

RESEARCH ARTICLE

**EFFECT OF BIRTHING BALL USE ON THE PROGRESS OF THE ACTIVE PHASE
OF THE FIRST STAGE OF LABOR AT AN INDEPENDENT MIDWIFERY
PRACTICE IN GALANGGANG VILLAGE
(PENGARUH PENGGUNAAN BIRTHING BALL TERHADAP KEMAJUAN
PERSALINAN KALA I FASE AKTIF PADA PRAKTIK MANDIRI BIDAN
DI DESA GALANGGANG)**

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ABSTRACT

Childbirth represents a natural physiological process experienced by women, yet suboptimal management can hinder smooth progression and prolong labor duration. This study examined the impact of birthing ball usage on advancing active phase of the first stage of labor among mothers at the Galanggang Village Midwifery Practice. Employing a quantitative quasi-experimental posttest-only control group design, we recruited 30 parturients via accidental sampling. Sample were selected based on inclusion criteria, consisting of normal pregnant women at Midwife N's and Midwife L's clinics who were willing to participate, with a gestational age of 37–42 weeks, in the active phase of the first stage of labor, with the fetal head already engaged in the pelvic inlet, and with intact membranes. The intervention group was treated with the use of a birthing ball from 4 cm to 10 cm dilation, while the control group only performed light walking activities in the room, labor progression data were captured through observation sheets and partographs, then analyzed using independent T-test. The intervention group using birthing balls averaged 205.67 minutes for active first stage labor 55 minutes shorter than the control group's 260.67 minutes with a p-value of 0.002 (<0.05). These findings confirm birthing balls effectively accelerate first stage labor advancement in this setting.

Keywords: active phase, birthing ball, first stage of labor, labor progress

ABSTRAK

Persalinan pada dasarnya proses fisiologis alami yang dialami ibu hamil, namun penanganan kurang optimal berisiko memperlambat kemajuan persalinan sehingga memperpanjang durasi totalnya. Penelitian ini mengkaji efek pemberian birthing ball terhadap percepatan kala I fase aktif pada persalinan di PMB Desa Galanggang. Penelitian ini menggunakan pendekatan kuantitatif dengan rancangan quasi-eksperimental posttest-only control group. Sampel penelitian berjumlah 30 orang yang dipilih menggunakan teknik accidental sampling. Sampel dipilih berdasarkan kriteria inklusi, yaitu ibu hamil normal di PMB Bidan N dan Bidan L yang

bersedia menjadi responden, usia kehamilan 37–42 minggu, berada pada kala I fase aktif, kepala janin sudah masuk PAP ketuban masih utuh. Kelompok intervensi diberikan perlakuan penggunaan birthing ball sejak pembukaan 4 cm hingga 10 cm, sedangkan kelompok kontrol hanya melakukan aktivitas berjalan ringan di ruangan, selanjutnya dilakukan evaluasi kemajuan persalinan menggunakan lembar observasi dan partograf. Teknik analisis data menggunakan Uji T-independent. Hasil penelitian menunjukkan rata-rata durasi pada kelompok intervensi (birthing ball) mencapai 205,67 menit, lebih cepat 55 menit dibanding kelompok kontrol (260,67 menit), dengan $p=0,002$ ($<0,05$). Birthing ball terbukti mempercepat kemajuan persalinan kala I fase aktif di lokasi penelitian.

Kata kunci: birthing ball, fase aktif, kemajuan persalinan, persalinan kala I

INTRODUCTION

Childbirth is a physiological process in which a viable fetus is delivered from the uterus to the external environment through the birth canal or other delivery methods. When the labor process is not managed properly, the progression of delivery may become obstructed and can result in prolonged labor.¹ One of the main causes of a prolonged first stage of labor is ineffective uterine contractions, which slow cervical dilation and delay labor progression. Prolonged labor may lead to maternal fatigue and significant energy depletion. As maternal exhaustion increases, uterine contractions may become weaker and less effective, potentially leading to failure in the progression of labor.² Ineffective uterine contractions during labor can also contribute to complications such as intrapartum and postpartum hemorrhage, which remain among the leading causes of maternal mortality.³

One way to prevent prolonged labor is to use a birthing ball, because birthing

balls can stimulate postural reflexes and maintain good spinal posture, thereby facilitating the descent of the fetus's head and reducing the duration of the first stage of labor.⁴ Birthing balls enhance uterine and placental circulation while easing pressure on surrounding tissues, boosting pelvic diameter by up to 30%, supporting joint comfort in knees and ankles, and offering targeted counter-pressure to the perineum and thighs. Against this backdrop, our research investigates how birthing ball application influences active first-stage labor progression among mothers attending the midwifery practice in Galanggang Village.

MATERIALS AND METHODS

This study employed a quantitative approach using a quasi-experimental method with a posttest-only control group design. The research was carried out at an independent midwifery practice (PMB) located in Galanggang Village between April and August 2023.

The participants consisted of women experiencing the active phase of the first stage of labor who delivered at the PMB during the study period. Participants were recruited using an accidental sampling technique, resulting in a total sample of 30 respondents. The sample in this study was divided into two groups, namely the experimental group and the control group, where the experimental group was the group that received a special intervention, namely the Birthing Ball, while the control group did not receive any special intervention other than light walking in the room. The control group in this study consisted of 15 people and the treatment group consisted of 15 people who met the inclusion and exclusion criteria.

The study was conducted after obtaining ethical approval and research approval from the research location with the number of ethical approval 016/KEPK/FITKes-UNJANI/VII/2023.

The data in this study were obtained through primary data collected directly from field research using research instruments such as observation sheets and partographs.

The data was processed using computer statistics programs to perform univariate and bivariate analyses. Univariate analysis was performed to obtain an overview of the characteristics of the respondents and each variable, and bivariate

analysis was used to determine the influence between variables. After that, a normality test was performed using skewness values and a parametric test (Independent T-test) was performed because the data showed a normal distribution in both variables.

RESULTS AND DISCUSSION

Based on univariate analysis, it was found that most of the women in the intervention group (12 respondents, or 80%) and most of the women in the control group (14 respondents, or 93.3%) were aged 20-35 years. Based on parity, most of the intervention group, as many as 11 respondents (73.3%), and most of the control group, as many as 12 (80%) respondents, were multiparous. Based on the duration of the first stage of labor, all 15 (100%) respondents in the intervention group were in the fast category, while in the control group, more than half (8 or 53.3%) of the respondents were in the fast category and almost half of them were in the slow category (7 or 47.6%). This can be seen in Table 1.

Maternal age is one of the risk factors associated with pregnancy quality or related to a mother's readiness for reproduction. The optimal reproductive age for a mother to conceive and give birth is 20-35 years old because at this age, the mother is physically and psychologically

mature enough to handle pregnancy and childbirth. At an age younger than 20 years old, reproductive functions have not fully developed, increasing the likelihood of complications during childbirth.^{6,7} When the age of the mother is over 35 years old, there will also be a risk. The older the mother is, the more progressive the deterioration of the endometrium will be, resulting in a lack of nutrient absorption which can cause the uterus to not contract properly.⁸

Parity refers to women who have given birth to a living baby. Primiparous parity refers to women who have given birth to a living baby once, multiparous parity refers to women who have given birth to a living baby several times, with no more than 5 deliveries, and grande multiparous parity refers to women who have given birth to a living baby more than 5 times. Parity is considered high-risk if it exceeds four times, as giving birth more than four times can cause the uterus to thin, leading to poor uterine contractions. Parity is considered low risk if the mother has given birth two to three times. Parity 1 and high parity (more than three) are associated with higher maternal mortality rates. The higher the parity, the higher the maternal mortality rate.⁹

In a primipara, the duration of the first stage of labor is longer than in a multipara. However, not all natural births will end within the normal time frame. Factors that contribute to prolonged labor include birth canal abnormalities, malpresentation, inadequate contractions, multiple pregnancies, and anemia. Primigravida mothers have very complex problems. In addition to their reproductive organs not being ready, there are disturbances in their power (the mother's own energy) and the possibility of psychological disturbances due to not being ready for pregnancy, for example in cases of casual sex or what is known as pregnancy outside of marriage.¹⁰

The research that was conducted by Daimah (2022) also states that age greatly affects a woman in dealing with pregnancy and childbirth, both physically and psychologically, so that someone under the age of 20 may not be psychologically ready to deal with pregnancy or childbirth. Readiness for pregnancy is determined by three factors, namely physical, mental, and economic readiness. In general, women are said to be ready for pregnancy if they are over 20 years old. Based on parity, most mothers who gave birth were multigravida, numbering 17 (56.7%).

Table 1 Frequency distribution of characteristics of mothers in active phase first stage of birth in PMB Galanggang Village

Respondent Characteristics	Intervention Group		Control Group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1. Age				
< 20 or > 35	3	20%	1	6,7%
20 – 35	12	80%	14	93,3%
2. Parity				
Primipara	4	26,7%	3	20%
Multipara	11	73,3%	12	80%
3. Duration of First Stage				
Fast	15	100%	8	53,3%
Slow	0	0%	7	46,7%
Total	15	100%	15	100%

Table 2 Frequency distribution of mean length of the first stage of the active phase in pregnant women in PMB Galanggang Village

Variable	Intervention Group	Control Group
Duration of First Stage		
Mean (minutes)	205,6	260,6
Min	165	195
Max	270	345
SD (Standard Deviation)	32,06	43,0

The analysis indicated that among the 15 respondents in the intervention group, the mean duration of the active phase of the first stage of labor was 205.6 minutes. The shortest duration recorded in this group was 160 minutes, while the longest reached 270 minutes. The control group showed a longer average duration of the active phase, with a mean time of 260.6 minutes. Within this group, the minimum duration observed was 195 minutes and the maximum duration was 345 minutes.

Childbirth is a series of processes that ends with the delivery of the baby by the mother. This process begins with true labor contractions, which are marked by progressive changes in the cervix, and ends with the delivery of the placenta. The dynamic process of childbirth involves four interrelated factors that influence labor. These four factors are power, passage, passenger, and the mother's psychological state. In addition to these four factors, the role of the birth attendant is also equally important. These factors can be influenced

by other factors that affect the labor process, such as age, parity, birth interval, and the mother's knowledge, which can be seen from her level of education. If there is a problem with one of these factors, it can cause difficulties during labor.¹¹

The first stage of labor begins with regular and increasing uterine contractions (in frequency and strength) until the cervix is fully dilated (10 cm). The first stage of labor consists of two phases, namely the latent phase and the active phase.¹²

The latent phase of the first stage of labor, which is the very slow opening of the cervix from 0 to 3 cm, lasts for 6-8 hours. The duration of the first stage of labor for primigravida is 12 hours, while for multigravida it is 8 hours. The second phase is the active phase of the first stage of labor, which is: The frequency and duration of contractions that cause gradual thinning and opening of the cervix. The active phase is divided into several stages, including the acceleration phase (rapid phase), from 3 cm to 4 cm dilation, which is achieved in 2 hours; the maximum dilation phase, from 4 cm to 9 cm dilation, which is achieved in 2 hours; and the deceleration phase (slowing down), from 9 cm to 10 cm dilation, which takes 2 hours.¹³

During this active phase, the frequency and duration of uterine contractions will gradually increase, usually occurring three or more times within 10

minutes and lasting for 40 seconds or more. Typically, from 4 cm dilation to complete dilation or 10 cm, the average rate of dilation is 1 cm per hour for primigravida and 2 cm for multigravida.¹⁴

Using a birthing ball by rotating the pelvis can help the descent of the fetus, as the cervix dilates more quickly. In addition, the pelvic area becomes wider, making it easier for the baby's head to descend to the pelvic floor. This movement can reduce pain during contractions. Sitting on the ball with pelvic rocking is preferred because the mother is more relaxed and not easily tired. By sitting, the mother can still help the head descend with gravity but is not tiring because she is not carrying the weight of her belly, so this position allows the mother to endure longer.¹⁵

From the results of research on the intervention group using birthing balls, it was found that the duration of the active phase of labor in mothers gave birth accelerated during the maximum dilation phase, from 4 cm to 9 cm, which was achieved in an average time of < 2 hours.

Sitting on the ball and rocking back and forth provides comfort and helps progress labor by using gravity while increasing the release of endorphins because the elasticity and curvature of the ball stimulate receptors in the pelvis that are responsible for secreting endorphins. Thus, the use of a birthing ball is a method that is

very helpful in actively responding to pain and reducing the duration of the active phase of labor.¹⁶

Tabel 3 The Effect of Using a Birthing Ball on the Progress of The First Stage of Labor in the Active Phase in PMB Galanggang Village

Variable	Mean	Mean difference	SE	P value	F
Duration of First Stage					
Intervention Group (Birthing Ball)	205,67	-55.000	13.859	0,002	15
Control Group	260,67				15

Analysis of bivariate data revealed that birthing ball use shortened active first-stage labor to an average of 205.67 minutes in the intervention group, compared to 260.67 minutes in controls a 55-minute reduction. An independent t-test confirmed statistical significance ($p = 0.002 < \alpha = 0.05$), demonstrating that birthing balls meaningfully accelerate labor progression for mothers at the Galanggang Village midwifery practice.

The birthing ball is a non-pharmacological physical exercise technique that involves the use of a large exercise ball and is commonly utilized by pregnant women, women in labor, and postpartum mothers to support maternal comfort and mobility.¹⁷ This ball helps mothers during the first stage of labor by advancing the delivery process. Mothers can utilize birthing balls in multiple

positions like sitting and gently rocking to foster comfort, harness gravity for labor advancement, and boost endorphin release. This effect may occur because the elastic and rounded surface of the ball stimulates sensory receptors in the pelvic area, thereby encouraging the release of endorphins.¹⁷

The Birthball or Birthing Ball is a relatively new tool for improving the birthing experience. Using the Birthing Ball combines rocking and movement which, in theory, helps the fetus find a more comfortable position through the pelvis and improves the progress of labor.^{18,19}

According to Mathew (2012), the use of a birthing ball may help shorten the duration of the first stage of labor without causing adverse effects for either the mother or the fetus. When the mother adopts an upright position while leaning forward on the birthing ball, uterine contractions may

become more effective, thereby facilitating the passage of the fetus through the pelvic canal. In addition, the gentle movements performed on the ball can help increase pelvic flexibility and create more space within the pelvic cavity, which may support the descent of the fetal head toward the pelvic floor.¹⁸

According to the theory proposed by Aprilla in Apriani (2021), the first stage of labor varies for each mother. The more relaxed and mobile a mother is, the shorter the time needed to reach full dilation. At the beginning of labor, mothers should not just lie in bed. Changing positions every half an hour to two hours will greatly help the labor process. Mothers can do squats or use a birth ball or beanbag chair to lean on and rock their pelvis. With the ball placed on the bed, mothers can stand and lean comfortably on the ball, pushing and rocking their pelvis for mobilization. With the ball on the floor or bed, the mother can kneel and bend over with her weight resting on the ball, moving to push her pelvis and helping the baby turn into the correct position (head-back position) so that labor can progress more quickly. A birth ball helps mothers to remain in a standing position and opens the pelvis, encouraging the baby to move downward. Changing positions during labor will change the shape and size of the pelvis, which will help the baby's head move into the optimal position

during the first stage of labor and help the baby rotate. Unlike mothers who only lie down during the first stage, the pressure of the head on the cervix will be greater on the posterior cervix (cervix at 6 o'clock), resulting in many cases of anterior cervical lip, which makes the delivery process longer and more painful.^{20,21}

This is in line with research conducted by Sri Wahyuni et al (2021), entitled The Effectiveness of Birth Ball Exercise on Mothers in Stage I Labor on the Duration of Stage I Active Phase and Stage II in the Delivery Room of the Arso 3 Community Health Center, Keroom Regency, Papua Province. showing that there was a difference in the duration of the first and second stages between mothers who were given Birth Ball Exercise treatment and those who were not given Birth Ball Exercise treatment, with a p-value of $0.015 < 0.05$.

Apriany et al. (2021) entitled The Effect of Birthing Ball Use on the Duration of the First Stage of Labor in Primigravida Women at PMB Desita in Bireuen Regency, which found a value of (R) of 0.579 and R Square of 0.0336, meaning that the effect of the Birthing Ball on the duration of the first stage of labor is 33.6%. In the ANOVA table, the calculated F value was 16.674 with a significance level of $0.000 < 0.005$. Based on the calculated t value = 4.083 > table t value = 2.035, it can be concluded

that the variable of Birthing Ball implementation affects the variable of the duration of the first stage of labor.

Feni Oktaviani et al. (2021) explored this further in their study The Effect of Birth Ball Use on the Duration of First Stage Labor in Primigravida Women at the Barokah Utama Clinic in Bandung. Data analysis via the Mann-Whitney test produced a p-value of 0.021 (<0.05), revealing shorter average first-stage labor durations among primigravida using birthing balls compared to non-users.¹⁷

In addition, this is in line with research conducted by Ardiana et al (2021), entitled “The effect of pelvic rocking with a birth ball on labor progress in mothers giving birth at the Tanjung Deli Tua primary clinic.” The results show that labor progress for the birth ball status, conducted with a sample of 15 people, had an average labor progress of 143 minutes with a standard deviation of 49.63, while labor progress for the non-birth ball status, conducted with a sample of 15 people, had an average labor progress of 281 minutes with a standard deviation of 81.27. Using an independent sample t-test where the variance values were considered different, and the alternative hypothesis was that the average labor progress for the birth ball status was different (two-tailed). With a 95% confidence level, a p-value of 0.00001 < 0.05 was obtained, which means that there

is a significant effect between pelvic rocking and birth ball on labor progress. The average labor progress for birth ball status performed and not performed was different, where birth ball status performed was 138.2 minutes faster than birth ball status not performed.

CONCLUSION

The findings of this study indicate that the use of a birthing ball significantly influences the progress of the first stage of labor. Statistical analysis using an independent t-test produced a p-value of 0.002 ($p < 0.05$), confirming a significant difference between the intervention and control groups. Women who used the birthing ball experienced a shorter duration of the active phase of the first stage of labor, with an average reduction of approximately 55 minutes compared with those who did not use the birthing ball. Therefore, the birthing ball may be considered a supportive non-pharmacological intervention that can be applied in maternal care during the first stage of labor.

CONFLICT OF INTEREST

No conflicts of interest were found during the research and in writing this article.

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BIBLIOGRAPHY

1. Idaningsih A. Asuhan Kebidanan Kehamilan. LovRinz Publishing; 2021. p. 165.
2. Parwirohardjo S. Ilmu Kebidanan. 4th ed. (Saifuddin AB. ed). PT. Bina Pustaka Sarwono Prawirohardjo: Jakarta; 2020. p. 562–580.
3. Astuti I, Noviyanti N. Pengaruh hypnobirthing terhadap tingkat nyeri dan kemajuan persalinan pada ibu bersalin di bpm kota cimahi. *The Southeast Asia Journal of Midwifery* 2016;1(1):43–47.
4. Sriwenda D, Yulinda Y. Efektifitas latihan birth ball terhadap efikasi diri primipara dengan persalinan normal. *JNKI (Jurnal Ners dan Kebidanan Indonesia) (Indonesian Journal of Nursing and Midwifery)* 2018;4(3):141–147.
5. Maryani T, Estiwidani D. Terapi birth ball berpengaruh terhadap lama kala II dan intensitas nyeri persalinan pada ibu bersalin primigravida di RB Kasih Ibu Yogyakarta. *Jurnal Kesehatan Ibu dan Anak* 2016;10(2):22–27.
6. Amin D, Ma'arifah A, Ratnasari E. Buku Ajar Kehamilan. 1st ed. Penerbit Nuansa Fajar Cemerlang Jakarta: Jakarta; 2024. p. 52–70.
7. Manuaba IAC, Manuaba IBG. Buku Ajar Patologi Obstetrik. EGC: Jakarta; 2020. p. 55.
8. Arifin S, Rahman F, Wulandari A, et al. Buku Ajar Manajemen Kesehatan. Pustaka Banua: Banjarmasin; 2019. p. 110–114.
9. Cholifah S, Rinata E. Buku Ajar Asuhan Kebidanan Kehamilan. Umsida Press 2022;(0); doi: 10.21070/2022/978-623-464-045-8.
10. Ayunda Insani A, El Sinta LB. Buku Ajar Asuhan Kebidanan pada Persalinan. 2019. p. 97–99.
11. Wahyuni S, Wijayanti I, Maran WB. Efektivitas Birth Ball Exercise Pada Ibu Bersalin Kala I Terhadap Lama Kala I Fase Aktif Dan Lama Kala II Di Ruang Bersalin Puskesmas Arso 3 Kabupaten Keroom Provinsi Papua. *Jurnal Ilmiah Keperawatan* 2021;9(1):9–20.
12. Widyastuti DE, Hanifah D, Sholikah S. Asuhan Komprehensif Pada Kehamilan. PT Nuansa Fajar Cemerlang: Jakarta; 2025. p. 15–33.

13. Widyastuti NE, Jayanti N, Mastutoh. Buku Teori & Model Praktik Kebidanan. Mahakarya Citra Utama: Jakarta; 2025. p. 82–96.
14. Varney H, Kriebs JM, Gegor LC. Varney's Midwifery. Jones and Bartlett Publishers, Inc.; 2021. p. 737–792.
15. Raidanti D. Birthing Ball (Alternative Dalam Mengurangi Nyeri Persalinan). Ahlimedia Press: Malang; 2021. p. 1–34.
16. Batubara AR, Ifwana L. Pengaruh Pelaksanaan Birthing Ball Terhadap Lamanya Persalinan Kala I Pada Ibu Primigravida Di PMB Desita, S. SiT, Kabupaten Bireuen. *Journal of Healthcare Technology and Medicine* 2022;7(2):641–650.
17. Oktaviani F. Pengaruh Pemberian Bola Persalinan Terhadap Lama Persalinan Kala I Pada Primigravida Di Klinik Utama Barokah Kota Bandung. *Muhammadiyah Medical Jurnal* 2021;2(2):55–61.
18. Jha S, Vyas H, Nebhinani M. The effect of birthing ball exercises on labor pain and labor outcome among primigravidae parturient mothers at a tertiary care hospital. *Cureus* 2023;15(3):1-7.
19. Gau M-L, Chang C-Y, Tian S-H. Effects of birth ball exercise on pain and self-efficacy during childbirth: a randomised controlled trial in Taiwan. *Midwifery* 2019;27(6):293–300.
20. Khairunisya K, Daimah U. Pelvic rocking dengan birth ball meningkatkan efikasi diri dan dilatasi servik ibu bersalin. *Gorontalo Journal of Public Health* 2022;5(1):47–56.
21. Purwati A. Pengaruh Teknik Bola Persalinan (Birthing Ball) Terhadap Penurunan Bagian Bawah Janin Pada Ibu Primigravida Inpartu Kala I Fase Aktif Di Pmb Ike Sri Kec. Bululawang Kab. Malang. *Journal of Islamic Medicine* 2020;4(1):40–45.