



EMPOWERING FAMILIES THROUGH PROPER NEWBORN UMBILICAL CORD CARE TO IMPROVE NEONATAL HEALTH

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Abstrak

Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan pengetahuan dan keterampilan keluarga mengenai perawatan tali pusat bayi baru lahir di Praktik Mandiri Bidan (PMB) Dame N. Silalahi, Kota Tanjungbalai Tahun 2025. Kegiatan ini menggunakan pendekatan edukatif partisipatif melalui penyuluhan kesehatan, demonstrasi, praktik langsung (return demonstration), serta pembagian leaflet edukasi. Peserta kegiatan berjumlah 30 orang yang terdiri dari ibu nifas, ibu hamil trimester III, suami, dan anggota keluarga yang terlibat dalam perawatan bayi baru lahir. Evaluasi dilakukan menggunakan pre-test dan post-test untuk mengukur pengetahuan serta lembar observasi untuk menilai keterampilan peserta. Hasil kegiatan menunjukkan adanya peningkatan rata-rata skor pengetahuan dari 6,23 sebelum intervensi menjadi 8,87 setelah intervensi. Proporsi peserta dengan kategori pengetahuan baik meningkat dari 26,7% menjadi 86,7%, dan 90% peserta menunjukkan kemampuan yang kompeten dalam melakukan perawatan tali pusat. Temuan ini menunjukkan adanya peningkatan pengetahuan dan keterampilan keluarga setelah diberikan edukasi kesehatan mengenai perawatan tali pusat. Kegiatan ini memberikan kontribusi dalam meningkatkan literasi kesehatan keluarga terkait perawatan neonatal dasar serta berpotensi mendukung pencegahan infeksi tali pusat di tingkat rumah tangga. Program pemberdayaan keluarga melalui edukasi kesehatan direkomendasikan untuk terus dilakukan secara berkelanjutan di pelayanan kebidanan sebagai upaya meningkatkan kesehatan neonatal.

Kata kunci: *Pemberdayaan Keluarga, Perawatan Tali Pusat, Bayi Baru Lahir, Edukasi Kesehatan, Kesehatan Neonatal.*

Abstract

This community service activity aimed to improve the knowledge and skills of families regarding newborn umbilical cord care at the Independent Midwifery Practice (PMB) Dame N. Silalahi, Tanjungbalai City in 2025. The program used a participatory educational approach through health counseling, demonstration, hands-on practice (return demonstration), and the distribution of educational leaflets. The participants consisted of 30 individuals, including postpartum mothers, third-trimester pregnant women, husbands, and family members involved in newborn care. Evaluation was conducted using pre-test and post-test questionnaires to assess knowledge, and observation checklists were used to evaluate participants' skills. The results showed an increase in the mean knowledge score from 6.23 before the intervention to 8.87 after the intervention. The proportion of participants with good knowledge increased from 26.7% to 86.7%, and 90% of participants demonstrated competent skills in umbilical cord care. These findings indicate an improvement in family knowledge and skills following the health education intervention on newborn umbilical cord care. This activity contributes to improving family health literacy regarding essential newborn care and has the potential to support the prevention of umbilical cord infection at the household level. Family empowerment programs through

health education are recommended to be continuously implemented in midwifery services as an effort to improve neonatal health outcomes.

Keywords: Family Empowerment, Umbilical Cord Care, Newborn, Health Education, Neonatal Health.

INTRODUCTION

The neonatal period, defined as the first 28 days of life, is a highly critical phase that determines child survival and long-term health outcomes. Despite global progress in maternal and newborn health services, neonatal mortality remains a significant public health issue, particularly in low- and middle-income countries. According to the World Health Organization, essential newborn care includes hygienic umbilical cord care, infection prevention, thermal protection, early initiation of breastfeeding, and early identification of neonatal danger signs. Among these components, proper umbilical cord care is particularly important because the umbilical stump serves as a potential entry point for pathogenic microorganisms that may lead to omphalitis, sepsis, and neonatal death (World Health Organization (Organization, 2024).

The umbilical cord stump is highly susceptible to bacterial colonization during the first days of life. Inappropriate cord care practices, such as the application of traditional substances, oils, or herbal materials, as well as inadequate hand hygiene, increase the risk of infection and serious neonatal complications. WHO recommends that the umbilical stump should be kept clean and dry, and caregivers should perform proper hand hygiene before handling the newborn. In high-risk settings, the application of chlorhexidine is recommended as an evidence-based intervention to reduce the incidence of omphalitis and neonatal mortality (Zatke, L., Jumle, R. M., Taksande, A., & Raut, 2025). Similar findings were reported by Obeagu et al. (2024), who emphasized that suboptimal cord care practices remain a major contributor to neonatal infections in developing countries (Obeagu, E. I., 2024).

Recent studies indicate that umbilical cord care practices are strongly influenced by maternal knowledge, cultural beliefs, family support, and access to accurate health information. A 2024 review highlighted that maternal education and family involvement are key determinants of appropriate newborn care practices, including cord hygiene (Ariani, D., Sari, M., & Putri, 2024). In addition, a 2025 systematic review reported that sociocultural traditions and low socioeconomic status continue to shape unsafe cord care behaviors in many communities, thereby increasing the risk of neonatal infection (Anyakorah, P. E., 2025).

Family empowerment has been widely recognized as an effective strategy to improve neonatal health outcomes. Families, particularly mothers and close caregivers, play a central role in daily newborn care, including maintaining cord hygiene, recognizing early signs of infection, and seeking timely healthcare services when complications arise. Evidence shows that educational interventions targeting families can significantly improve knowledge, skills, and practices related to newborn care, thereby reducing preventable neonatal health problems (Amponsah-Kodua, G., 2025). At the local level, observations at the Dame N. Silalahi Independent Midwifery Practice in Tanjungbalai indicate that some families still lack adequate understanding and confidence in performing proper umbilical cord care, and traditional practices are still occasionally found during home care after



delivery. However, structured educational interventions focusing on hands-on training and family involvement have not yet been optimally implemented in this setting. This gap highlights the need for strengthening family-based education programs to improve newborn care practices. Therefore, this community service activity aims to empower families through structured health education and practical demonstration of proper umbilical cord care in order to improve neonatal health and support the prevention of cord-related infections in the community.

METHOD

This community service activity used a participatory health education approach with a one-group pre-test and post-test quasi-experimental design to evaluate the effectiveness of educational intervention on improving family knowledge and skills regarding newborn umbilical cord care. The program aimed to empower families in performing proper cord care practices to prevent infection and improve neonatal health outcomes.

The activity was conducted at Dame N. Silalahi Independent Midwifery Practice (PMB), Tanjungbalai, Indonesia, in 2025 and was implemented in a single-day session. The implementation included preparation, educational intervention, practical demonstration, hands-on practice, and evaluation. The participants consisted of 30 individuals, including postpartum mothers, third-trimester pregnant women, husbands, and family members directly involved in newborn care. Participants were selected using a total sampling technique from families attending the midwifery practice during the study period. Inclusion criteria included willingness to participate, ability to communicate effectively, and direct involvement in newborn care, while exclusion criteria included participants who were unable to complete the full program or refused to complete the evaluation process.

Prior to implementation, the research team coordinated with the midwife in charge regarding scheduling, venue preparation, and participant recruitment. Educational materials, leaflets, demonstration tools, and evaluation instruments were prepared in advance. The educational content focused on the definition and function of the umbilical cord, principles of clean and dry cord care, hand hygiene practices, recognition of infection signs, and the prevention of harmful traditional practices.

The intervention was delivered through interactive health education sessions using lectures, visual presentations, and guided discussions lasting approximately 30–45 minutes. This was followed by a structured demonstration and supervised return demonstration using infant mannequins to ensure participants' understanding and skill acquisition. Participants were also provided with leaflet-based educational materials for home reference.

Evaluation of the program was conducted using structured questionnaires administered before and after the intervention to measure knowledge

improvement. The questionnaire consisted of 10 multiple-choice items and was adapted from previously validated instruments; its reliability was tested using Cronbach's alpha with a minimum acceptable value of ≥ 0.60 . Skills were assessed using an observation checklist during return demonstrations, and the assessment was conducted by trained observers to minimize subjective bias.

Data analysis was performed using descriptive statistics, including mean, frequency, and percentage, to compare pre-test and post-test results. The effectiveness of the intervention was determined based on changes in knowledge scores and improvement in skill performance after the educational program. Ethical considerations were observed by obtaining informed consent from all participants prior to data collection. Participants were informed about the objectives of the program, and confidentiality was maintained throughout the study. However, since the intervention was conducted in a single-day session, the study did not assess long-term retention of knowledge and skills, which is acknowledged as a limitation of this community service activity. The success of the program was determined based on participant attendance, improvement in knowledge scores, achievement of skill competency, and participants' willingness to apply proper cord care practices at home.

RESULTS AND DISCUSSION

RESULTS

The community service program was successfully implemented with the participation of 30 individuals consisting of postpartum mothers, third-trimester pregnant women, husbands, and other family members who were actively involved in newborn care. The educational intervention was conducted through interactive health education sessions, demonstrations of appropriate umbilical cord care techniques, question-and-answer discussions, and return demonstrations to evaluate participants' practical skills. Program evaluation focused on participants' demographic characteristics, changes in knowledge before and after the intervention, distribution of knowledge categories, and practical competency in performing newborn umbilical cord care.

Understanding participants' demographic characteristics is essential for describing the target population and interpreting the effectiveness of the educational intervention. Variables including age, participant status, and educational level were documented because these factors may influence health literacy, learning capacity, and the adoption of recommended newborn care practices. The characteristics of participants involved in the community service program are presented in Table 1.



Table 1. presents the characteristics of participants involved in the community service activity.

Characteristic	Frequency (n)	Percentage (%)
Age 20–35 years	22	73.3
Age >35 years	8	26.7
Postpartum mothers	15	50.0
Third-trimester pregnant women	10	33.3
Family members/husbands	5	16.7
Senior high school education	18	60.0
College education	8	26.7
Junior high school education	4	13.3

Table 1 shows that most participants were within the productive reproductive age of 20–35 years (73.3%), while the remaining 26.7% were older than 35 years. This age distribution indicates that the majority of participants were in the age group commonly associated with active childbearing and parenting responsibilities. Regarding participant status, postpartum mothers constituted half of the total participants (50.0%), followed by third-trimester pregnant women (33.3%) and husbands or other family members (16.7%). The inclusion of family members reflects a family-centered approach to newborn care, recognizing that infant care practices are often shared among household members. In terms of educational background, most participants had completed senior high school (60.0%), while 26.7% had higher education and 13.3% had junior high school education. Overall, these characteristics suggest that participants possessed sufficient educational backgrounds to actively engage in health education activities and comprehend the information delivered during the intervention.

To evaluate the effectiveness of the educational intervention, participants' knowledge regarding evidence-based newborn umbilical cord care was measured before and immediately after the health education session using structured questionnaires. The comparison of pre-test and post-test scores was intended to determine the extent of cognitive improvement following participation in the program. The results are summarized in Table 2.

Table 2. Knowledge Scores Before and After the Educational Program

Assessment	Mean Score	SD
Pre-test	6.23	1.42
Post-test	8.87	0.94
Mean Difference	2.64	-

As shown in Table 2, participants demonstrated a substantial increase in knowledge following the educational intervention. The mean knowledge score improved from 6.23 before the intervention to 8.87 after the intervention, representing an average increase of 2.64 points. In addition to the increase in mean score, the standard deviation decreased from 1.42 to 0.94, indicating that participants' post-intervention knowledge scores became more consistent and less variable. This finding suggests that the educational activities successfully improved participants' understanding while also reducing differences in knowledge among individuals. The combination of lectures, visual educational materials, demonstrations, and interactive discussions likely facilitated better comprehension of recommended umbilical cord care practices, including maintaining cord

cleanliness and dryness, avoiding harmful traditional applications, recognizing danger signs of infection, and knowing when to seek medical care.

Beyond examining changes in average knowledge scores, participants' knowledge levels were categorized into good, moderate, and poor to provide a clearer understanding of how the intervention influenced overall knowledge distribution. This categorical analysis allows for evaluation of the proportion of participants achieving satisfactory knowledge after completing the educational program. The distribution of knowledge categories before and after the intervention is presented in Table 3.

Table 3. Distribution of Knowledge Levels Before and After Intervention

Knowledge Category	Before n (%)	After n (%)
Good	8 (26.7)	26 (86.7)
Moderate	15 (50.0)	4 (13.3)
Poor	7 (23.3)	0 (0.0)

Table 3 demonstrates a marked improvement in participants' knowledge levels following the educational intervention. Before the intervention, only 26.7% of participants were categorized as having good knowledge, whereas half of the participants (50.0%) had moderate knowledge and nearly one-quarter (23.3%) had poor knowledge regarding appropriate umbilical cord care. Following the educational activities, the proportion of participants with good knowledge increased dramatically to 86.7%, while those with moderate knowledge decreased to 13.3%, and no participants remained in the poor knowledge category. This considerable shift indicates that the intervention effectively enhanced participants' understanding of essential newborn cord care principles and enabled most participants to achieve an adequate level of knowledge. The findings also suggest that structured health education can substantially improve community awareness and preparedness for safe newborn care practices.

In addition to knowledge assessment, participants' practical abilities in performing newborn umbilical cord care were evaluated through a return-demonstration session using a standardized observational checklist. The assessment focused on essential procedural competencies, including proper hand hygiene before cord care, maintaining cord cleanliness and dryness, correct diaper positioning to avoid covering the umbilical stump, avoidance of unnecessary topical substances, and identification of signs indicating possible infection. The results of the practical skills assessment are presented in Table 4.

Table 4. Participants' Practical Skills in Umbilical Cord Care

Skill Category	Frequency (n)	Percentage (%)
Competent	27	90.0
Not Yet Competent	3	10.0

Table 4 indicates that the majority of participants (90.0%) successfully demonstrated competency in performing proper newborn umbilical cord care during the return-demonstration session. Only three participants (10.0%) were categorized as not yet competent, primarily requiring additional guidance on several procedural steps. Overall, participants were able to perform appropriate hand hygiene, maintain umbilical cord dryness, correctly position diapers below the cord stump, avoid practices that may increase infection risk, and identify early warning signs requiring professional medical attention. These findings suggest that



combining theoretical education with live demonstrations and supervised hands-on practice effectively improved participants' psychomotor skills and confidence in applying evidence-based umbilical cord care. The high competency rate also indicates that practical demonstration is an effective educational strategy for translating knowledge into appropriate caregiving behavior among postpartum mothers and family caregivers.

DISCUSSION

The findings of this community service activity demonstrate that family-based health education is effective in improving both knowledge and skills regarding newborn umbilical cord care. The observed increases in knowledge scores, the shift toward higher knowledge categories, and the high proportion of competent participants indicate that the intervention successfully achieved its educational objectives. These results are consistent with the World Health Organization (Organization, 2024b), which emphasizes that proper newborn care education is essential in reducing neonatal infections such as omphalitis and sepsis. Similarly, the Ministry of Health of the Republic of Indonesia (2024) highlights the importance of involving families in maternal and child health programs to improve neonatal outcomes at the household level (Indonesia, 2024).

The significant improvement in participants' knowledge after the intervention suggests that the combination of lectures, discussions, and demonstrations is an effective educational strategy. This interactive approach enables participants not only to receive theoretical knowledge but also to observe and practice correct procedures directly. According to adult learning theory, learning becomes more effective when participants are actively engaged in the process and can relate the material to real-life experiences (Pratiwi, N., Hidayat, T., & Susanti, 2024)(Atta, M., Xie, Y., & Qin, 2025). In addition, Ningsih, Putra, and Wulandari (2025) reported that demonstration-based education significantly improves mothers' understanding of umbilical cord care compared to lecture-only methods (Ningsih, R., Putra, A., & Wulandari, 2025)(Dorling, J. S., Roehr, C. C., Katheria, A. C., & Mitchell, 2025).

The improvement in knowledge categories from predominantly moderate and low levels before the intervention to mostly good knowledge afterward reflects the effectiveness of structured health education in addressing knowledge gaps. Prior to the intervention, participants' understanding was likely influenced by limited access to accurate health information and the persistence of traditional newborn care practices(Major, G. S., Unger, V., Nagy, R., Veres, D. S., Garami, M., Varga, P., & Gasparics, 2025). In many settings, cultural beliefs such as applying herbal substances or powders to the umbilical stump may still exist and increase the risk of infection. Obeagu and Obeagu (2024) noted that inadequate maternal knowledge remains a major barrier to proper cord care practices, reinforcing the need for continuous health education based on scientific evidence(Obeagu, E. I., & Obeagu, 2024)(Wahyuni, F., Lubis, S., Faradina, D., & Husada, 2024).

The high level of practical competency achieved by participants further confirms the effectiveness of demonstration and return-demonstration methods in skill acquisition. Practical training allows participants to directly practice essential procedures such as maintaining hand hygiene, keeping the umbilical stump clean and dry, and identifying signs of infection. Zatke et al. (2025) found that competency-based training significantly improves caregivers' ability to perform neonatal care procedures compared to conventional teaching methods (Zatke, S., Kumar, R., & Singh, 2025) (Islam, M. T., Akter, T., Faruk, M. O., Rani, R., Nipo, J. H., Mita, A. R., & Rizwan, 2025). Moreover, WHO (2024) stresses that correct umbilical cord care practices are critical in preventing neonatal infections, particularly in resource-limited settings (Organization, 2024b).

Overall, the results highlight the importance of family-centered health education in strengthening newborn care practices at the community level. Involving family members, including husbands and other caregivers, enhances the sustainability of correct practices at home, as newborn care decisions are often influenced by the family environment. Amponsah-Kodua et al. (2025) reported that family involvement in neonatal care education improves adherence to recommended practices and reduces neonatal complications (Amponsah-Kodua, A., 2025) (Amina, S., & Burki, 2025). Therefore, integrating structured, skill-based, and family-centered education into routine maternal and child health services is essential to ensure sustained improvements in knowledge, skills, and neonatal health outcomes (Organization, 2024b) (Indonesia, 2024).

CONCLUSIONS AND SUGGESTIONS

The community service program successfully improved participants' knowledge and skills regarding newborn umbilical cord care. This was demonstrated by the significant increase in participants' competency level, with 90% of participants able to correctly perform essential cord care procedures. These procedures included proper hand hygiene, maintaining a clean and dry umbilical stump, correct diaper positioning, and early recognition of infection signs. Overall, the findings indicate that the educational intervention was effective in enhancing both cognitive understanding and practical abilities related to safe newborn care practices. Based on the findings, it is recommended that family-centered health education programs on newborn umbilical cord care be continuously implemented in midwifery practice settings to sustain and expand the benefits of the intervention. In addition, follow-up training and continuous mentoring should be provided for participants who are not yet fully competent to ensure that all families achieve adequate skill levels. Strengthening ongoing education and supervision is essential to ensure consistent application of safe cord care practices at home, thereby contributing to the prevention of neonatal infections and the improvement of overall neonatal health outcomes.



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