Advances in Healthcare Research
Volume 3, Issue 2 (2025)
Website: https://advancesinresearch.id/index.php/AHR
OPEN ACCESS
e-ISSN: 2985-9808

The Effect of Bengkung Use on Abdominal Circumference Reduction in Postpartum Women

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ARTICLE HISTORY

Received: July 15, 2025
Revised: July 31, 2025
Accepted: August 12, 2025

DOI :
https://doi.org/10.60079/ahr.v3i2.575

ABSTRACT

Purpose: The postpartum period is a critical recovery period for mothers after childbirth and is prone to complications that contribute to high maternal mortality rates (MMR) in Indonesia. This study aims to evaluate the effect of bengkung use on reducing abdominal circumference in postpartum mothers as a non-pharmacological measure to support physical recovery after childbirth.

Research Method: This study used a quasi-experimental design with a pre-test and post-test control group approach. The research subjects consisted of two groups: the experimental group, which used bengkung regularly, and the control group, which underwent early mobilization without the use of bengkung. Data collection was conducted by measuring the waist circumference both before and after the intervention.

Results and Discussion: The study's results indicate that regular use of bengkung has a significant impact on reducing abdominal circumference in postpartum women. The effectiveness of bengkung in accelerating the process of uterine involution and abdominal muscle recovery is reinforced by the involvement of education and the comfort experienced by the mothers during use.

Implications: These findings have a practical impact on midwifery services, particularly in integrating traditional practices that have been proven effective into standard postpartum care. Bengkung could be a safe, affordable, and locally based alternative intervention.

Keywords: postpartum; postpartum mother; abdominal circumference.

Introduction

The postpartum period is a critical phase lasting six weeks after childbirth, during which the mother's body undergoes recovery from the physiological changes experienced during pregnancy and birth. During this period, attention to the mother's physical and psychological condition is crucial, as inadequate management can lead to serious complications, including death. The postpartum period is highly vulnerable to various health issues, ranging from infections, bleeding, hormonal imbalances, to psychological disorders such as baby blues and postpartum depression (Sumarni & Nahira, 2022). Maternal mortality remains a significant public health issue globally. Maternal mortality is defined as the death of a woman during pregnancy or within 42 days of the end of pregnancy, due to factors

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e-ISSN: 2985-9808

related to pregnancy or its management. It is estimated that more than 800 women die every day worldwide due to complications during pregnancy and childbirth, with the majority of cases occurring in developing countries (Khaerunnisa, 2024). In Indonesia, the maternal mortality rate (MMR) remains a serious issue. According to data from the World Health Organization (WHO), the MMR in Indonesia stands at 189 per 100,000 live births, a figure that remains high compared to other countries in Southeast Asia. Various factors continue to contribute to the high MMR, including delayed recognition of danger signs, limited access to quality healthcare services, and obstetric complications such as postpartum hemorrhage (Sari *et al.,* 2023). In the Kudus District, a similar phenomenon is occurring. In 2023, there were 11 maternal deaths, most of which were due to postpartum hemorrhage. This bleeding is often caused by uterine atony, retained placenta, and inadequate postpartum care (Ibrahim & Ridwan, 2022). In this context, there is a need to explore non-medical interventions, including traditional approaches such as the use of bengkung, which has been practiced by the community for a long time and is believed to support the natural recovery of postpartum women.

Research on postpartum care has evolved with increasing attention to holistic approaches in postpartum recovery, including the use of traditional methods such as bengkung. The use of bengkung is a cultural practice aimed at supporting the physical recovery of postpartum women, particularly in helping to restore abdominal shape after childbirth. Bengkung is defined as a long piece of cloth wrapped around the abdomen of a mother to apply gentle pressure to the abdominal muscles, which is believed to accelerate uterine recovery and help reduce abdominal circumference (Ester Yohana Sitorus *et al.,* 2023). A study by Qomariah *et al.,* (2024) showed that the use of bengkung can provide physical comfort and improve blood circulation, both of which support the healing process after childbirth. Additionally, bengkung is viewed as a solution to psychological discomfort caused by body shape changes, which often lowers a mother's self-confidence (Krisnawati *et al.,* 2022; Panjaitan & Lentari, 2024). The reduction in abdominal circumference is an essential indicator in measuring the effectiveness of bengkung use. Postpartum abdominal circumference can trigger dissatisfaction with appearance and impact maternal mental health. Therefore, attention to this physical aspect is crucial to reduce the risk of postpartum depression. According to Sundari *et al.,* (2023), the gentle pressure from the bengkung helps restore the elasticity of abdominal muscles that stretch during pregnancy. An experimental study by Sumarni & Nahira, (2022) provides empirical support for this, finding that mothers who used a postpartum belt showed a significant reduction in waist circumference compared to the control group, with a p-value of 0.032 in the paired T-Test and a p-value of 0.036 in the independent T-Test.

Several studies have shown that the use of a bengkung can have positive effects on the physical recovery of postpartum mothers, particularly in reducing abdominal circumference. However, most of these findings are still descriptive and lack strong, systematic empirical data. Studies like the one conducted by Sumarni & Nahira, (2022) have indeed employed a quantitative approach with significant results; however, the number of such studies remains limited, especially in local contexts and specific populations, such as postpartum women in the Mejobo, Kudus area. Most previous studies have focused on subjective benefits, such as comfort and self-confidence, without incorporating objective measurements of physiological changes, including standardized and regular waist circumference measurements. Additionally, few studies have comprehensively explored perceptions and practices of bengkung use while considering educational, cultural, and information access factors. This constitutes a theoretical limitation, as there is no conceptual model that fully explains the mechanisms through which bengkung influences abdominal muscle recovery and the well-being of postpartum women. In

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this context, it is essential to bridge the gap between traditional practices and scientific approaches by building empirical evidence that can serve as the basis for culturally informed health interventions. This study aims to expand the scope of theory and practice by evaluating the influence of bengkung use on measurable and data-based reductions in waist circumference, thereby enriching the body of knowledge in maternal nursing in a more in-depth and contextual manner.

Specifically, our study examines the quantitative and measurable influence of bengkung use on postpartum abdominal circumference reduction in the Mejobo area of Kudus. Despite the widespread practice of bengkung among its community, this location has not been the focus of previous studies. Unlike prior studies, which have tended to be descriptive and subjective, this research employs an empirical approach through the systematic measurement of waist circumference and the use of valid statistical methods to evaluate the effectiveness of the intervention. Additionally, this study considers the local context and socio-cultural characteristics of the community in viewing traditional care practices as part of promotive and preventive efforts in maternal health services. Based on the identified gaps, the objective of this study is to scientifically determine whether the use of bengkung significantly affects the reduction of postpartum abdominal circumference and to provide scientific evidence that can be used as a basis for decision-making in maternal nursing practice, particularly in efforts to reduce the risk of postpartum complications such as hemorrhage and psychological disturbances caused by body shape changes.

Literature Review and Hypothesis Development

Physiological Changes During the Postpartum Period

Postpartum physiological changes refer to various anatomical and hormonal transformations that occur in a woman's body after childbirth, particularly as the body works to return to its pre-pregnancy state. One of the primary changes is uterine involution, a process by which the uterus returns to its original size and position. According to Amicis *et al.,* (2021), this process begins immediately after the placenta is delivered, triggered by uterine contractions driven by the hormone oxytocin, and lasts for approximately six weeks. Involution includes a reduction in uterine muscle volume, a decrease in the number of blood vessels, and a shrinkage in the size of the uterine fundus. In a clinical context, these changes are significant as they indicate the successful recovery of the female reproductive system after childbirth. As explained by Othman *et al.,* (2022), the change in the position of the uterine fundus from above the umbilicus toward the symphysis pubis serves as a visual indicator used by healthcare providers to assess the progress of involution. This process is highly dynamic and influenced by various factors, including breastfeeding frequency, nutritional status, and the mother's psychological condition. Tambunan *et al.,* (2023) add that postpartum uterine contractions can cause pain, especially during breastfeeding, as the let-down reflex increases oxytocin production, which accelerates involution. Therefore, a thorough understanding of postpartum physiology is not only crucial in obstetric care but also in developing intervention strategies to accelerate the mother's holistic recovery.

During the postpartum period, abdominal circumference measurement is an essential indicator for monitoring the effectiveness of uterine involution and other physiological changes. A decrease in abdominal circumference reflects the involution process as well as the reduction of fat tissue and fluid accumulated during pregnancy. Covali *et al.,* (2021) developed a postpartum ultrasound scale (PUUS) as an objective method to assess uterine involution based on visual images, which can indicate the extent of uterine shrinkage. However, in primary care settings, abdominal circumference measurement

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using a flexible measuring tape remains a simple, cost-effective, and reliable method (Sebo *et al.,* 2017). This measurement should be performed consistently during the first six weeks postpartum to monitor signs of abnormal involution, such as subinvolution or latent hemorrhage. Measurement results indicating stagnation or an increase in abdominal circumference can serve as an early warning sign of complications requiring medical intervention. Keirse, (2011) emphasizes that manual measurements, such as palpation and tape measurements, have advantages in detecting early abnormalities in uterine involution. However, they should be combined with other examinations when clinical indications are present. In the context of this study, the use of a flexible measuring tape is a suitable choice, as it provides high accuracy and does not cause excessive pressure on the mother's abdomen. Therefore, routine abdominal circumference measurements can serve as a preventive measure to ensure the smooth progression of uterine involution.

It is essential to recognize that changes in abdominal circumference are not merely physiological phenomena, but also have significant psychological and social implications for mothers. The process of postpartum body shape recovery is often closely associated with self-perception and self-confidence (Faruga-Lewicka *et al.,* 2024). Amicis *et al.,* (2021), although studying an animal population, demonstrated that uterine involution occurs both macroscopically and microscopically within a timeframe of 4 to 7 days, indicating that this process is both rapid and gradual. These findings suggest that if the involution process proceeds without complications, changes in body size can be observed promptly and contribute to maternal well-being. Conversely, delays in recovery can lead to anxiety and dissatisfaction with one's physical condition, especially if there is insufficient understanding from healthcare providers or the social environment. Therefore, education about this physiological process is essential so that mothers have realistic expectations and do not demand instant changes. Counseling on normal and abnormal signs during the postpartum period can also improve maternal health literacy and encourage active self-monitoring. Within this framework, abdominal circumference measurement serves as both an evaluative and educational tool, helping mothers understand the dynamics of their recovery and foster a positive mindset toward postpartum bodily changes.

Bengkung

Bengkung is a long piece of cloth measuring approximately 2–4 meters in length and 20–25 cm in width, used to bind a woman's abdomen after childbirth. Its purpose is to provide muscle support, accelerate recovery, and restore the body's shape postpartum. In Malay tradition, bengkung is recognized as part of traditional attire, particularly in the context of postpartum health recovery, and is typically worn during the postpartum period, which lasts 40 days or more, depending on the individual mother’s needs. A study by Sumarni & Nahira, (2022) confirms that the use of bengkung is not merely a cultural practice but also has significant therapeutic value in accelerating postpartum recovery, particularly in reducing abdominal circumference. The practice of wrapping the abdomen with bengkung is performed as soon as possible after childbirth. It is believed to aid uterine involution and reduce discomfort caused by abdominal distension during pregnancy. Another study conducted by Irnawati (2022) also shows that the use of bengkung can accelerate the reduction in uterine fundal height and improve maternal comfort during the postpartum period.

Bengkung, as a non-pharmacological intervention method, has gained attention in modern midwifery practice due to its benefits, which are not only physical but also psychological. Rahayu, (2018) explains that abdominal binding with bengkung can reduce back pain in postpartum women, especially

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during the early stages of recovery. These therapeutic effects are believed to be related to the gentle pressure exerted by the wrapped cloth, which supports abdominal muscle structure and stimulates natural uterine contractions. In this context, bengkung can be understood as a compression tool that supports the body's natural mechanisms to accelerate involution and prevent complications such as subinvolution or musculoskeletal discomfort. Additionally, Sitorus *et al.,* (2023) noted that postpartum women who used bengkung experienced faster uterine size reduction compared to those who did not, as well as improved mobility and comfort in daily activities. These findings form the basis for recommending bengkung as one of the supportive methods in postpartum recovery programs, particularly in areas that strongly uphold traditional practices yet remain open to evidence-based approaches.

The effectiveness of bengkung is also supported by its psychological aspects. In Indonesian culture, the use of bengkung is not only seen as a physical effort to restore body shape but also as a symbol of self-care and family attention toward the new mother. According to findings by Irnawati (2022), postpartum women who used bengkung reported higher levels of comfort and increased self-confidence, which ultimately contributed to emotional stability and readiness to take on the role of motherhood. This aspect is vital because postpartum recovery involves not only physical recovery but also mental and psychosocial well-being. Trust in the effectiveness of bengkung is also a key factor driving its adherence, as highlighted by Sumarni & Nahira, (2022), who found that mothers who received education about the benefits of bengkung were more likely to adhere to its use and demonstrated better recovery outcomes. Therefore, the use of bengkung can be categorized as a holistic intervention that addresses physiological, psychological, and cultural aspects in postpartum care practices, and is highly relevant for further research and integration into maternal health care approaches in Indonesia.

The Effect of Bengkung on the Abdominal Circumference of Postpartum Women

The use of a bengkung after childbirth is one of the traditional postpartum care practices that has been passed down through generations by various cultures worldwide, including in Indonesia (Yuniantini *et al.,* 2023). A bengkung is a long, wide piece of cloth wrapped around the abdomen of a postpartum woman. It is generally used to provide physical support to the abdominal muscles that have become relaxed due to pregnancy and childbirth. In the context of midwifery and maternal health, the use of a bengkung is believed to accelerate the recovery process and restore body shape, particularly by helping to reduce abdominal circumference. This practice is not only culturally widespread but is also gaining attention in scientific studies as a potential non-pharmacological approach. Postpartum women typically experience abdominal wall expansion due to the nine-month pregnancy process. During the postpartum period, the body naturally undergoes involution, a process in which the reproductive organs return to their original size. During this process, physical support in the form of a postpartum belt is believed to play a role in strengthening abdominal muscle tone, reducing tissue edema, and improving blood circulation in the abdominal area, thereby positively impacting recovery. Additionally, the belt can provide psychological comfort as mothers feel their body shape beginning to return to its previous form, which in turn boosts self-confidence and readiness to face the breastfeeding period.

From a physiological perspective, the theory of postpartum recovery states that the abdominal muscles, which have undergone distension during pregnancy, require time and support to return to their original form. One method used to accelerate this recovery process is the application of stable and even external pressure, such as that provided by a postpartum belt. A postpartum belt offers additional

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support for the loosened abdominal wall, thereby helping to enhance abdominal muscle contractions and indirectly accelerate uterine involution. In a study conducted by Sumarni & Nahira (2022), it was found that postpartum women who consistently used a postpartum belt showed a greater reduction in waist circumference compared to the control group that did not use a postpartum belt. This study reinforces the assumption that the mechanical compression provided by bengkung has a real effect on abdominal muscle structure. Although statistical tests support the study results, the main point to emphasize is the effectiveness of this traditional method in accelerating the natural physical healing process. The observed reduction in waist circumference suggests that bengkung can serve as a safe and effective supportive intervention. Beyond physiological aspects, the use of bengkung also influences maternal posture, reduces the risk of back pain, and enables mothers to move more actively. These effects further accelerate the overall recovery process, which is a key objective in postpartum care.

Research Method

This study used an experimental research design, which aims to examine the effect of an intervention or treatment on a specific variable by comparing a treatment group and a control group. The type of experiment used was a pre-experimental design, in which the treatment given was the use of bengkung on postpartum women. The study was conducted in the service area of the UPTD Puskesmas Mejobo, Mejobo Subdistrict, Kudus District. The research was conducted over a period of two months, from April to May 2025. This approach was chosen to directly observe the impact of the bengkung intervention on changes in the abdominal circumference of postpartum women after childbirth. The population in this study was all postpartum women in the working area of the Mejobo Health Center, Kudus, during the period from April to May 2025, totaling 38 individuals. From this number, the researcher selected a sample of 30 respondents using purposive sampling. This technique was chosen because it considers specific criteria determined by the researchers beforehand, such as the age of postpartum women, their postpartum health condition, and their willingness to participate in the entire intervention designed in this study. The sample was then divided into two groups: an intervention group that used bengkung and a control group that received early mobilization without the use of bengkung.

Data collection was conducted through direct measurement of the postpartum mothers' abdominal circumference. The instrument used was a measuring tape (meter) with units in centimeters (cm), which had been calibrated beforehand to ensure data accuracy. Measurements were taken twice: before the intervention and after the intervention, spanning a four-week period. The intervention group used a bengkung for 6–8 hours per day for 4 weeks, while the control group underwent early mobilization without the use of a bengkung during the same period. Measurements were taken directly by the researcher on both groups to ensure that the data obtained were objective and standardized. The collected data were analyzed using two approaches, namely univariate and bivariate analysis. Univariate analysis was used to describe the characteristics of the respondents and the distribution of the research variables in general. Meanwhile, bivariate analysis was used to determine the effect of using a bengkung on the reduction in waist circumference of postpartum women. Statistical tests included the paired T-test to assess changes before and after treatment within the same group, and the independent T-test to compare results between the intervention and control groups. This analysis was conducted to test the hypothesis and evaluate the significance of differences resulting from the intervention.

Advances in Healthcare Research
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Website: https://advancesinresearch.id/index.php/AHR
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e-ISSN: 2985-9808

Results and Discussion

Analysis Result

Table 1. Characteristics of Respondents Based on Age and Body Mass Index (BMI)

Category	Sub-category	Experiment f	Experiment %	Control f	Control %
Age (Year)	<20	0	0%	0	0%
	21–35	15	100%	15	100%
	>35	0	0%	0	0%
Total Age		15	100%	15	100%
BMI	Thin	0	0.00%	0	0.00%
	Ideal	6	40.00%	12	80.00%
	Fat	9	60.00%	3	20.00%

Table 2. Data on the Use of Bengkung and Waist Circumference of Postpartum Women (Pre-Test and Post-Test)

Category	Subcategory	Experiment f	Experiment %	Control f	Control %
Use of Bengkung	Compliant (>6 hours/day for 4 weeks)	15	100,00%	–	–
	Non-compliant (<6 hours/day)	0	0,00%	–	–
Total Use of Bengkung		15	100,00%	–	–
Waist Circumference – Pre-Test	Standard (<80 cm)	0	0,00%	0	0,00%
	At Risk (80–90 cm)	1	6,70%	7	46,70%
	Obesity (>90 cm)	14	93,30%	8	53,30%
Total Pre-Test		15	100%	15	100%
Waist Circumference – Post-Test	Normal (<80 cm)	4	26,70%	2	13,30%
	At Risk (80–90 cm)	10	66,70%	12	80,00%
	Obesity (>90 cm)	1	6,70%	1	6,70%
Total Post-Test		15	100%	15	100%

Source: Primary Data Processing, 2025

Based on Table 1, all respondents in this study, both in the experimental group and the control group, were aged between 21 and 35 years. The number of respondents in each group was 15 (100%). There were no postpartum women under the age of 20 or over 35 years old in either the experimental or control groups (0 respondents or 0%). This indicates that all participants fell within the healthy reproductive age category, as defined by the WHO, which is 21–35 years, generally considered the most optimal age range for pregnancy and childbirth. This uniformity in age also reflects the homogeneity of basic characteristics between the two groups, thereby reducing the possibility of bias due to age differences in further analysis.

Based on Table 1, the frequency distribution of respondents' nutritional status according to BMI in the experimental group showed that the majority of respondents were obese, with nine people

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(60.00%). Six people (40.00%) in this group had an ideal nutritional status, and there were no respondents with a malnourished status (0.00%). This indicates that most respondents in the experimental group are in the overweight category, which may influence the rate of change in waist circumference during the intervention period. Meanwhile, in the control group, the majority of respondents (80.00%, 12 people) are in the ideal nutritional status category, while three people (20.00%) are classified as overweight. Similar to the experimental group, there were no respondents with a malnourished status in the control group. A comparison of the two groups reveals that the experimental group was predominantly comprised of respondents with an overweight nutritional status. In contrast, the control group had a higher proportion of respondents with an ideal dietary status. This condition is essential to consider in the analysis because initial nutritional status can influence the effectiveness of using a belly wrap in reducing postpartum abdominal circumference.

Based on Table 2, all respondents in the experimental group (100%) used bengkung for more than 6 hours per day for four consecutive weeks, as per the intervention criteria. There were no respondents who used bengkung for less than 6 hours per day. This indicates that the level of compliance with bengkung use in the intervention group was very high, suggesting that the intervention was consistently implemented in this group. The frequency distribution of waist circumference measurements at baseline (pre-test) showed that in the experimental group, the majority of respondents (14 individuals, 93.30%) were classified as obese. Meanwhile, only one person (6.70%) was in the at-risk category, and there were no respondents with a normal waist circumference (0.00%) in this group. This finding suggests that most respondents in the experimental group began the study with a waist circumference already classified as obese, necessitating targeted intervention to reduce it. In the control group, the majority of respondents were also in the obese category (8 people, 53.30%), while seven people (46.70%) were in the at-risk category, and there were no respondents with a normal waist circumference (0.00%). Although the majority of respondents in the control group were also obese, the obesity rate in the control group was lower than that in the experimental group.

This difference in distribution indicates that, before the intervention, the initial waist circumference condition in the experimental group was generally more severe than in the control group. The results of the frequency distribution of waist circumference after the intervention (post-test). In the experimental group, there were four respondents (26.70%) with waist circumferences in the normal category (less than 80 cm), 10 respondents (66.70%) in the at-risk category (80–90 cm), and only one respondent (6.70%) still classified as obese (greater than 90 cm). This indicates a significant improvement in the experimental group, as no respondents had a normal waist circumference before the intervention. In contrast, after the intervention, some respondents had reached the normal category. In the control group, two respondents (13.30%) had a normal waist circumference, 12 respondents (80.00%) remained in the at-risk category, and one respondent (6.70%) was classified as obese. Although the number of respondents in the normal category increased in the control group, the proportion remained smaller compared to the experimental group. A comparison between the two groups revealed that the experimental group exhibited more favorable changes, with an increase in the percentage of respondents achieving a normal waist circumference and a decrease in the number of respondents classified as obese. This suggests that the use of a belly band may be effective in helping to reduce waist circumference in postpartum women.

A normality test was conducted to determine whether the data were normally distributed. This test is a prerequisite for selecting the type of statistical test to be used in further analysis. If the data is usually distributed, parametric tests such as the t-test can be used. Conversely, if the data is not normally

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e-ISSN: 2985-9808

distributed, non-parametric tests are used. In this study, the normality test was performed using the Shapiro-Wilk test because the number of samples per group was 15 respondents, which is below the recommended limit of 50 samples for using the Shapiro-Wilk test.

Table 3. Results of Shapiro-Wilk Normality Test

Group	Time	Statistik Shapiro-Wilk	df	Sig.	Conclusion
Control	Pre-Test	0,985	15	0,992	Normal
Experiment	Pre-Test	0,894	15	0,076	Normal
Control	Post-Test	0,983	15	0,988	Normal
Experiment	Post-Test	0,887	15	0,060	Normal

Source: Primary Data Processing, 2025

Information:

- df: degrees of freedom (sample size - 1)
- Criteria: Sig. Greater than 0,05 ➔ normally distributed data

Based on the results in Table 3, it can be seen that the significance value (Sig.) in the Shapiro-Wilk test for all groups (control and experimental) is above 0.05 at both the pre-test and post-test. In detail:

- Control group pre-test: Sig. = 0,992
- Experimental group pre-test: Sig. = 0,076
- Control group post-test: Sig. = 0,988
- Experimental group post-test: Sig. = 0,060

Since all Sig. Values greater than 0.05 indicate that the data in all groups are normally distributed. Thus, the normality assumption is met, and further statistical analysis can be performed using parametric tests, such as the t-test. The paired sample t-test is used to determine the difference between the means of two paired measurements within the same group, specifically comparing pre-test and post-test values within a single group. In this study, the test was conducted to determine whether there was a significant difference in the waist circumference of postpartum women before and after the intervention.

Table 4. Results of Paired Sample T-Test

Data Pair	Mean Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-test – Post-test	10,17	4,42	0,81	12,61	29	0,00

Source: Primary Data Processing, 2025

Based on Table 4, it is known that the mean difference between the pre-test and post-test values is 10.17 cm, indicating a decrease in waist circumference after the intervention. The calculated t-value is 12.61 with df = 29, and the significance value (Sig. 2-tailed) is 0.000. Since the significance value is less than 0.05 ($p < 0.05$), it can be concluded that there is a statistically significant difference between the waist circumference before and after the intervention.

The independent sample t-test was used to determine whether there was a statistically significant difference between the experimental group and the control group. In this study, the test was

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e-ISSN: 2985-9808

conducted on the pre-test and post-test results of the abdominal circumference of postpartum mothers in both groups.

Table 5. Results of the Independent Sample T-Test

Time	t	df	Sig. (2-tailed)	Mean Difference	Information
Pre-Test	1,694	28	0,101	3,20	Insignificant
Post-Test	-2,952	28	0,006	-5,47	Significant

Source: Primary Data Processing, 2025

Explanation of Results:
Pre-test:

The test results showed no significant difference between the control group and the experimental group before the intervention. The significance value (p-value) = 0.101 was greater than 0.05, so H_0 was accepted. This means that both groups had equivalent initial conditions before the treatment was given.

Post-test:

Following the intervention, a significant difference was observed between the experimental and control groups, with a p-value of 0.006, which is less than 0.05. The t-value of -2.952 and the mean difference of -5.47 indicate that the experimental group experienced a greater reduction in waist circumference compared to the control group. Thus, H_1 is accepted, indicating a significant effect of the intervention on reducing waist circumference.

Discussion

Characteristics of Respondents Based on Age

The results showed that the age distribution of respondents between the bengkung group and the early mobilization group was relatively balanced. In the bengkung group, most respondents were in their early to mid-twenties, as were those in the early mobilization group. However, there was a slight difference in the early mobilization group, which included respondents of older age, while no respondents of that age were found in the Bengkung group. This similarity in age distribution is essential to ensure that the research results are not influenced by age variations but rather by the differences in treatment provided. Theoretically, age is one of the critical variables in determining the success of the postpartum recovery process. Healthy reproductive age is between twenty and mid-thirties, and at this age, women's physiological conditions are considered optimal for natural recovery. According to Rini K. (2021), women in this age range have a better capacity to support the process of uterine involution and abdominal muscle adjustment after childbirth. In line with this, Krisnawati *et al.,* (2022) state that the use of a postpartum belt can accelerate the recovery process by providing compression to the abdominal muscles, thereby supporting more efficient contractions and aiding uterine involution.

The use of a postpartum belt not only provides mechanical support but also psychological comfort, which ultimately encourages postpartum women to be more active and participate in recovery activities. Researchers believe that the intervention of using a bengkung is highly effective in the productive age group because ideal physiological conditions support it. In other words, the nearly uniform age distribution among the groups allows researchers to conclude that differences in outcomes are more likely due to the intervention method rather than the influence of age itself. This finding is

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supported by research conducted by Krisnawati *et al.,* (2022), which shows that the use of bengkung has a positive impact on postpartum recovery, particularly in the process of uterine involution and reduction in abdominal circumference. Another study by Irnawati & Azzahroh (2022) also showed that postpartum women who used bengkung demonstrated a more significant decrease in waist circumference compared to those who did not use it, further reinforcing that this intervention is effective in accelerating the physical recovery of postpartum women.

Characteristics of Respondents Based on Body Mass Index (BMI)

The results also showed striking differences in the initial nutritional status of respondents between the experimental and control groups. Most respondents in the experimental group were classified as obese based on their Body Mass Index (BMI), while the majority of respondents in the control group had an ideal BMI. No respondents with a BMI in the underweight category were found in either group. These variations in nutritional status have the potential to influence the speed and effectiveness of the abdominal circumference reduction process during the postpartum period, given that a higher BMI is closely associated with greater body fat accumulation. The Body Mass Index (BMI) is a commonly used indicator to determine an individual's nutritional status based on their height and weight. Individuals with a high BMI tend to have a larger proportion of visceral fat in the abdominal area, which is more difficult to break down compared to subcutaneous fat. In the context of the postpartum period, this is important because visceral fat can slow down the process of uterine involution and abdominal muscle recovery. After childbirth, although a woman's weight may decrease, visceral fat tends to increase, especially in the first few weeks of the postpartum period. This explains why participants with a high BMI showed a slower decrease in waist circumference compared to those with an ideal BMI.

However, in the experimental group with higher BMI, regular use of a belly wrap still yielded positive results. The pressure exerted by the belly wrap helps support abdominal muscles and increase intra-abdominal pressure, contributing to the reduction in abdominal size. Although the response to the intervention may be slower in individuals with higher BMI, the results obtained still demonstrate significant improvement. Therefore, nutritional status is a crucial variable that must be considered when designing intervention strategies for postpartum women, particularly non-pharmacological interventions such as the use of abdominal binders. This study is supported by research conducted by Anggraeni *et al.,* (2019), which showed that postnatal exercise or postpartum yoga interventions can accelerate the uterine involution process and significantly reduce waist circumference. Although the intervention approach used in this study differs from that of the previous research, the physiological principles underlying both methods are similar, involving stimulation of abdominal muscles and increased muscle tone postpartum. These findings reinforce the current study's results, indicating that physical interventions, such as the use of a postpartum belt, remain relevant and practical as part of postpartum recovery strategies, particularly when supported by balanced nutrition.

Univariate Analysis

Bengkung Usage Data

The findings of this study indicate that all respondents in the experimental group showed a very high level of compliance with the use of bengkung. All postpartum mothers in this group consistently wore bengkung for the recommended duration, which was more than six hours per day during the

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intervention period. There were no respondents in the experimental group who did not comply with the use of bengkung. This reflects that the intervention provided was well accepted and followed with discipline by the respondents. The high level of compliance is closely related to the success of the educational process conducted by the researchers before the intervention. The education provided gave postpartum mothers an understanding of the benefits of using a bengkung in accelerating physical recovery after childbirth. This knowledge enabled respondents to adopt a positive attitude and gain a comprehensive understanding of the importance of consistency in implementing the intervention. In addition to education, factors such as comfort during use, family support, and ease of access to the tools used were also key drivers of the intervention's success.

Physiologically, the use of bengkung has a strong theoretical basis in supporting the recovery process of postpartum women. Bengkung provides stable pressure on the abdominal area, thereby maintaining the position of the abdominal muscles, which helps shrink the size of the uterus and accelerates the return of the reproductive organs to their original condition. The postpartum period is a time when involution occurs, a process in which the uterus and other body tissues return to their pre-pregnancy state. In this process, the external pressure generated by the bengkung can facilitate the performance of uterine muscles and tissues, thereby accelerating recovery. Researchers believe that the success of bengkung use is not solely determined by the design of the intervention but is also significantly influenced by the mother's adherence to the protocol. When the intervention is consistently implemented according to guidelines, the results obtained are optimal. Therefore, non-pharmacological interventions like bengkung need to be supported by appropriate communication strategies to ensure widespread acceptance and comprehensive implementation by postpartum women. The findings of this study are supported by the research of Qomariah *et al.,* (2023), which stated that consistent use of bengkung can accelerate uterine involution in postpartum women. The study found that mothers who used bengkung experienced a faster recovery process compared to those who did not.

Waist circumference data of postpartum mothers

In addition to compliance with the use of bengkung, this study also evaluated changes in the abdominal circumference of postpartum women in the experimental and control groups. The results obtained showed a decrease in abdominal circumference in both groups after the intervention period; however, a more pronounced decrease was observed in the experimental group. These changes serve as evidence that the use of a postpartum belt intervention can have a significant impact on accelerating abdominal muscle recovery and reducing abdominal size postpartum. Before the intervention, most postpartum women in the experimental group had relatively high abdominal circumference measurements, indicating significant accumulation of abdominal tissue postpartum. However, after several weeks of bengkung use, the majority of participants experienced a significant reduction in abdominal circumference and moved to a lower category. In contrast, the control group, which only underwent early mobilization, showed a milder decrease, with most respondents remaining in the same abdominal circumference category as before the intervention. These differing results indicate that the use of a postpartum belt is more effective in supporting the physical recovery process compared to early mobilization without the use of compression aids.

This phenomenon of reduced waist circumference aligns with Putri, (2024) explanation that, after childbirth, the mother's body undergoes an involution process, during which the uterus shrinks and the abdominal muscles begin to return to their original form. During this process, physical

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interventions such as postpartum exercises or the use of compression devices like a bengkung can accelerate recovery by stimulating the muscles and tissues involved. The pressure exerted by the bengkung promotes more optimal muscle contractions and improves abdominal muscle tone that had weakened due to pregnancy. Researchers noted that the success of waist circumference reduction in the experimental group was not solely attributed to the physiological effects of the bengkung but was also supported by mothers' understanding of the importance of postpartum recovery. The education provided and the mothers' subjective experiences of comfort while wearing the bengkung further enhance the effectiveness of the intervention. Therefore, this intervention not only offers aesthetic benefits such as reducing abdominal circumference but also has clinical value in preventing metabolic complications and supporting the long-term health of postpartum women.

The findings of this study are supported by a study conducted by Safitri, (2022), which compared postpartum exercise and core exercises for reducing abdominal circumference in mothers after childbirth. Both types of exercises were found to have a positive impact on the physical recovery of mothers, particularly in reducing the enlarged abdomen commonly associated with pregnancy. Although the methods used in the study differed, the underlying physiological principles remained the same, namely, providing physical stimulation to the abdominal muscles to support the involution process. This study reinforces that non-pharmacological interventions, such as physical exercise or the use of abdominal binders, are highly effective and can be adopted as practical approaches in maternal healthcare.

The Effect of Bengkung Use on Abdominal Circumference Reduction in Postpartum Women

The results of this study indicate that the use of bengkung in postpartum women has a significant effect on accelerating the reduction of abdominal circumference. A greater reduction was found in the group of postpartum women who consistently used bengkung compared to the group that only underwent early mobilization without additional intervention. These findings suggest that the provision of physical intervention in the form of bengkung use has a direct impact on the physiological recovery process of postpartum women, particularly in the process of uterine involution and the tightening of abdominal muscles postpartum. Biologically, after childbirth, the mother's body undergoes a process of involution, which is the return of the uterus and other reproductive organs to their pre-pregnancy condition. During this process, the size of the uterus gradually shrinks, and the abdominal muscles that stretched during pregnancy slowly return to their original shape and function. The use of a postpartum belt provides gentle and stable pressure on the abdominal area, which helps maintain muscle position, supports natural uterine contractions, and aids in reducing fluid retention in surrounding tissues. The pressure generated by the belt also improves local blood circulation, thereby helping more effective tissue recovery.

The interpretation of these results leads to the conclusion that non-pharmacological interventions such as the use of a postpartum belt are an effective and straightforward strategy for accelerating postpartum recovery. This effectiveness stems not only from the physiological mechanisms induced by compression but also from the psychological aspects of postpartum women. The comfort provided by wearing a bengkung tends to boost self-confidence, encourage gentle mobility, and foster a sense of discipline during the recovery period. These psychological aspects play a crucial role in accelerating physical recovery, as emotional support and comfort influence hormonal balance and the body's response to healing. It is also important to note that the initial conditions of both groups were

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relatively similar. Therefore, the final results, which show differences in abdominal circumference reduction, can be more closely linked to the interventions provided rather than to differences in the respondents' baseline characteristics. This confirms that regular use of a postpartum belt, especially when combined with adequate education and family support, can yield more optimal results compared to relying solely on early mobilization activities.

The findings of this study are consistent with the theory proposed by Saifuddin, (2006), who states that the postpartum period is a critical phase for the involution process, during which the uterus, abdomen, and other bodily organs return to their pre-pregnancy condition. In this process, external interventions such as a postpartum belt can function as a physiological aid to accelerate the recovery of tissues that have expanded during pregnancy. Furthermore, the pressure from the bengkung acts as a stabilizer for muscles and soft tissues, facilitating more efficient contraction of abdominal muscles. This concept explains how the gentle pressure applied by the bengkung can activate the function of abdominal and uterine muscles while stimulating blood circulation and the expulsion of residual pregnancy fluids still retained in the mother's body. Previous studies also support these findings. One such study, conducted by Safitri *et al.,* (2022), investigated the effects of postpartum exercise on abdominal circumference in postpartum women. In their research, it was found that mothers who participated in structured physical exercises experienced a faster and more significant reduction in abdominal circumference compared to those who did not. Although the interventions used were different, the physiological principles underlying their effectiveness remained similar, namely the stimulation of postpartum abdominal muscles, which accelerates the recovery process and restores muscle tone.

The study by Qomariah *et al.,* (2023) also provides supporting evidence consistent with the findings of this study. In their research, it was found that postpartum women who used a postpartum belt experienced a faster decrease in uterine fundal height, indicating accelerated uterine involution. This effect was achieved by applying constant pressure to the lower abdomen, which helped push the uterus back into its original position. The study also highlighted the subjective comfort experienced by mothers while using the bengkung, which contributed to increased compliance and effectiveness of the device. Additionally, similar results were reported in a study by Hassan *et al.,* (2021), which investigated the efficacy of abdominal binders in postpartum recovery. The study showed that mothers who used abdominal binders experienced reduced pain, increased comfort, and better mobility compared to those who did not use them. Although the device used was not a bengkung in the Indonesian cultural context, the principle of the device is similar, providing compression support to the abdominal wall to accelerate tissue and muscle recovery. These findings confirm that continuous gentle pressure can serve as a valid supportive method in postpartum care.

Conclusion

This study was conducted to explore the effect of bengkung use on abdominal circumference reduction in postpartum women. Through an experimental approach with two groups, namely the intervention group and the control group, this study successfully described the differences in postpartum physiological changes resulting from the use of bengkung. The overall analysis revealed that the use of bengkung is a crucial non-pharmacological intervention in supporting the postpartum recovery process. The primary objectives of this study were fully achieved, including measuring waist

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circumference before and after the intervention in both the experimental and control groups, as well as identifying the significant influence of bengkung use on changes in waist circumference.

The novelty of this study lies in the utilization of bengkung as part of culturally-based postpartum care practices, which has been scientifically proven. This study not only enriches the scientific literature in the fields of midwifery and maternal nursing but also makes significant practical contributions to the development of maternal healthcare policies. The use of bengkung, a traditional practice, can be considered a viable alternative intervention in standard operating procedures (SOPs) for postpartum care in health facilities. The practical implications of these findings include empowering healthcare workers to educate postpartum women about the use of bengkung and integrating this intervention into home care programs and home visits. From a managerial perspective, policymakers in the field of public health can utilize the results of this study to develop culturally appropriate and evidence-based midwifery care guidelines.

This study has several limitations that need to be considered. One limitation is the relatively small sample size and limited scope to one Puskesmas working area, so the results cannot be generalized widely. Additionally, psychosocial and nutritional factors that may influence postpartum recovery were not included as control variables in this study. Therefore, it is recommended that further research be conducted with a broader geographical scope and a larger sample size. Future studies should also integrate additional variables such as physical activity levels, nutritional intake, and mothers' perceptions of bengkung use to gain a more comprehensive understanding. Researchers may also explore comparisons of the effectiveness of various non-pharmacological interventions, such as postpartum exercises, massage therapy, and the use of abdominal binders, to determine the most optimal approach in supporting the recovery of postpartum mothers.

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