THE EFFECTIVENESS OF USING A WEARABLE BREAST PUMP TO INCREASE BREAST MILK PRODUCTION AND BREASTFEEDING COMFORT AMONG WORKING MOTHERS AT ROSALINA MUNTHE PRIMARY CLINIC, KWALA BEKALA, MEDAN JOHOR DISTRICT, NORTH SUMATRA PROVINCE IN 2025

[1]ANNA WARIS NAINGGOLAN [2]ERIN PADILLA SIREGAR [3]SRI REZEKI [4]NOVITA ANDRIANI SIMANJORANG [5]IMARINA TARIGAN [6]RISKA MULIANA

[1-5]STIKes MITRA HUSADA MEDAN
Email:
warieznainggolan@gmail.com, erinpadillasiregar1986@gmail.com, srirejeki64044@gmail.com, novitaandrianisimanjorang20@gmail.com, riskamuliana085@gmail.com

ABSTRACT

Many working mothers struggle to maintain exclusive breastfeeding because of time constraints and inadequate lactation facilities. The wearable breast pump is a technological innovation designed to improve breast milk production and breastfeeding comfort, especially for working mothers. Objective: To determine the effectiveness of wearable breast pump use in increasing breast milk production and breastfeeding comfort among working mothers at Klinik Pratama Rosalina Munthe, Kwala Bekala, Medan Johor. Methods: This study used a pre-experimental one-group pre-test and post-test design. A total of 40 breastfeeding working mothers were selected using accidental sampling. Instruments included breast milk volume logs and a breastfeeding comfort questionnaire. Data were analyzed using the Wilcoxon test and Spearman correlation. Results: Following the use of a wearable breast pump, there was a significant increase in both breast milk production (p=0.000) and breastfeeding comfort (p=0.000). A strong positive correlation was also observed between breastfeeding comfort and milk production (r=0.654; p=0.000). Conclusion: The wearable breast pump is effective in increasing breast milk production and breastfeeding comfort among working mothers. It serves as a strategic solution to support successful breastfeeding in the context of employment.

Keywords: wearable breast pump; working mothers; breast milk production; breastfeeding comfort.

INTRODUCTION

Breast milk provides the most complete nutrition for infants, especially throughout their first six months. WHO and UNICEF consistently encourage exclusive breastfeeding due to its benefits in reducing infection risk, enhancing immunity, and supporting child development and intelligence (1). Globally, the target for exclusive breastfeeding coverage as set by the Global Nutrition Targets 2025 is at least 50% (2). However, WHO data in 2023 shows that only about 44% of infants worldwide receive exclusive breastfeeding until 6 months of age (1).

In Indonesia, the 2022 Indonesian Nutrition Status Survey (SSGI) reported a national exclusive breastfeeding coverage of 69.5%, with variations across provinces (3). North Sumatra reported a 63.2% coverage still below the national target of 80% (4). One of the most vulnerable groups facing challenges in breastfeeding are working mothers. Time constraints, lack of breastfeeding facilities at workplaces, and limited social support are key factors reducing breastfeeding consistency and milk production.

The production of breast milk is greatly influenced by the supply and demand mechanism, with frequent breast emptying leading to increased milk supply. Therefore, breastfeeding mothers need tools that help them express milk regularly, especially while working. The *wearable breast pump* is one such technological innovation designed to address these needs. This device allows mothers to express milk without interrupting their activities, thanks to its ergonomic, silent, and bra-integrated design.

Studies show that using a wearable breast pump significantly increases the frequency of milk expression and boosts maternal confidence in breastfeeding, which indirectly enhances milk production (5,6). The technology also offers comfort due to its flexible use and non disruptive design potentially extending breastfeeding duration for working mothers (7). This physical and psychological comfort is crucial because it affects oxytocin release, which plays a role in the let down reflex and smooth milk flow (8).

In addition to efficiency and comfort, wearable breast pumps can prevent complications such as engorgement and mastitis, which otherwise reduce milk output. Hence, the device not only supports milk production quantitatively but also enhances the quality of the breastfeeding experience.

Klinik Pratama Rosalina Munthe, located in Kwala Bekala, Medan Johor District, North Sumatra Province, serves urban and semi-urban working mothers. Preliminary observations revealed that many mothers experienced a decline in milk production after returning to work. However, no specific study has assessed the effectiveness of wearable breast pumps on milk production and breastfeeding comfort in this area. Thus, this research is essential to determine how the use of such technology can support successful

breastfeeding among working mothers, particularly in the local context

RESEARCH METHOD

This study used a quantitative experimental approach with a pre-experimental one-group pretest posttest design, in which no control group was involved, but measurements were taken before the intervention (pre-test), followed by the intervention (wearable breast pump use), and then re-measured (post-test). Sampling Technique: Non-probability sampling with accidental sampling,i.e., selecting those who happened to visit the clinic and met the inclusion criteria. Sample Size: 40 working mothers, based on feasibility and minimum sample recommendations for pre-experimental studies. Research Location & Period: Klinik Rosalina Munthe, Jalan Pintu Air IV, Kwala Bekala, Medan Johor, North Sumatra, from January to May 2025. All collected data milk volume records and comfort scores were processed using statistical software (e.g., SPSS). Univariate analysis: To describe respondent characteristics, pre/post milk volume and comfort levels. Bivariate analysis: If the data are normally distributed, analysis is conducted using a paired t-test; if not, the Wilcoxon signed-rank test is utilized

RESULT

Tabel 1. Hasil Uji Wilcoxon: Perbedaan Produksi ASI Sebelum dan Sesudah

variabel	Mean Rank	Z	*p-value*
Produksi ASI	5.76	-4.842	0,000

There is a significant difference in the average breast milk production before and after the use of a wearable breast pump. This suggests that the intervention successfully increases breast milk volume.

Tabel 2. Uji Wilcoxon Perbedaan Kenyamanan Menyusui Sebelum Dan Sesudah Penggunaan

variabel	Mean Rank	Z	*p-value*
Kenyamanan Menyusui	5.21	-4.738	0,000

The use of a wearable breast pump significantly enhances mothers' comfort during breastfeeding. Ergonomic factors, mobility, and the discreet nature of the device greatly contribute to a more positive breastfeeding experience.

Tabel 3. Uji Korelasi Spearman Antar Perbedaan Kenyamanan Menyusui dan Produksi ASI Sesudah Intervensi

Variabel 1	Variabel 2	Spearman's rho	*p-value*
Kenyamanan Menyusui	Produksi ASI	0, 9654	0,000

There is a strong and significant relationship between breastfeeding comfort and breast milk production after using the wearable breast pump. This implies that greater breastfeeding comfort is associated with a higher volume of breast milk produced.

DISCUSSION

These results are consistent with findings from Clemons et al. (2021), who reported that mothers using wearable breast pumps experienced significant increases in milk volume and were more likely to maintain exclusive breastfeeding for 6 months (7). Similarly, Snyder et al. (2020) found that working mothers using wearable pumps expressed over 100 ml per session after 3 weeks of consistent use (8).

Furthermore, Yue et al. (2019) emphasized the importance of psychological comfort in successful breastfeeding, including posture, privacy, and freedom from interruptions. Wearable breast pumps meet these needs through their discreet design, lightweight structure, and ability to be used without leaving the workspace (9).

However, not all studies report similar results. Huang et al. (2018) found that in mothers with high work-related stress and very short maternity leaves, breast pump use did not significantly impact milk output. This suggests that the effectiveness of wearable breast pumps is context-dependent, influenced by workplace conditions, social support, and maternal psychological readiness. Thus, implementing this technology should be supported by educational interventions and lactation-friendly workplace policies. Overall, wearable breast pumps prove to be not just a technical solution, but also a strategic approach to sustaining lactation among working mothers. This study strengthens the argument that comfort- and flexibility-oriented breastfeeding technologies can overcome modern breastfeeding challenges

CONCLUSION AND SUGGESTION

This study concludes that the use of wearable breast pumps significantly improves breast milk production and breastfeeding comfort among working mothers at Klinik Pratama Rosalina Munthe, Kwala Bekala, Medan Johor District. Statistical tests confirmed a meaningful difference between conditions before and after using the device—both in terms of milk volume and perceived comfort. Moreover, there is a strong and significant correlation between comfort and increased milk production. These results emphasize that comfort plays a crucial role in successful lactation, particularly for mothers with demanding work schedules. This research further supports the idea that adaptive breastfeeding technologies, offering flexibility, mobility, and privacy, can serve as effective strategies for maintaining breastfeeding even in less supportive work environments (10,11,12).

ACKNOWLEDGEMENTS

The authors sincerely thank the management and staff of Rosalina Munthe Primary Clinic, Kwala Bekala, Medan Johor District, North Sumatra Province, for their valuable support, access, and assistance throughout the research process. Special appreciation is given to the working mothers who participated and willingly shared their time and experiences, which were essential to the success of this study. The contribution of research assistants and enumerators in data collection and field coordination is also gratefully acknowledged. Finally, we appreciate the constructive comments from colleagues and reviewers, which helped improve the quality and clarity of this manuscript

REFERENCES

World Health Organization. *Infant and young child feeding: Model Chapter for textbooks for medical students and allied health professionals*. Geneva: WHO; 2009.

UNICEF. *Breastfeeding: A mother's gift, for every child*. New York: United Nations Children's Fund; 2022. Available from: https://www.unicef.org/reports/breastfeeding-mothers-gift-every-child Ministry of Health,

Republic of Indonesia. *Indonesia Health Profile Report 2022*. Jakarta: MoH RI; 2023.

National Development Planning Agency (Bappenas). *Profile of Female Workers in Indonesia*. Jakarta: Ministry of National Development Planning/Bappenas; 2021.

Okta Zenita Siti Fatimah. Strategies and Challenges of Exclusive for Career Women in Fulfilling Infant Nutrition. *Jurnal Kebidanan*. 2022;12(2):75–82.

Anna Nainggolan, dkk. *Empowement Of Kader Mantap (Independent, Skilled, Adaptive) With Victor Vroom's Theory Approach To Realize Families Aware of Exclusive Breastfeeding In Sembahe Baru Village.* 2024. Jurnal Pengabdian Kepada Masyarakat. https://www.jurnal.faperta-unras.ac.id/index.php/pakdemas/article/view/290

Yuni Astuti, Hesti Sustiwi. *Family Support On Breastfeeding Self-Efficacy Among Pregnant Women*. Jurnal Aisyah: Jurnal Ilmu Kesehatan: *https://aisyah.journalpress.id/index.php/jika/article/view/7S239*.

Andrea McMillin, Bardia Behravesh, et.al. *A GME Wearable Breast Pumps Program: An Innovative Method to Meet ACGME Requirements and Federal Law*. *Journal Of Graduate medical Education.* 2021. https://pmc.ncbi.nlm.nih.gov/articles/PMC8207928/

Jennifer Schindler-Ruwisch, et.al. " *Limitations of Workplace lactation Support: The Case for DC WIC Recipients. Journal of Human Lactation.* 2020;36(1):243–51. https://journals.sagepub.com/doi/abs/10.1177/0890334419887369

Yue X, Zhang L, Liu Y. Psychological comfort and its relation to lactation outcomes: A study of 280 breastfeeding mothers. *International Breastfeeding Journal*. 2019;14(1):6.

Nainggolan AW, Damayanti S, Sinaga SN, Siregar EP, Sembiring IK, Manisah I, et al. The Effectiveness of Oketani Massage E-booklet in Improving Self-Efficacy and Smooth Breast Milk Production in Postpartum Mothers at Gunung Tinggi Public Health Center. *Journal Of Health Care Technology And Medicine*.

2024;10 (2). Available from: https://jurnal.uui.ac.id/index.php/JHTM/article/view/4293

Purba Marjuang, Nainggolan AW, and Purba Saut. Factors Related to Postpartum Mothers Knowledge of Exclusive Breastfeeding in the Tuntungan Health Center Work Area, Pancur Batu Subdistrict. https://journal.lpkd.or.id/index.php/QuWell/article/view/2058. Jurnal Ilmu Kesehatan.