

Woolwich massage and back rolling are effective in increasing breast milk production in mothers with post-cesarean section indications of premature rupture of membranes (prom) in hospitals

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ABSTRACT

Introduction: Premature rupture of the membranes (KPD) is one of the conditions that is a factor that causes the procedure to be performed by sectio caesarea because the prematurely ruptured membranes increase the risk to the mother and fetus. Cesarean delivery can lead to ineffective breastfeeding due to pain, stress, and separation between the mother and the baby in the NICU. Efforts are made to increase breast milk production, namely with Woolwich massage and back rolling. **Objectives:** The purpose of this study is to determine if the effectiveness of Woolwich massage and back rolling can increase breast milk production of post-cesarean section mothers with KPD indications in hospitals. **Methods:** This research method uses a descriptive method with a case study approach using postpartum nursing care carried out on April 28-Mei 3, 2025, for post-SC mothers on the indication of KPD. **Results:** The evaluation was carried out for 3 days, with the administration of Woolwich massage and back rolling twice a day for ± 20 minutes. On the first day before the action was taken, the breast milk had not come out. After the massage, there began to be changes even though there was still very little breast milk. On the second day, breast milk production began to look more stable and was seen dripping until the fifth day, when the milk had begun to flow smoothly. **Conclusion:** this study shows that the action of Woolwich massage and back rolling is proven to increase breast milk production in post-SC mothers with ineffective breastfeeding problems.

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INTRODUCTION

Preterm Premature Rupture of Membranes (PPROM), a rupture of the amniotic membrane that occurs long before the time of delivery, can cause a decrease in the volume of amniotic fluid (oligohydramnion). This condition significantly increases the risk of intrauterine infections such as chorioamnionitis and neonatal sepsis, as well as negatively impacting fetal growth and

development. Therefore, cesarean delivery is often the preferred option to reduce the risk of more severe complications in mother and fetus (AlexSandro Rolland souza et al., 2016). According to research (Desma Ayu Kusuma Wardani et al., 2024) Other complications due to KPD are infections in childbirth and puerperium, long partus, and increased cesarean section (SC) actions.

According to WHO (2023) more than 29.3 million births by the sectio caesarea (SC) method occur every year worldwide, with an average prevalence of 21%. In some countries, this figure is even more than 40%, which far exceeds the WHO recommendation, which sets an ideal figure of between 10% and 15% only for certain medical cases. According to WHO (2019), as many as 35.6% of women in developing countries experience failure in breastfeeding exclusively, and about 20% face serious obstacles in the early postpartum period, including mothers undergoing cesarean section. This is in line with (Riskesdas, 2018), which shows that exclusive breastfeeding coverage in Indonesia only reaches 42%. Childbirth with the SC method not only has an impact on the delivery process itself but can also lead to reduced breast milk production. A number of studies have also shown a similar tendency that SC actions affect breast milk production. According to research (Retnawati Ayu Shinta et al., 2024), only 44.3% of post-SC mothers are able to produce breast milk properly, while the rest experience obstacles due to pain and anxiety that interfere with the release of oxytocin. Mas □adah & Rusmini (2015) revealed that post-SC mothers often experience delays in early breastfeeding initiation due to pain, the effects of anesthesia, and limited movement. In line with that, (Syukur Abdul Nursari et al., 2020), emphasized that hormonal disorders and postoperative pain also slow down breast milk production in post-SC mothers. According to research (Setyorini et al., 2022), breast milk (ASI) is a perfect source of nutrition for the growth and development of babies and also contains natural antibodies that protect against infections in early life.

The WHO recommends exclusive breastfeeding for the first six months. However, breastfeeding, especially in post-cesarean section mothers, often faces obstacles due to postoperative pain and separation between mother and baby, thus interfering with the initiation of early breastfeeding and milk production. This condition is generally exacerbated when SC delivery is carried out due to complications such as Premature Rupture of Membranes (KPD), which also increases the risk of premature birth and breastfeeding challenges in babies. Breast milk production in the mother due to the lack of stimulation from the baby caused by the baby's inability to perform direct suction has an impact on the mother's neuroendocrine system not being optimally stimulated. So that the production of the hormones prolactin and oxytocin decreases, which ultimately leads to a decrease in milk volume.

Although policy and clinical support have been provided, the success of breastfeeding remains influenced by the individual conditions of the mother and baby. According to research (Layuk et al., 2023), the administration of regional anesthesia contributes positively to the smooth production of breast milk in post-sectio caesarean mothers because it allows for the effective implementation of early breastfeeding initiation (IMD). IMD stimulates the release of the hormones oxytocin and prolactin, which are essential for breast milk production. However, the success of breastfeeding does not depend only on the type of anesthesia. If the baby is born prematurely due to Premature Rupture of the Membranes (KPD), he is usually treated in the NICU and cannot breastfeed directly, so the mother's breasts do not get optimal stimulation. As a result, breast milk production can be inhibited even though anesthesia supports the IMD process. Therefore, In the case of premature babies, a holistic approach is needed that includes maternal pain management, psychological support, breastfeeding education, as well as strategies to maintain breast milk production even without direct suction from the baby (Li et al., 2024). According to research (Usman et al., 2019), common obstacles such as delayed breast milk release, postoperative pain, and mother-baby separation encourage the need for alternative strategies that are safe, practical, and effective. In the condition of postpartum mothers, cesarean section and premature babies, breast milk cannot be produced optimally due to the effects of anesthesia and breast conditions.

According to research (Retnawati Ayu Shinta et al., 2024), it proves that the combination of these two techniques significantly increases breast milk adequacy within three days, characterized by an increase in the baby's weight as well as the frequency of bowel movements. Woolwich massage is focused on the lactiferous sinus area to increase milk production through prolactin, while *back rolling* targets the oxytocin nerve pathway to facilitate the let-down reflex. This effectiveness is strengthened by research (Malatuzzulfa Isti Nurlia et al., 2022) which shows that the combination of two techniques is more optimal than separate implementation. Compared to other massage methods such as Marmet or Oketani, Woolwich massage and *back rolling* offer advantages in terms of hormonal target clarity, ease of application, and the potential for family empowerment in supporting breastfeeding mothers; Acupressure is the non-pharmacological technique identified in this research to reduce pain. According to research (Sudjarwo et al., 2023), acupressure has been proven to be effective in reducing pain intensity, is safe to use, and can be an alternative choice to reduce dependence on analgesics. therefore, this study aims to determine whether Woolwich massage and back rolling can increase breast milk production in mothers with Post Sectio Caesarea due to Premature Rupture of Amniotic Membranes (KPD) in the hospital. Woolwich massage Woolwich massage and *back rolling massage actions* can increase breast milk production in mothers with Post Sectio Caesarea On Indications of Premature Rupture of Amniotic Membranes (KPD) in the hospital.

RESEARCH METHOD

This research design uses a descriptive case study approach, aiming to examine the effectiveness of the combination Woolwich massage and back rolling massage actions can in increasing breast milk production in *post-cesarean section* mothers on the indication of *Premature Rupture of Amniotic Membranes (KPD)* in hospitals. The research location is in the Kamala Room on the 3rd floor of Hermina Jatinegara Hospital on May, 2025. Data collection was carried out through direct interviews with patients and families, observation of the patient's condition, physical examination of the patient, and data collection from medical records. HINA WEB Hermina <https://simrs.herminahospitals.com/live/login.html>. This research has also received permission from Hermina Hospital with No. 308/IKH/YPH/III/2025.

RESULTS AND DISCUSSIONS

The results of the study were obtained in postpartum mothers. Subjective data is that the patient said that the breast milk had just come out a little; the patient said that he could not breastfeed his baby because he was treated separately in the NICU room. The objective is to get the condition of the mammary glands enlarged, the areola of the mammary glands is hyperpigmented, the milk production is small, and the breasts do not experience swelling. The baby was treated in the NICU for *prematurity* with a body weight of 1716 grams. This is in line with research (Purnamawati et al., n.d.). Factors that affect the smooth running of breastfeeding include the mother's physical condition, the baby's condition, psychological factors, and socio-cultural factors. Anxiety and stress in postpartum mothers, especially due to separation from the baby such as care in the NICU, can interfere with the oxytocin and prolactin reflexes that play a role in milk production, as well as inhibit the bonding process of mother and baby, which has an impact on breastfeeding success and another study by (Musafa'ah et al., 2017), shows that the separation of mother and baby, such as in care in the NICU, can also hinder the smooth production of breast milk. Isolation limits the frequency of breastfeeding and skin-to-skin contact, which is important in stimulating the hormones oxytocin and prolactin, resulting in a decrease in milk production and excretion and interfering with the success of the breastfeeding process.

The nursing diagnosis that is a priority in intervening is ineffective breastfeeding related to not treating the joint, characterized by the patient saying that her child was admitted to the NICU because of *prematurity* and BBLR. The diagnosis is proven by research by (Santy et al., 2023), that

the causes of ineffective breastfeeding are untreated infants, prematurity, and insufficiency of the baby's sucking reflex. Another result that supports this study (Heller et al., 2021), is that breastfeeding in premature babies with a body weight of less than 2500 grams has obstacles, namely the weak ability of the baby's sucking and swallowing reflex so that the stimulus in the mother's anterior pituitary is lacking in producing the hormone prolactin. In addition, premature babies who are treated separately from their mothers to get intensive care in the NICU room are also increasingly difficult to increase breast milk production. Based on the diagnosis of ineffective breastfeeding, there is no gap between theory and fact, namely because there is no combined care and the baby is born *prematurely*.

The nursing action plan that the author takes to overcome ineffective breastfeeding that will be given to postpartum mothers includes the identification of the mother's breast, the identification of breast milk, the teaching of Woolwich massage, *the back rolling massage*, and the teaching of expressing breast milk. This action was given because, based on the results of the study, postpartum mothers complained that the breast milk had just come out slightly and they had not been able to breastfeed directly because their baby was treated separately in the NICU room with a premature condition and a BBLR of 1716 grams. This research is in line with (Fatmawati et al., 2019), which states that breast care affects breast milk production. Another factor that can increase breast milk production is the administration of Woolwich massage and massage rolling. Another study (Retnawati Ayu Shinta et al., 2024) states that Woolwich massage is effective in increasing expenses for breast milk. Research by Mayangsari & Rahma (2019) also showed that mothers who received back-rolling massage experienced increased milk production due to the stimulation of hormones that support the breastfeeding process.

The first day postpartum, breast palpation was carried out, and the results of the breast were palpable; the breasts began to enlarge, the nipples protruded, and there were no signs of breast milk dam. The mother said that the breast milk had not come out and felt anxious because she had not met her baby. This condition is considered to inhibit the production of breast milk, so in the morning the implementation is carried out in the form of *Woolwich massage* and *back rolling massage* for ± 20 minutes. The results of the implementation on the first day showed a change, namely, breast milk began to come out, even though in very small amounts and only wetting the tip of the nipple. In the afternoon, the author trained the mother to do the massage independently. The implementation of the second day was carried out with *Woolwich massage* and *back rolling* twice a day with guidance.

The results obtained showed that breast milk production began to increase compared to the previous day, seemed to start dripping from both breasts, and the mother began to be able to massage independently. The implementation of the third day was obtained as a result of breast milk beginning to flow more smoothly from both breasts after massage. The mother seemed more confident and motivated to continue the massage independently at home and began to collect breast milk to be stored and given to her baby, who was still being treated in the NICU room. The results of this implementation are supported by research (Folendra Rosa et al., 2024) which explains that Woolwich massage functions to stimulate nerves in the breast that activate the hypothalamus and anterior pituitary, thereby stimulating the production of the hormones prolactin and oxytocin. Prolactin plays a role in milk production, while oxytocin helps its release through the let-down reflex.

Based on this clinical experience and the support of scientific theories, the authors believe that Woolwich massage and *back-rolling massage* are simple but very effective approaches in stimulating lactation, especially in mothers who experience psychological and physiological obstacles due to separation from the baby. In addition to providing physical stimulation to facilitate the flow of breast milk, these two techniques also contribute greatly to creating a sense of comfort, increasing maternal confidence, and strengthening emotional involvement between mother and baby even though they have not had direct contact.

The author evaluated directly after Woolwich massage and *back rolling massage* for 5 days with a frequency of 2 times a day. It was found that there was an increase in breast milk production in postpartum mothers on the first day. Before the Woolwich massage and *back rolling massage*, the breast milk only came out slightly in the mother's nipples, and after the Woolwich massage and *back rolling massage* were carried out, The mother's milk comes out in a drop on both breasts. On the second day before the breast milk massage, the patient only came out with 3 drops on the right side and 2 drops on the left, and after the breast massage, 0.1 cc was seen dripping on the right side and 5 drops on the left. On the third day, there was a significant increase in breast milk production in postpartum mothers, which was as much as 0.3 cc from both breasts. This is in line with research (Retnawati Ayu Shintia et al., 2024), which showed that before the Woolwich massage intervention, the average milk output was only 0.26 cc, and after the intervention, it increased to 1.3 cc. Other research by (Rosyaria et al., 2018) supports.

The effectiveness of Woolwich massage and back rolling massage in improving breast milk production, where 60% of respondents with Woolwich massage and 80% with back massage experienced an increase in breast milk production. Although there was no statistically significant difference between the two methods, the results of the study showed that both could be used as an alternative to interventions according to the mother's comfort and preference. This study has limitations in terms of action, namely that patients were not treated with other non-pharmacological therapies.

CONCLUSION

The studies and theories obtained concluded that *post-SC* pain, psychological distress due to separation from the baby, and overall physical discomfort have the potential to inhibit the oxytocin and prolactin reflexes, which are the main hormones in milk production and excretion. Therefore, the physical and psychological obstacles experienced by patients today have a great influence on the ineffectiveness of the breastfeeding process.

The priority diagnosis for intervention was ineffective breastfeeding associated with non-combined care, characterized by infants being admitted to the NICU due to prematurity and BBLR. This condition causes babies to experience impaired sucking and swallowing reflexes, thereby inhibiting the stimulation of milk production. Separate treatment also worsens the breastfeeding process. Breastfeeding diagnosis is not effective according to the patient's condition and is a priority in nursing management. The intervention actions carried out on Mrs. N were focused on the Woolwich massage method and back-rolling massage to stimulate breast milk production and prevent breast swelling due to not breastfeeding directly.

The intervention started from the first day of post SC and was carried out once a day with a duration of ± 20 minutes. At first, the breast milk did not seem to come out, and the patient admitted that he was anxious because he had not met his baby, who was treated in the NICU. After the first intervention, a drop of breast milk began to be seen coming out of each breast. On the second day, the amount of breast milk increased to 0.1 cc in the right breast and five drops in the left after the massage and expressing training. On the third day, the milk that came out increased to about 0.3 cc from both breasts.

From the results of the evaluation during the three days of the intervention, it can be concluded that Woolwich massage and back rolling massage are effective in increasing breast milk production to postpartum mothers, who experiences breastfeeding obstacles due to separation from the baby after premature delivery. An increase in breast milk volume is seen gradually from day to day, indicating a positive response to the intervention given. Husband's support and independent education also strengthen the success of therapy. Thus, Woolwich massage and back-rolling massage can be used as effective nonpharmacological interventions to overcome ineffective breastfeeding in post-cesarean section mothers, especially in situations where the baby is being treated in the NICU. A nurse applies a combination of Woolwich massage and back-rolling massage to a post-cesarean section mother to support smooth breastfeeding.

The massage technique involves stimulating the breasts and back to help activate the hormones oxytocin and prolactin, which play a crucial role in breast milk production and release. This massage also aims to create a sense of relaxation in the mother, allowing the let-down reflex to function more optimally. The direction of further research is to use other methods to reduce pain, namely a combination of lavender with Benson relaxation, which has been proven by the research results of (Zulhaida, Wandini R, 2025).

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References

- AlexSandro Rolland souza, Adriane Farias Patriota, Gláucia viRGínia de QueiRoz lins GueRRa, & Brena Carvalho pinto de melo. (2016). Evaluation of perinatal outcomes in pregnant women with preterm premature rupture of membranes. *Revista Da Associacao Medica Brasileira*. <https://doi.org/10.1097/AOG.0000000000002236>
- Desma Ayu Kusuma Wardani, F., Windari, F., Octavia, T., Studi, P. S., Usada, D., Nalanda Jakarta, S., Studi Ilmu Alquran dan Tafsir, P., Raden Intan Lampung, U., & Kebidanan Hampar Baiduri Kalianda Lampung Selatan Korespondensi Penulis, A. (2024). Risk Factors for Premature Rupture of Membrans in Pregnant Woman (Vol. 13, Issue 2). Online. <http://ejurnalmalahayati.ac.id/index.php/duniakesmas/index>
- Eka Sri Wahyuni, Yanti Dwi Mutiara, Peny Ariani, Vitrilina Hutabarat, Tetty Junita Purba, & Nurhamidah. (2021). Pengaruh Pijat Woolwich Terhadap Produksi Asi Pada Ibu Postpartum Di Klinik Sri Wahyuni . *Jurnal Dopler*, 5.
- Fatmawati, L., Syaiful, Y., & Wulansari, A. (2019). Pengaruh Perawatan Payudara Terhadap Pengeluaran Asi Ibu Post Partum (The Effect of Breast Care in the Milk Output of Post Partum Mother).
- Folendra Rosa, E., Harsanto, E., Anggraini, S., Studi D-III Keperawatan Baturaja, P., & Kemenkes Palembang, P. (2024). Article Implementasi Edukasi Menyusui, Pijat Woolwich, dan Pijat Oksitosin pada Ibu Post Partum Terhadap Keadekuatan Suplai ASI. <https://stikes-nhm.e-journal.id/NU/index>
- Hastuti Usman. (2019). Kombinasi Metode Pijat Woolwich Dan Massage Rolling (Punggung) Mempengaruhi Kecukupan Asi Pada Ibu Post Partum Hastuti Usman. <Http://Jurnal.Poltekkespalu.Ac.Id/Index.Php/Jbc/>
- Heller, N., Rüdiger, M., Hoffmeister, V., & Mense, L. (2021). Mother's own milk feeding in preterm newborns admitted to the neonatal intensive care unit or special-care nursery: Obstacles, interventions, risk calculation. *International Journal of Environmental Research and Public Health*, 18(8). <https://doi.org/10.3390/ijerph18084140>
- Layuk, J., Kesehatan, P., & Timur, K. (2023). *Sosroatmodjo Tanjung Selor* (Vol. 2, Issue 2).
- Li, X., Li, Y., Qian, L., Han, P., Feng, H., & Jiang, H. (2024). Mothers' experiences of breast milk expression during separation from their hospitalized infants: a systematic review of qualitative evidence. *BMC Pregnancy and Childbirth*, 24(1). <https://doi.org/10.1186/s12884-024-06323-3>
- Mayangsari, D., & Rahma, D. (2019). Manfaat Back Rolling Massage Terhadap Pengeluaran Asi Di Klinik Esthi Husada Husada Semarang. *Jurnal Smart Kebidanan*, 6(1), 48. <Https://Doi.Org/10.34310/Sjkb.V6i1.245>
- Musafa'ah, S., Retno, D. A., & Kholis, A. H. (2017). Hubungan Rawat Gabung Dengan Produksi Asi Pada Ibu Nifas Di Ruang Melati Rsud Kabupaten Jombang (The Correlation Of Rooming In With The Production Of Breast Milk For Postpartum Mother In The Room Of Melati Rsud In Jombang District).
- Mas'Adah, & Rusmini. (2015). Teknik Meningkatkan Dan Memperlancar Produksi Asi Pada Ibu Post Sectio Caesaria . *Jurnal Kesehatan Prima*, 9, 1495-1505.
- Nurlia, O., Malatuzzulfa, I., Meinawati, L., & Nufus, H. (n.d.). Upaya Peningkatan Produksi ASI melalui Pijat Woolwich dan Massage Rolling pada Ibu Nifas 1 Minggu Post Partum. In *Jurnal Kebidanan* (Vol. 12, Issue 1).
- Nabella Vidya Rizka, & Salsabella Muslimah Listania. (2020). Hubungan Keputihan Dengan Ketuban Pecah

- Dini Di Rumah Sakit . Jurnal Ilmu Kesehatan Karya Bunda Husada , 6.
- Puspita, D. F., Novianty, K., & Rahmadini, A. F. (2021). Faktor-Faktor Yang Berhubungan Dengan Kejadian Ketuban Pecah Dini Pada Ibu Bersalin Di Bpm Sri Puspa Kencana.Amd,Keb Di Kabupaten Bogor. *Journal Of Midwifery Care*, 2(01), 1-10. <https://doi.org/10.34305/Jmc.V2i01.364>
- Retnawati Ayu Shintia, Khoiriyah Etika, Muslim, & Zufri. (2024). Pengaruh Pijat Woolwich Terhadap Produksi Asi. *Jurnal Cakrawala Kesehatan*, 15.
- Riskesdas. (2018). Badan Penelitian dan Pengembangan Kesehatan.
- Rosyaria, A., Fakultas, B., Kesehatan, I., & Surabaya, S. (2018). Perbedaan Massage Woolwich Dan Massage Rolling (Punggung) Terhadap Peningkatan Produksi Asi Pada Ibu Postpartum. *Jurnal Ilmiah: J-HESTECH*, 1(1), 43-49. <http://ejournal.unitomo.ac.id/index.php/jhest>
- Santy, W. H., Rahayu, A., Keperawatan, F., & Kebidanan, D. (2023). Cup Feeder Untuk Mengatasi Masalah Menyusui Tidak Efektif Pada Bayi Yang Tidak Rawat Gabung RSI Jemur Sari.
- Setyorini, E., Amelia, R., Setianingsih, A., Poltekkes, H. K., & Semarang, K. (2022). Efektivitas Menyusui Dini Terhadap Produksi Asi. 4(2). <https://doi.org/10.31983/Jsk.V4i1.9182>
- Syukur Abdul Nursari, Wahyutri Endah, & Putri Erma. (2020). Pijat Kombinasi Endorfin Oksitosin Mempengaruhi Produksi Asi Pada Ibu Post Operasi Sectio Caesarea. *Mahakam Midwifery Journal*, 5.
- Usman, H., Kebidanan, J., & Kemenkes Palu, P. (2019). Kombinasi Metode Pijat Woolwich Dan Massage Rolling (Punggung) Mempengaruhi Kecukupan Asi Pada Ibu Post Partum Di Wilayah Kerja Puskesmas Mapane Kabupaten Poso.
- Website, A., Wafiah Purnamawati, W., Fatmawati, A., Imansari, B., Sarjana Keperawatan, M., Ilmu Kesehatan Universitas, F., & Bandung, A. (n.d.). *J u r n a l K e p e r a w a t a n M u h a m m a d i y a h Analisis Hubungan Kecemasan Terhadap Produksi ASI Pada Ibu Postpartum: Litera-ture Review*. In *Jurnal Keperawatan Muhammadiyah* (Vol. 7, Issue 2).
- WHO. (2019). Infant and young child feeding Breastfeeding.
- WHO. (2023). million cesarean sections are performed worldwide.
- Yuwanto Ady Mahmud, Saputra Fredy Khalid.M, Herniyatun, Fadila Erida, Haerianti Masyita, Rakiang Elisa Natallia, Suryani Maria, Viyan Septiana Achmad, & Arafah Salmah. (2023). *Metodologi Keperawatan* (N. S. S. Pd. , M. Biomed. Dr. Neila Sulung, Ed.; Vol. 1). Cv Getpress Indonesia
- Zulhaida, Wandini R, A. (2025). *Ju r n a l K e p e r a w a t a n M u h a m m a d i y a h Penggunaan Terapi Relaksasi Benson Kombinasi Aromaterapi Lavender pada Ibu dengan Nyeri Akut Post Sectio Caesarae di RS . Bhayangkara Bandar Lampung Tahun 2025*. *Jurnal Keperawatan Muhammadiyah*, 10(4), 198-203. <https://journal.um-surabaya.ac.id/JKM/article/view/27615/10281>