Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

Original Research

Effectiveness of warm compresses on the incidence of perineal rupture in phase II labor

Selvia[1*], Sismeri Dona[1], M. Fajriannor[2], Lisda Handayani[1]

[1]*Department of Midwifery, Sari Mulia University, Banjarmasin, Indonesia*
[2]*Department of Health Promotion Applied Bachelor, Sari Mulia University, Banjarmasin, Indonesia*

[*]Corresponding author: selviarusdi26@gmail.com

ARTICLE INFO

Article history:
Received 04 Janauary 2025
Accepted 08 February 2025
Publish 28 February 2025

Keywords:
Perineal rupture
Warm compress
Second stage labor
Primiparous women
Maternal morbidity

ABSTRACT

Background: Perineal rupture is a common complication during the second stage of labor, particularly among primiparous women, leading to maternal morbidity. Warm compresses have been suggested as an intervention to reduce perineal rupture by promoting muscle relaxation and elasticity. However, their effectiveness remains inconclusive.
Objective: To analyze the effect of warm compress application on the incidence of perineal rupture during the second stage of labor in primiparous women.
Method: This quasi-experimental study employed a pre-test and post-test design involving 10 primiparous women at 18 to 29 years old divided into intervention (n=5) and control (n=5) groups. Warm compresses were applied for 20 minutes during the second stage of labor in the intervention group. Data were collected using partograph sheets and analyzed using descriptive and inferential statistics, with a significance level of $p<0.05$.
Result: Among the intervention group, 40% experienced no laceration, 20% had first-degree laceration, and 40% had second-degree laceration. In the control group, 40% had no laceration, and 60% suffered second-degree laceration. Statistical analysis showed no significant difference in the incidence of perineal rupture between the groups ($p=0.452$).
Conclusion: Warm compresses did not significantly reduce the incidence of perineal rupture during the second stage of labor. Further research with a larger sample size and broader variables is recommended to validate these findings.

1. Introduction

Labor is a physiological process characterized by regular uterine contractions that progressively increase in frequency and intensity, leading to the thinning (effacement) and opening (dilation) of the cervix. According to the Sample Registration System (SRS), the leading causes of maternal mortality include hypertension (33%), obstetric hemorrhage

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

(27%), non-obstetric complications (15.7%), infections during pregnancy (6.06%), and other causes (4.81%) (Jain et al., 2024; Lawrence & Beyuo, 2022; Taher, 2024). Among the complications that can arise during childbirth, particularly in the postpartum period, are uterine atony-related bleeding, placental retention, and perineal rupture (Sigalingging & Sikumbang, 2018).

Perineal rupture, one of the common complications in stage II of labor, can lead to significant maternal morbidity, including dysfunction of the female reproductive system. This injury is more frequently observed in primiparous women, as their perineal tissues may lack sufficient elasticity or the necessary tension during the birthing process, leading to tears. The long-term consequences of perineal rupture include a heightened risk of postpartum hemorrhage, being the second leading cause of maternal bleeding after uterine atony (Syamsiah & Malinda, 2019).

Pprevent or reduce the incidence of perineal rupture, one intervention is the application of warm compresses. The warm water compress technique has been widely known and used in complementary midwifery practice (Anisa et al., 2023; Palimbo et al., 2023; Sumartila et al., 2024). Warm compresses provide soothing warmth to the perineum, alleviating discomfort, reducing muscle spasms, and enhancing tissue relaxation. From a physiological standpoint, warm compresses promote the softening of fibrous tissues, enhance tissue oxygenation, and prevent muscle stiffness by inducing vasodilation, which improves blood flow. As a result, the perineal muscles are relaxed, making the perineum more elastic and potentially reducing the risk of trauma during delivery (Susilawati & Ilda, 2019).

Recent studies have shown promising results regarding the role of warm compresses in reducing the incidence of perineal rupture. Dawa et al. (2022) demonstrated that the application of warm compresses significantly decreased the occurrence of perineal tears following childbirth. Similarly, Magoga, et al (2019) found that the use of warm compresses in the second stage of labor increased the likelihood of an intact perineum, while decreasing the need for episiotomy and the severity of perineal trauma. This effect is thought to be mediated by the warm compress's ability to stimulate the Golgi tendon organ, which helps stretch the perineal muscles and induces a relaxation response, thus reducing muscle resistance during the second stage of labor.

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

Based on preliminary studies obtained in Independent Midwife Practice (IMP) I and A in December 2023 indicated that of the 35 pregnant women in their third trimester, perineal rupture was still a prevalent issue, with the highest degree of laceration being second-degree tears. The occurrence of perineal rupture was notably more common in primiparous mothers. Given these findings, this study aims to analyze the effect of warm compress administration on the incidence of perineal rupture during phase II of labor.

2. Method

Research design

This study employs a quasi-experimental design with a pre-test and post-test approach to assess the effect of warm compresses on the incidence of perineal rupture during phase II of labor. A controlled, non-randomized study design was chosen due to the practical limitations of random assignment in a clinical setting. The pre-test phase involved the collection of baseline data regarding the incidence and severity of perineal rupture, while the post-test phase examined the outcomes following the intervention, which consisted of warm compress application during the second stage of labor.

Respondent

The sample in this study consisted of 10 participants, specifically 5 primiparous women who received the intervention (warm compresses) and 5 primiparous women in the control group who did not receive the intervention. Sampling was conducted using a purposive sampling method, with participants selected based on predefined inclusion and exclusion criteria. The inclusion criteria for participation were: (1) primiparous women in the second stage of labor, (2) women with no contraindications to vaginal delivery, and (3) women who voluntarily consented to participate in the study. Exclusion criteria included: (1) women with known perineal pathologies, such as perineal tears, unresolved episiotomy, pelvic organ prolapse, rectovaginal or vesicovaginal fistula, or active perineal infections; (2) women with complications such as severe preeclampsia, uncontrolled diabetes, coagulation disorders, systemic infections, or other contraindications for the intervention, including conditions that may impair healing or increase the risk of adverse outcomes; and (3) women unable to provide informed consent due to cognitive impairment, language barriers, or medical emergencies. A total of 10 participants was considered adequate for the purpose of this study,

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

providing a balance between the intervention and control groups to assess the effect of warm compresses on the incidence of perineal rupture.

Data collection

Data collection for this study was conducted at IMP I and A Banjarmasin, Kalimantan Selatan – Indonesia, focusing on the application of warm compresses and its effect on the incidence of perineal rupture during phase II of labor. The primary instrument used for data collection was the partograph sheet, specifically phase II number 13 and phase III numbers 27 and 28, which are standard forms for monitoring labor progress and perineal condition. These partograph sheets were utilized to record key data, including maternal demographics, the progression of labor, the application of warm compresses, and the incidence and degree of perineal rupture. The intervention group received warm compresses for 20 minutes during the second stage of labor, and the control group did not receive this intervention. The research assistants, trained in the use of these partographs, carefully documented all relevant observations. Additionally, a treatment protocol sheet was used to track the details of the warm compress application for those in the intervention group.

Data Analysis

The collected data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including frequencies, means, and standard deviations, were used to summarize the demographic characteristics and the incidence of perineal rupture. Inferential statistics, such as chi-square tests for categorical variables, were applied to compare the incidence of perineal rupture between the control and intervention groups, with warm water compress as the independent variable and the incidence of perineal rupture as the dependent variable. A p-value of <0.05 was considered statistically significant. All data were analyzed using the SPSS software version 25.

Ethical consideration

This research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was granted by the Research Ethics Commission of Sari Mulia University, Banjarmasin, Indonesia, under approval number 193/KEP-UNISM/IV/2024. Written informed consent was obtained from all participants, ensuring they were fully informed about the study's objectives, procedures, potential risks, and benefits. Participants were also assured of their right to withdraw from the study at any time without

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

any negative impact on their medical care. To protect participants' privacy, all data collected were anonymized and securely stored.

3. Results

Table 1 presents the characteristics of the participants involved in this study on the effectiveness of warm compresses on the incidence of perineal rupture in phase II labor. The table includes demographic data such as maternal age, which ranges from 18 to 29 years, with the highest frequency observed among participants aged 20 and 24 years (20% each). Additionally, gestational age at delivery varied between 38 and 41 weeks, with the majority of participants (90%) giving birth between 38 and 40 weeks.

Table 1. Characteristics of participant

Characteristic	Frequency	Percentage (%)	Sum of Liceration Incidence		
			No	1st Degree	2nd Degree
Age (years old)					
18	1	10		1	
19	1	10			1
20	2	20	1		1
21	1	10			1
23	1	10	1		
24	2	20	1		1
25	1	10	1		
29	1	10			1
Tolal	10	100			
Gestational age (weeks)					
38	3	30	1	1	1
39	3	30	1		2
40	3	30	1		2
41	1	10	1		
Total	10	100			

Table 2 illustrates the comparison of perineal rupture occurrences between primiparous mothers who received warm compresses and those who did not during the second stage of labor. The categories of perineal rupture include no laceration, first-degree laceration, and second-degree laceration. Among the group given warm compresses, 40% experienced no laceration, 20% had a first-degree laceration, and 40% had a second-degree laceration. In the group without warm compresses, 40% also experienced no laceration, but none had first-degree lacerations, while 60% suffered second-degree lacerations. The statistical test yielded a p-value of 0.729, indicating no significant difference in the incidence

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

of perineal rupture between the two groups.

Table 2. Association of warm compress and laceration degree in labor

Warm compress	Laceration degree						p-value[a]
	No laceration		1st degree		2nd degree		
	F	Percentage (%)	F	Percentage (%)	F	Percentage (%)	
Given	2	50	1	100	2	40	0.452
Not given	2	50	0	0	3	60	
Total	4	100	1	100	5	100	

Notes: F is frequencies of case; [a] is Likelihood ration test

4. Discussions

The findings of this study demonstrate that the application of warm compresses during the second stage of labor has an impact on reducing the incidence of perineal rupture, although first- and second-degree ruptures were still observed in the majority of participants. Most women who experienced minor ruptures were within the young reproductive age range (18–25 years) with full-term gestational ages (38–41 weeks). This phenomenon suggests that while warm compresses offer a protective effect on perineal tissues (Bqlein & Badr, 2024), intrinsic factors such as tissue elasticity, maternal age, and parity continue to play significant roles in determining susceptibility to rupture.

All participants in the current study were primiparous women, a demographic known to face a higher risk of perineal rupture. Primiparous mothers—those delivering for the first time—often experience heightened vulnerability due to their perineal tissues' lack of prior exposure to the stress of childbirth. As the birth canal has not previously accommodated a fetal head, the perineal muscles and tissues tend to be less elastic and more prone to tearing. Additionally, primiparous mothers may have limited knowledge and experience with labor processes, potentially exacerbating the risk of adverse outcomes. The findings are consistent with the research by Cakwira et al. (2022), which reported a high prevalence of perineal ruptures among primiparous women, accounting for 71% of cases in their study. Similarly, Hukubun et al. (2021) identified parity as a significant risk factor for perineal rupture, with lower parity correlating with increased rupture severity.

Aasheim et al. (2017), in their systematic review in the Cochrane Database, emphasized that warm compresses enhance vascularization of perineal tissues, reduce muscle tension, and significantly lower the incidence of third- and fourth-degree ruptures, although their protection against minor ruptures remains inconsistent. These results align with the findings

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

of Hui et al. (2023), which indicated that the application of heat to the perineal area can increase local collagenase activity, thereby improving tissue flexibility. However, the occurrence of first- and second-degree perineal ruptures in younger mothers in this study suggests that warm compresses may not fully address biological limitations, such as the insufficient readiness of tissues that have not undergone prior distension. Åhlund (2019) reported that primiparous women tend to experience ruptures despite protective interventions due to biomechanical adaptations of the perineum differing from those in multiparous women.

Another critical factor influencing perineal rupture is maternal age. Younger mothers, particularly those under 20 years old, are at an elevated risk due to suboptimal organ function and low perineal elasticity. This study's findings align with Hukubun et al. (2021), which highlighted that younger maternal age often results in less optimal perineal conditions, increasing susceptibility to rupture. Furthermore, advanced maternal age (≥35 years) can also negatively affect perineal elasticity, as natural aging processes reduce tissue flexibility, compounding the risk of rupture. Young mothers face additional challenges, including higher rates of anemia, prematurity, and pathological labor, which may further exacerbate the risk of perineal trauma.

Fetal weight is another significant determinant of perineal rupture. In this study, two participants in the intervention group had similar fetal weights of 3200 grams; however, one experienced a second-degree rupture, while the other had no laceration. This discrepancy highlights that factors beyond fetal weight, such as maternal tissue elasticity and delivery technique, contribute to perineal outcomes. Research by Imas & Chairiyah (2024) supports these findings, noting that mothers delivering fetuses weighing between 2500 and 4000 grams have a sixfold increased risk of first- and second-degree perineal ruptures. This range encompasses most normal birth weights, indicating that while fetal weight is a contributing factor, it is not the sole determinant of perineal integrity.

Proper straining techniques during the second stage of labor play a crucial role in mitigating the risk of perineal rupture. The results of this study are consistent with Julima (2018), who emphasized the importance of maternal knowledge and appropriate straining practices in reducing perineal injuries. Incorrect techniques can lead to excessive pressure on the perineum, exacerbating the likelihood of rupture. While improper straining can

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

exacerbate the risk of severe perineal tears, it is essential to consider that other factors, such as fetal positioning and maternal health, also contribute significantly to the overall risk profile during delivery (Hu et al., 2022).

The absence of significant effects of warm compresses on the incidence of perineal rupture in this study can be attributed to various interrelated factors. One key factor is the mother's preparation during pregnancy, particularly regarding physical and psychological readiness for labor. This finding aligns with the research by Hassan et al. (2020), which concluded that warm perineal compresses do not significantly reduce the rate of episiotomy or other perineal outcomes. In their study, the lack of a clear effect was linked to variations in the techniques used, maternal conditions, and other confounding variables. The potential influence of these factors underscores the need for a comprehensive understanding of maternal and procedural dynamics during childbirth.

The small sample size in this study is a notable limitation, potentially affecting the generalizability and statistical power of the findings. With only 10 participants divided equally between intervention and control groups, the study may lack the robustness needed to detect subtle effects of warm compresses on perineal rupture incidence. This limitation contrasts with the study by Dawa (2022), which included 15 respondents in the intervention group and demonstrated a significant reduction in perineal ruptures. The larger sample size in Dawa's study likely provided greater statistical power and more reliable results. Future research should aim to include a larger and more diverse sample to enhance the validity and applicability of findings.

Physiologically, warm compresses are hypothesized to reduce perineal rupture by promoting tissue relaxation and elasticity. The warmth induces vasodilation, enhancing blood flow and oxygenation to the perineal tissues. This process softens fibrous tissues, reduces muscle stiffness, and promotes relaxation. However, the findings of this study did not support the hypothesis that warm compresses significantly reduce perineal rupture rates. This discrepancy may be attributed to several factors, including variations in compress application techniques, the duration of intervention, and individual differences among participants.

While this study did not find significant effects of warm compresses, prior research provides mixed evidence on their efficacy. Magoga et al. (2019) conducted a meta-analysis showing that warm perineal compresses during the second stage of labor reduced the

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

severity of perineal trauma and the need for episiotomies. These findings highlight the potential benefits of warm compresses when applied correctly and consistently. However, Hassan et al. (2020) reported no significant differences in perineal outcomes, emphasizing the importance of standardized protocols for compress application. The variability in findings underscores the need for further research to clarify the conditions under which warm compresses are most effective.

To address the limitations of this study and build upon existing knowledge, future research should consider larger sample sizes to enhance statistical power and reliability. Standardized intervention protocols for warm compress application—including timing, temperature, and duration—will improve consistency across studies. Additionally, exploring factors such as maternal hydration, nutritional status, and labor duration could provide a more comprehensive understanding of perineal outcomes. Longitudinal studies are recommended to assess the long-term effects of warm compresses on perineal healing and maternal satisfaction. Comparative studies evaluating warm compresses against other interventions, such as perineal massage or cold compresses, could further identify the most effective strategies for preventing perineal rupture.

Furthermore, warm compresses offer dual benefits—not only reducing the risk of perineal trauma but also accelerating tissue recovery and decreasing postpartum pain intensity (Fetrisia et al., 2024; Bqlein & Badr, 2024)—which reinforces the notion that this intervention holds comprehensive therapeutic value. Therefore, integrating warm compresses into labor protocols can be recommended as an effective non-invasive approach, although its effectiveness should be considered alongside other maternal factors.

5. Conclusion

The findings of this study suggest that warm compresses do not significantly reduce the incidence of perineal rupture among primiparous women during the second stage of labor. However, the results must be interpreted cautiously due to the small sample size and other methodological limitations. Future research with larger, more diverse populations and standardized protocols is essential to determine the true efficacy of warm compresses in reducing perineal trauma. Additionally, a holistic approach that considers maternal preparation, age, parity, fetal weight, and delivery techniques will be crucial in optimizing perineal outcomes and improving maternal health during childbirth.

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

6. Conflict of interest

All authors declare no conflict of interest.

7. References

Aasheim, V., Nilsen, A. B. V., Reinar, L. M., & Lukasse, M. (2017). Perineal techniques during the second stage of labour for reducing perineal trauma. *The Cochrane database of systematic reviews*, *6*(6), CD006672. https://doi.org/10.1002/14651858.CD006672.pub3

Anisa, F. N., Palimbo, A., Maolinda, W., & Yuliyana. (2023). Effect of warm compress and breathing technique on duration of the second stage of labor. Health Sciences International Journal, 1(1), 16-23. https://doi.org/10.71357/hsij.v1i1.7

Bqlein, A. S., & Badr, H. (2024). Effects of warm compresses on the perineal area during the active phase of labor: A quasi-experimental study. *Cureus*, *16*(8), e67825. https://doi.org/10.7759/cureus.67825

Cakwira, H., Mukengere, M., Lucien, B., Aborode, A. T., Sironge, L., Michael, M. V., & Akilimali, A. (2022). The clinical characteristics of perineal tears: A study carried out on 14 pregnant women in a tertiary center: Case series. *Annals of Medicine and Surgery*, *82*(August), 104432. https://doi.org/10.1016/j.amsu.2022.104432

Dawa, O., & Syam, N. (2022). The effect of warm compresses on the perineum during the second stage of labor on the incidence of perineal rupture in primapara [in Indonesia]. *Jurnal Inovasi Penelitian*, *3*(1), 4751-4754. https://doi.org/10.47492/jip.v3i1.2153

Fetrisia, W., Esterina, U., Sari, M. M., Ismul, I., & Firdawati, F. (2024). The effect of warm water compress on the vagina on the healing of perinium wounds in post partum mothers. *Jurnal Kesehatan*, *15*(2). https://doi.org/10.35730/jk.v15i2.1155

Hassan, A., Monem, A. A., Mohamed, M., El-Habashy, I., Helmy, S., & Yonis, M. (2020). Effect of hands-on, hands-off and warm compresses perineal techniques during the 2 nd stage of labor on perineal outcomes among primiparae with vaginal delivery. In *International Journal of Novel Research in Healthcare and Nursing* (Vol. 7). www.noveltyjournals.com

Hu, Y., Lu, H., Huang, Q., Ren, L., Wang, N., Huang, J., Yang, M., & Cao, L. (2022). Risk factors for severe perineal lacerations during childbirth: A systematic review and meta-analysis of cohort studies. *Journal of Clinical Nursing*, *32*(13–14), 3248–3265.

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

https://doi.org/10.1111/jocn.16438

Hui, W. H., Chiu, P. H., Ng, I. I., Chang, S. W., Chou, C. C., & Chen, H. H. (2023). Unraveling the molecular mechanism of collagen flexibility during physiological warmup using molecular dynamics simulation and machine learning. *Computational and structural biotechnology journal*, *21*, 1630–1638. https://doi.org/10.1016/j.csbj.2023.02.017

Hukubun, Y., Budiono, D. I., & Kurniawati, E. M. (2021). The relationship between age, parity, and birth weight with the degree of perineal rupture in the Jayapura Hospital. *Indonesian Midwifery and Health Sciences Journal*, *5*(1), 103–115. https://doi.org/10.20473/imhsj.v5i1.2021.103-115

Imas, N. R. I., & Chairiyah, R. (2024). The relationship of the weight of newborn babies and the incident of perineal rupture in primipara mothers at Mutiara Bunda Delivery Hospital. *Journal of Nursing and Midwifery Sciences*, *3*(1). https://doi.org/10.54771/9wr42z11

Jain, D., Maheshwari, R., Jain, M., Rudavath, B., & Misra, A. (2024). Record based study to determine the MMR and causes of maternal mortality: An experience from a tertiary care center in Central India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *13*(11), 3250–3254. https://doi.org/10.18203/2320-1770.ijrcog20243186

Julima, W. &. (2018). The relationship between pushing technique and the incidence of perineal rupture in mothers giving birth at Tibawa Health Center, Gorontalo Regency (in Indonesia. *Jurnal Kesehatan*, 1–14.

Lawrence, E. R., Klein, T. J., & Beyuo, T. K. (2022). Maternal mortality in low and middle-income countries. *Obstetrics and gynecology clinics of North America*, *49*(4), 713–733. https://doi.org/10.1016/j.ogc.2022.07.001

Magoga, G., Saccone, G., Al-Kouatly, H. B., Dahlen G, H., Thornton, C., Akbarzadeh, M., Ozcan, T., & Berghella, V. (2019). Warm perineal compresses during the second stage of labor for reducing perineal trauma: A meta-analysis. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, *240*, 93–98. https://doi.org/10.1016/j.ejogrb.2019.06.011

Palimbo, A., Anisa, F. N., Handayani, L., & Hasanah, U. (2023). The effectiveness of using warm compresses and birthing balls on the anxiety level of the active phase of the first stage

Health Sciences International Journal (HSIJ)
Vol. 3, No. 1, February 2025, pp. 115 – 126
ISSN: 3026-5037

of labor. *Health Sciences International Journal*, 1(1), 1-8. https://doi.org/10.71357/hsij.v1i1.3

Sigalingging, M., & Sikumbang, S. R. (2018). Factors associated with the occurrence of perineal rupture in mothers giving birth at the Imelda Indonesian Workers Hospital, Medan [in Indonesia]. *Jurnal Bidan Komunitas*, *1*(3), 161. https://doi.org/10.33085/jbk.v1i3.3984

Sumartila, Palimbo, A., Istiqamah, & Mahdiyah, D. (2024). Effect of warm water compress with endorphin massage on reducing labor pain intensity in the first stage active phase. *Health Sciences International Journal*, *2*(2), 84-95. https://doi.org/10.71357/hsij.v2i2.27

Susilawati, E., & Ilda, W. R. (2019). The effectiveness of warm compresses and cold compresses on the intensity of perineal wound pain in postpartum mothers at BPM Siti Julaeha Pekanbaru [in Indonesia]. *Journal Of Midwifery Science*, *3*(1), 7–14.

Syamsiah, S., & Malinda, R. (2019). Determinants of perineal rupture incidence at BPM E.N Surabaya [in Indonesia]. *Jurnal Ilmiah Kesehatan*, *10*(2), 190–198. https://doi.org/10.37012/jik.v10i2.54

Taher, T. M. J. (2024). Maternal mortality: What is the situation and the determinants?. *Maaen Journal for Medical Sciences*,3(1), Article 7. https://doi.org/10.55810/2789-9136.1041