

Effect of Birth Balls on Reducing Labor Pain During First Stage of Active Phase in Primigravida Maternity

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Abstract

Background: Pain in labor is a manifestation of shortening contractions of the uterine muscles. Data on maternity of primigravida in Indonesia, as many as 54% felt severe pain, as many as 46% experienced moderate pain and mild pain. It is important for health services to always use non-pharmacological measures to relieve labor pain.

Purpose: The purpose of this study was to assess effect of use of birth balls on reducing of labor pain during first stage of active phase in primigravida maternity at the Public Health Center of Sawah Besar Subdistric.

Methods: This research used Pre-Experimental Design with one group pretest – posttest design type. The samples used the minimum requirement of experimental samples, namely 30 maternity mothers. Instrument in this research used questionnaires. Bivariate analysis used *paired t-test*.

Results: After analysis, the average value for reduction of pain before used *birth ball* was 84.33. The average reduction of pain after used *birth ball* was 65.67. There is an effect of use of birthball on reducing of labor pain during first stage of active phase in primigravida maternity at the Public Health Center Sawah Besar Subdistric in 2019 (p value 0.000).

Conclusion: The conclusion was that there was an effect of the use of birthball on reducing of labor pain during first stage of active phase in primigravida maternity. The results suggest Using *birth balls* can be used as an alternative to non-pharmacological therapy in management of labor pain during the active phase. This effort can be applied in practice and as material for further research.

Keywords: Birth Ball, First Stage of Active Phase, Labor Pain, Maternity

Introduction

According to World Health Organization (WHO) data in 2015 the Maternal Mortality Rate (MMR) in the world is 210 per 100,000 live births, MMR in developing countries is 230 per 100,000 live births and MMR in developed countries is 16 per 100,000 live births. MMR in East Asia 33 per 100,000 live births, South Asia 190 per 100,000 live births, Southeast Asia 140 per 100,000 live births and West Asia 74 per 100,000 live births.¹

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According to the Indonesian Health Profile in 2016, it shows a significant increase in MMR to 359 per 100,000 live births. Based on records from the DKI Jakarta Health Office, the maternal mortality rate in DKI Jakarta in 2017 was 53.2/100,000 live births, an increase from 2016, which was 41.56/100,000 births.²

Efforts to accelerate the reduction of MMR can be done by ensuring that every mother is able to access quality maternal health services, such as pregnant women's health services, childbirth assistance by trained health workers in health care facilities.

Childbirth is also defined as stretching and dilation of the cervix as a result of contraction of the uterine muscles, to push the results of conception (fetus and uri) out. Pain in labor is a manifestation of contractions of the shortening of the uterine muscles. Data on primigravida maternity mothers in Indonesia, as many as 54% felt severe pain, as many as 46% experienced moderate pain and mild pain. Labor pain and pain management are major concerns for women, families and health care providers.²

The causes of pain are physiological and psychological, physiological includes a person's physical state, while psychological is a person's psychiatric factors or someone's feelings. Labor pain is a feeling of discomfort due to physical feelings related to the condition of uterine contractions accompanied by thinning and opening until reaching the peak of labor.³

Based on the results of a preliminary study obtained from the delivery room of the puskesmas in Sawah Besar District, the number of primigravida maternity mothers in January – February 2019 was 50 maternity mothers. 32 mothers had severe pain, 23 mothers had moderate pain. But to cope with labor pain, midwives only recommend mothers good relaxation techniques. The results of interviews with midwives in the delivery room as many as 12 midwives from 15 people, in the delivery room did not know the method of managing labor pain in a non-pharmacological manner.

Method

1. Research design

The type of research used in this study is quantitative with research design *Pre-Experiment Design*. This design is used to reveal cause-and-effect relationships only by involving one group of subjects, so there is no strict control over variables. The design in this study is *one group pre-test – post test design*.

2. Settings and samples

This study conducted at Public Health Center of Sawah Besar Subdistric. In this study the sample to be taken according to the sum minimum sample of experimental research is as many as 30 people on first stage of active phase in primigravida maternity.

3. Measurement and data collection

Data collection techniques using questionnaire sheets.

4. Data analysis

Analysis in this study used paired sample t-test with a meaning level of 0.05

Result

Table 1.
Frequency Distribution of Labor Pain Levels

Labor Pain Level	Before the Intervention		After the Intervention	
	Frequency	%	Frequency	%
Moderate pain 40-70mm	2	6,7	23	76,7
Severe Pain 75-90mm	28	93,3	7	23,3
Total	30	100	30	100

Based on table 1, it can be seen that out of 30 respondents, there were 2 respondents (6.7%) who felt moderate pain on a pain scale of 40-70mm and 28 respondents (93.3%) experienced severe pain on a pain scale of 75-90mm and after intervention from 30 respondents there were 23 respondents (76.7%) who felt moderate pain on a pain scale of 40-70mm and 7 respondents (23.3%) experienced severe pain on a pain scale of 75-90mm.

Table 2.
Average decrease in labor pain

Birthball	N	Mean	Median	SD	Min	Max
Before Using <i>the Birth Ball</i>	30	84.33	85.00	7.160	70	95
After Using <i>the Birth Ball</i>	30	65.67	65.00	8.880	45	80

Table 2 shows that the decrease in pain in primigravida maternity mothers before the use of birth ball averaged 84.33 with the lowest pain value of 70 mm and the highest 95 mm and the decrease in pain in primigravida maternity after the use of birth ball averaged 65.67 mm, with the lowest pain value of 45 mm and the highest 80 mm.

Table 3.
Normality Test Results Against Reducing Labor Pain

Variable	Frequency (n)	Shapiro-Wilk	
		Df	Sig.
Decreased labor pain before birth ball use	30	30	0,067
Decreased labor pain after birth ball use	30	30	0,329

Based on table 3, it can be seen that the normality test for reducing labor pain before the use of the birth ball is 0.067 and the normality test result after the use of the birth ball is 0.329, which means that both data are normally distributed ($p\text{-value} > 0.05$).

Table 4.
The effect of the use of *birth balls* on reducing labor pain during the active phase

Variable	Frequency (n)	Mean	SD	p-value
Decreased labor pain before birth ball use	30	84.33	7.160	0.000
Decreased labor pain after birth ball use	30	65.67	8.880	

Based on the table above, it is known that the average decrease in labor pain before the use of birth ball is 84.33 while the average decrease in labor pain after the use of birth ball is 65.67 This result shows that there is a decrease in the level of labor pain before and after the use of birthball and obtained a significance value of 0.000 smaller than the significance level of 5% ($p\text{ value} = 0.000 < 0.05$), then the conclusion is that H_a is accepted.

Discussion

Based on the results of research conducted before the use of *birthball*, it was found that from 30 respondents there were 28 respondents (93.3%) felt severe pain levels on a scale of 75-90 mm. In line with Judha's (2012) theory, labor pain is individual and highly subjective. Each individual will perceive pain differently to the same stimulus depending on the pain threshold he or she has. Pain in labor is different from other pains in general. Pain in labor is a manifestation of contractions (shortening) of the uterine muscles. This

contraction causes pain in the waist, abdominal area and radiates towards the thighs. These contractions cause the opening of the cervix (cervix). With the opening of this cervix, labor will occur.⁴

This is in line with Ade K's research (2017), entitled the effectiveness of *birth* ball exercises on reducing labor pain, showing that the pain score before using the birthing ball most respondents experienced a bit more pain, namely as many as 11 people (64.7%) from 17 respondents.⁵ The results of Yurizki's research (2022, there was a decrease in the level of maternity pain before and after being given counterpressure treatment with birthball, namely, from a scale of 7-9 or moderate pain as many as 15 respondents (93.75%) decreased to a scale of 1-3 or mild pain 14 respondents (87.5%), and while from severe pain 1 respondent (6.25) when given the intervention to 0%.⁶

Tri M research (2016) states that it is known that respondents with moderate pain are more (76.7%) felt by respondents who do *birthball* therapy than before therapy. While respondents with severe pain scale were more (46.7%) felt by respondents before starting therapy than those who had birthball therapy.⁷

The results of research conducted after the use of *birthball* found that from 30 respondents there were 23 respondents (76.7%) who felt moderate pain on a pain scale of 40-70 mm. There was a decrease in pain levels after using the birth ball. In line with Aprillia's theory (2011), exercise with a birth ball is useful for controlling, reducing and eliminating pain in labor, especially when I because it can be used in various positions. One of the movements is to kneel and chest leaning forward, leaning and hugging the *birthball*, then shaking the hips clockwise or left and right. It can bring comfort and reduce labor pain, aiding labor progress by using gravity while increasing the release of endorphins because the elasticity and curvature of the ball stimulate receptors in the pelvis responsible for secreting endorphins.⁸

According to Series P (2014), that the technique of using birth ball can close the gate of pain messages that will be sent to the spinal cord and brain besides that the strong pressure exerted when doing *birth ball* techniques can activate endorpin compounds so that the transmission of pain messages can be inhibited which can cause a decrease in pain intensity.⁹

This is in line with the results of Tri M research (2016) stated that it was known that in the control group initially more than half (53.3%) of respondents experienced pain

with a severe scale. After relaxation of breath with the use of *birthball* in all (100%) becomes moderate.⁷ Hani's research (2017), entitled The Relationship Between the Use of Birthball Techniques and the Level of Pain in Maternity Women Kala I at BPM Umu Hani Yogyakarta in 2015 stated that after the birthball technique, the average study subjects had a pain scale of 6 (moderate pain) as many as 7 respondents or 46.7%, pain scale 7 (moderate pain) as many as 2 people (13.3%) and pain scale 5 (moderate pain) as many as 6 people or 40.0%.¹⁰

The average difference in the decrease in labor pain before the use of birth ball was 84.33 mm while the average decrease in labor pain after the use of birth ball was 23.3 mm. This result showed that there was a decrease in labor pain levels before and after the use of birthball and obtained a significance value of 0.000 smaller than the significance level of 5% ($P \text{ Value} = 0.000 < 0.05$), then the conclusion was H_a accepted which means there is an effect of using birthball on reducing labor pain during first stage of active phase.

Gate Control Theory explains that complex modulation in the spinal cord and in the brain is an important factor in pain perception. This theory explains that there is a gateway that can facilitate the transmission of pain. This theory also states the endogenous ability to reduce and increase the degree of pain through modulation of impulses that enter the dorsalis cornea through the gate. The nerve mechanism in the spinal cord can function like a gate that can be opened and closed, there is an increase in pain when the flow of nerve impulses is opened and there is a decrease in pain when the nerve impulses are closed. With the gate open causes the conduction of nerve impulses through the spinal cord to the brain, then the message of new pain reaches the brain causing a pain response. With the gate closed, the transmission of nerve impulses from the bone marrow to the brain is blocked so that a person does not respond to pain.¹¹

Exercises with labor balls are useful for controlling, reducing and eliminating pain in labor, especially when I because it can be used in various positions. One of the movements is to kneel and chest leaning forward, leaning and hugging the *birthball*, then shaking the hips clockwise. or left and right. This can make you feel comfortable and reduce labor pain, help labor progress by using gravity while increasing the release of endorphins because the elasticity and curvature of the ball stimulate receptors in the pelvis responsible for secreting endorphins, accelerate the process of cervical dilation, support

an upright posture position will facilitate the birth process and help the fetal position in an optimal position so as to facilitate normal delivery.⁷

The results of this study are in line with Ferinawati's research (2021) entitled The Effect of Using Birthing Balls on Reducing Pain Levels in Maternity Women at BPM Yulia Fonna, A.Md.Keb, SKM Lipah Rayeuk Village, Jeumpa District, Bireuen Regency, so there are several results found, among others, the level of pain in maternity mothers in the Mild category, which is as many as 4 people (10%), medium category 20 people (50%), and in weight category 12 people (30%) in very heavy category as many as 4 people (10%). So it can clearly be seen that the majority of Pain Levels are in the Medium category. Decreased pain levels in maternity mothers because with the help of using a birthing ball makes mothers more comfortable during labor, and helps the progress of maternal labor. The movement of swaying over the ball creates a sense of comfort and helps labor progress. The majority of respondents experienced moderate pain levels because the mother used the birthing ball in accordance with the guidance of midwives, researchers and supported by the patient's family at the time of delivery.¹²

Based on the description above, researchers assume that the use of birth balls and assessment through direct observation methods to respondents and the use of the VAS scale, overall all respondents on average said that they felt more relaxed, calm, comfortable and labor pain that they felt reduced even though the pain response shown was different for each respondent. The position of labor, changing position and proper movement will help increase comfort / decrease pain, increase satisfaction with freedom of movement, and improve maternal self-control. In addition, the position of the mother can also affect the position of the fetus and the progress of labor. If the pain is mainly in the back, many mothers feel happy to keep moving during the first time and some prefer to lift the pelvis and move the pelvis in the direction of the *birth ball* rotation during contractions. Emphasis in the form of strong pressure stimulation on the sacrum used during labor can cause a relaxing effect so as to reduce pain due to uterine contraction that mothers feel.

Limitations

Limitations when collecting data, namely in the use of birthballs are new for respondents so researchers must explain well to respondents until they understand the

benefits of using *birthballs*, some maternity mothers prefer to lie down. Complicating childbirth which is an exclusion factor, is also one of the limitations of researchers, namely maternity mothers who come some have experienced premature rupture of membranes and contractions didn't adequate.

Conclusion

Results were obtained before the use of birthball from 30 respondents, there were 93.3% of maternity mothers felt severe pain on a scale of 75-90 mm, while after the use of birthball, 76.7% felt moderate pain on a pain scale of 40-70 mm. The results of the paired t test analysis were p value = 0.000 (p value < 0.05), so the conclusion is that there is an effect of using birthball on reducing of labor pain during first stage of active phase in primigravida maternity. So it is expected that health workers in dealing with labor pain in mothers can use birthballs to reduce labor pain for non-pharmacologically, so that was expected to increase maternal care.

References

1. WHO (World Health Organization). Angka Kematian Ibu dan Angka Kematian Bayi. 2016. www.pusdatin.kemendes.go.id.
2. Kemenkes RI. Data dan Informasi Kesehatan Profil Kesehatan Indonesia 2016. Kemenkes RI. Jakarta. 2017.
3. Rejeki, S., Hartiti, T., & Khayati, N. Nyeri Persalinan Kala I Melalui Praktik Counterpressure oleh Suami di RSUD Soewondo Kendal. *Jurnal Keperawatan Maternitas*, 2014. Vol 2(2), 127-135.
4. Judha, M., Sudarti, & Fauziah, A. *Teori Pengukuran Nyeri dan Nyeri Persalinan*. Yogyakarta: Nuha Medika. 2012.
5. Kurniawati, A., Dasuki, D., & Kartini, F. Efektivitas Latihan Birth Ball terhadap Penurunan Nyeri Persalinan Kala I Fase Aktif pada Primigravida. *Indonesian Journal Of Nursing and Midwifery*. 2017. 5(1). P 1-10.
6. Telova, Y. Pengaruh pemberian counterpressure birth ball terhadap penurunan nyeri persalinan di BPM Maiharti Kisaran Barat Tahun 2022. *Jurnal Kebidanan Kestra (JKK)*. 2022. 5(1). 161-165.

7. 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.
8. Aprillia, Y. *Siapa Bilang Melahirkan itu Sakit ?* Yogyakarta: CV Andi Offset. 2011.
9. Pasongli, S., Rantung, M., & Pesak, E. Efektifitas Counterpressure Terhadap Penurunan Intensitas Nyeri Kala I Fase Aktif Persalinan Normal Di Rumah Sakit Advent Manado. *Jurnal Ilmiah Bidan*.2014. 2(2). 12-16.
10. Hani, U. Hubungan Penggunaan Teknik Birthball Dengan Tingkat Nyeri Pada Ibu Bersalin Kala I Di Bpm Umu Hani Yogyakarta Tahun 2015. *Intan Husada : Jurnal Ilmiah Keperawatan*, 2017. 4(1). 22-29.
11. Brannon, L. dan Feist, J. & Updegraff, John A. *Health psychology: an introduction to behavior and health*. California. Brooks/Cole Publishing. 2014.
12. Ferinawati., & Zahara, R. Pengaruh Penggunaan Birthing Ball Terhadap Penurunan Tingkat Nyeri Pada Ibu Bersalin Di BPM Yulia Fonna, A.Md. Keb, SKM Desa Lipah Rayeuk Kecamatan Jeumpa Kabupaten Bireuen. *Journal of Healthcare Technology and Medicine*. 2021. 7(2). 651-660.