the gate control mechanism. This mechanism of gate control works by modifying the sensation of pain before it reaches the cerebral cortex, thereby reducing the perception of pain. Birth ball exercises change sensations and treat low back pain. In addition, weakness in pelvic and lumbo complexity is related to chronic instability. Exercises using a birth ball will enhance the strength of trunk stabilizer muscles, including the multifidus, erector spinae, and abdominal muscles (transversus, rectus, and oblicus). Another beneficial outcome of birth ball training is to reduction of muscle work imbalances, which in turn enhances movement efficiency<sup>26</sup>.

Birth ball is one of the distraction methods in overcoming pain, when the birth ball is used, the attention of the maternity mother will be distracted thereby reducing the vigilance of pregnant women in tolerating pain. Increased attention related to increased pain will have an effect on the person's pain response. Pregnant women who are experiencing pain and their attention is diverted will focus their attention on other things so that their awareness of the pain they are feeling will decrease<sup>12</sup>.

According to the researcher's opinion, the use of birth ball to alleviate lower back pain in expectant mothers in their third trimester by giving mothers the feeling of having the ability to control pain and lower their minds as well as negative assessments of pain through distraction techniques or distractions and physical movements that are patterned, one of the factors that can affect pain is attention. Increased attention is associated with increased pain, and vice versa. The presence of distractions or distractions is associated with a person's decreased response to pain. By directing the client's attention and focus toward other stimuli, their awareness of pain is reduced. During the use of a birth ball, their attention to pain is redirected through physical activity involving patterned movements that provide comfort and relaxation. Additionally, this practice can boost the confidence of expectant mothers experiencing lower back pain in managing their discomfort, thereby reducing the intensity of the pain they feel.

Besides birth ball exercises, other alternative approaches can also help relieve back pain in expectant mothers by promoting muscle flexibility. One such method is prenatal yoga, which has been proven effective in easing musculoskeletal discomfort. Prenatal yoga functions as a successful intervention in treating pregnant women back pain through a series of physiological mechanisms that focus on flexing the muscles that are under tension during pregnancy. This process works through asana movements specifically designed to improve the flexibility of ligaments and lower back muscles, especially the paraspinal and hamstring muscles which tend to be stiff due as a result of postural adjustments in posture and anterior weight gain during pregnancy<sup>12</sup>. A study by Mediarti et al. (2024)<sup>27</sup> was found a significant decrease in the level of back pain experienced after undergoing a yoga intervention. Similarly, Purnawati et al. (2022)<sup>28</sup> reported that prenatal yoga has an effect on reducing back pain complaints in pregnant women during the third trimester.





## CONCLUSION

According to the findings of the research that has been conducted, analysis using the Paired t revealed a p value of 0.000, which is less than 0.05, indicating a statistically significant difference in lower back pain intensity among expectant mothers in their third trimester before and after being trained on the use of birth ball with video media at Ayrin Mom and Baby Care Denpasar, in addition, it can be seen that there is a decrease in the intensity of low back pain before and after the birth ball method is given by 3.35. Video-guided birth ball exercises are significantly effective in reducing the intensity of lower back pain among third trimester pregnant women at Ayrin Mom and Baby Care Denpasar. Pregnant women are encouraged to use birth ball independently at home as a supportive means to alleviate physical discomfort during pregnancy.

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