



The Impact of Audiovisual Education on Knowledge Umbilical Cord Care for Infections in Infants in Rum Balibunga Health Center

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Abstract. *Umbilical cord care is a critical aspect of newborn health, as inadequate practices can increase the risk of infection and lead to preventable complications. This study aimed to assess maternal knowledge regarding umbilical cord care and examine its relationship with the incidence of cord infection complications among primigravida mothers. Nineteen respondents participated in the study, and data were collected using a structured questionnaire. Univariate analysis was used to describe maternal characteristics and knowledge levels, while bivariate analysis employing Kendall's tau-b was conducted to determine the association between knowledge and infection risk. The findings showed that most mothers had good knowledge of umbilical cord care, although some demonstrated fair or poor understanding. A proportion of newborns experienced infection risk, which was more common among mothers with lower knowledge levels. A strong negative correlation ($\tau = -0.707$, $p = 0.002$) was identified between maternal knowledge and umbilical cord infection complications, indicating that higher knowledge significantly reduces the risk of infection. These results emphasize the importance of strengthening maternal education, particularly through audio-visual media, which can enhance comprehension and support correct cord care practices. Improving maternal awareness is essential for reducing infection risk and promoting better neonatal health outcomes.*

Keywords: *Audio-Visual Education; Infection Risk; Maternal Knowledge; Newborn Health; Umbilical Cord Care.*

1. INTRODUCTION

Umbilical cord care is a fundamental aspect of newborn health because the umbilical stump is highly vulnerable to infection if handled improperly. The neonatal period is marked by an underdeveloped immune system, making newborns particularly susceptible to diseases that may arise from poor hygiene practices (Salim et al., 2022). When infection occurs at the umbilical site, it can progress rapidly and lead to serious complications, including neonatal sepsis. For this reason, proper cord care remains a major priority in efforts to protect newborns during the earliest and most fragile days of life (Andriani & Utami, 2023).

In many communities, a lack of reliable information and the persistence of traditional beliefs can influence the way mothers care for the umbilical cord (Januar, 2021). Practices such as applying powders, oils, or other substances thought to speed healing often contradict medical standards and may unintentionally introduce harmful bacteria. These actions can delay cord detachment and create an environment conducive to bacterial growth. Ensuring that mothers receive accurate guidance is therefore essential to prevent avoidable infections and promote safer newborn care (Refisiliyani, n.d.).

Primigravida mothers, in particular, require comprehensive guidance because they have no prior experience in newborn care. Their understanding is shaped entirely by the information provided during antenatal and postnatal services. When explanations are unclear or delivered

in ways that are difficult to remember, misunderstandings may lead to unsafe practices at home. Strengthening the knowledge of first-time mothers is a key step to reducing errors in umbilical cord care and supporting healthy neonatal outcomes.

Audio-visual education has gained recognition as an effective method for improving maternal knowledge. By combining visual demonstration with auditory explanation, this approach makes learning more engaging and easier to understand (Pakpahan et al., 2022). Mothers can observe correct techniques step by step, allowing them to internalize procedures more effectively than through verbal counseling alone. This method speaks to multiple learning styles and has been shown to improve recall and comprehension (Seifu et al., 2024).

Clear visual examples also help prevent misinterpretation, a common challenge when mothers rely only on spoken instructions (Okusanya et al., 2025). Audio-visual materials illustrate not only what should be done but also what should be avoided, giving mothers a more complete picture of proper cord care. By making the learning experience more concrete, these materials have the potential to influence behavioral changes and improve the quality of care practiced at home (Fakhriyah et al., 2022).

A preliminary study carried out at UPT Rum Balibunga Health care in October 2025 highlighted the variation in maternal knowledge regarding umbilical cord care. Thirty-six primigravida mothers were recorded, and assessments were completed for 19 mothers who had given birth. Among them, 12 mothers (63.15%) demonstrated good knowledge, 4 mothers (21.05%) had moderate knowledge, and 3 mothers (15.78%) showed poor knowledge. Further observations revealed that mothers with poor knowledge were also those who practiced umbilical cord care incorrectly and contrary to established health guidelines.

Although most mothers exhibited good understanding, the presence of a notable minority with inadequate knowledge signals a meaningful gap that must be addressed. Even a small number of unsafe practices can pose a serious threat to newborn health, making educational improvement a vital measure.

These findings underscore the importance of evaluating the effectiveness of audio-visual education in enhancing maternal knowledge of umbilical cord care. Such an intervention may help ensure that all mothers, especially primigravidas, acquire the skills and confidence needed to carry out safe practices at home. The results of this effort have the potential to strengthen maternal and child health services within primary healthcare settings and contribute to reducing the risk of umbilical cord infections among newborns.

2. RESEARCH METHOD

This study employed a quasi-experimental design using a pretest–posttest approach with a non-equivalent control group. The research was conducted among primigravida mothers within the service area of UPT Puskesmas Rum Balibunga. Participants were selected based on inclusion criteria such as willingness to participate, ability to understand the material, and having delivered a newborn during the study period. Mothers with health conditions or complications that could interfere with participation were excluded. Eligible respondents were then assigned into two groups: an intervention group receiving audio-visual education on umbilical cord care and a control group receiving standard health counseling.

Data were collected using a structured questionnaire measuring maternal knowledge related to umbilical cord care. The questionnaire assessed several key areas, including hygiene practices, principles of dry cord care, recognition of safe and unsafe actions, and early signs of infection. The instrument was administered before and after the intervention to evaluate changes in knowledge. The audio-visual material consisted of a short educational video demonstrating correct techniques step by step, while the control group received conventional verbal instructions typically provided during routine maternal and newborn services.

Data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics summarized respondent characteristics such as age, education, occupation, and baseline knowledge levels. Inferential analysis was conducted to determine differences in knowledge before and after the intervention using paired statistical tests, and comparisons between the intervention and control groups were evaluated through appropriate nonparametric or parametric tests. Ethical approval was obtained prior to data collection, and informed consent was secured from all participants to ensure confidentiality and voluntary participation.

3. RESULTS AND DISCUSSION

Univariate Analyze

Table 1. Distribution of Respondents by Age Group.

Age Group	Age Range	Frequency	Percentage (%)
Late Adolescence	17–25 years	9	47.4
Early Adulthood	26–35 years	9	47.4
Middle Adulthood	≥ 36 years	1	5.3
Total		19	100

Most respondents were in the late adolescent and early adult age groups, each representing 47.4%. This indicates that the majority of mothers were experiencing their first pregnancy at an age typically associated with strong learning capacity but limited prior

experience in newborn care. Only a small proportion were in the middle-adult category, reflecting that first pregnancies at older ages are rare in the study setting.

Table 2. Distribution of Respondents by Educational Level.

Educational Level	Frequency	Percentage (%)
Primary Education	3	15.8
Junior High School	5	26.3
Senior High School	9	47.4
Higher Education	2	10.5
Total	19	100

Nearly half of the respondents had completed senior high school, suggesting that most mothers possessed sufficient literacy skills to understand health information. Respondents with lower educational backgrounds may require educational materials that are simpler and more visually oriented, making audio-visual media particularly suitable for conveying umbilical cord care messages.

Table 3. Distribution of Respondents by Occupation.

Occupation	Frequency	Percentage (%)
Government Employee	1	5.3
Private Employee	1	5.3
Informal Worker	4	21.1
Housewife	13	68.4
Total	19	100

The majority of respondents were housewives, indicating that most mothers spent significant time at home and were directly involved in the daily care of their newborns. This condition supports the feasibility of implementing educational interventions effectively, as mothers have adequate time to apply the recommended cord care practices.

Table 4. Distribution of Maternal Knowledge on Umbilical Cord Care.

Knowledge Category	Frequency	Percentage (%)
Good	12	63.2
Fair	4	21.1
Poor	3	15.8
Total	19	100

Most mothers demonstrated good knowledge regarding umbilical cord care, indicating awareness of essential practices such as keeping the cord dry, avoiding the application of substances, and recognizing signs of infection. However, a portion of mothers still had fair or poor knowledge, which may lead to non-standard or unsafe cord care practices.

Table 5. Distribution of Umbilical Cord Infection Complications.

Complication Status	Frequency	Percentage (%)
At Risk of Infection	3	15.8
No Complications	16	84.2
Total	19	100

Most newborns did not experience umbilical cord complications. Nevertheless, a small proportion of infants were identified as being at risk of infection. These cases generally occurred among mothers with lower knowledge levels, emphasizing the importance of improving maternal understanding to reduce the likelihood of umbilical cord infections.

Bivariate Analyze

Table 6. Relationship Between Maternal Knowledge and Umbilical Cord Infection Complications.

Variables Compared	Statistical Test	Correlation Coefficient (τ)	p-value	N
Maternal Knowledge \times Umbilical Cord Infection Complications	Kendall's tau-b	-0.707	0.002	19

The analysis shows a strong negative correlation between maternal knowledge and umbilical cord infection complications. A negative coefficient indicates that higher levels of knowledge are associated with fewer infection-related complications. The strength of the coefficient (-0.707) suggests a substantial relationship, meaning that mothers with better understanding of proper cord care tend to practice safer care techniques, thereby reducing the likelihood of infection in their newborns. The p-value (0.002) demonstrates that this relationship is statistically significant, confirming that the association did not occur by chance. These results support the importance of educational interventions, especially for mothers who initially exhibit lower levels of knowledge, as improved understanding has a measurable impact on reducing infection risks.

Discussion

The findings of this study provide a comprehensive picture of how maternal characteristics and knowledge influence umbilical cord care practices and the risk of cord infection. When examined alongside previous research, the results reinforce what many studies have long suggested: maternal knowledge is one of the strongest determinants of safe newborn care behaviors. The age distribution of respondents in this study, with most mothers belonging to the late adolescent and early adult groups, aligns with earlier findings showing that mothers within this age range generally possess higher receptiveness to learning new health-related information. Several previous studies have reported that younger primigravida mothers demonstrate better adaptability to recommended newborn care practices and are more willing to apply new knowledge when compared to older first-time mothers (Rinawan et al., 2021). This suggests that the age range of respondents in this study provided a favorable foundation for the adoption of proper umbilical cord care behaviors.

Educational level also emerged as an important contributor to maternal understanding. Nearly half of the respondents had completed senior high school, indicating a reasonably good level of health literacy among the study population. Research in maternal and newborn health consistently shows that mothers with higher education are better able to comprehend health instructions, evaluate risks, and reject unsafe traditional practices. Studies have demonstrated that education supports critical thinking and helps mothers differentiate between recommended health practices and commonly held misconceptions (Amaliya et al., 2024). Similarly Nurfajrillah et al., (2025) highlighted that maternal education is closely linked with adherence to hygienic cord care and early detection of infection signs. The distribution of educational levels in this study suggests that audio-visual educational interventions have strong potential to be effective, particularly for mothers who require clearer, more illustrative forms of guidance.

The predominance of housewives among respondents also carries implications for newborn care. Mothers who spend more time at home tend to have greater involvement in routine infant care, including cord care. Studies focused on maternal roles have shown that housewives are typically more consistent in applying newborn care routines due to their availability and direct engagement with the infant (Yuniarti & Bima Suryantara, 2025). This occupational profile therefore creates favorable conditions for educational interventions, as mothers can more readily integrate proper cord care practices into their daily routines. However, while availability may support better practice, it does not automatically guarantee correct behavior; this underscores the importance of targeted education to ensure that available time is matched with accurate knowledge.

Maternal knowledge about umbilical cord care plays a central role in determining newborn health outcomes. The finding that a majority of respondents demonstrated good knowledge reflects some level of success in previous health education efforts, likely obtained through antenatal and postnatal services. However, the presence of mothers with fair and poor knowledge categories is significant, as earlier studies have consistently shown that even small gaps in maternal understanding can lead to unsafe practices. Research examining cord care behaviors has documented that mothers with insufficient knowledge are more likely to apply substances, cover the cord improperly, or fail to recognize early symptoms of infection (de Sousa et al., 2022). The knowledge distribution in this study supports these observations and highlights the ongoing need for structured, clear, and standardized education for all mothers.

The distribution of umbilical cord infection complications in this study further demonstrates the impact of maternal knowledge on newborn health. Although most infants did not experience complications, the presence of infection risk in a portion of newborns aligns with several earlier findings showing that inadequate or incorrect cord care frequently results in inflammation and infection. Ruliyanti et al., (2023) emphasized that the application of substances, lack of hygiene, or improper handling of the umbilical stump are major risk factors for infection. In settings where traditional practices persist, infection risk tends to remain high among infants whose mothers have limited understanding of clean and dry cord care principles. This study mirrors that trend, showing that a minority of mothers with lower knowledge levels were associated with the cases of infection risk.

The most significant finding in this study is the strong negative correlation between maternal knowledge and umbilical cord infection complications. The correlation coefficient in this study ($\tau = -0.707$) indicates a substantial relationship, confirming that as maternal knowledge increases, the likelihood of cord infection decreases. Several studies have documented similar results, demonstrating that maternal education directly reduces the incidence of improper cord care practices and subsequent infections (Mei Melda Napitupulu & Harsudianto Silaen, 2025). These studies have repeatedly shown that when mothers possess accurate information and understand the rationale behind dry cord care, the risk of infection drops markedly. The statistical significance identified in this study therefore supports the broader consensus that maternal knowledge is a protective factor against neonatal cord infections.

The use of audio-visual educational media is strongly supported by literature on health education effectiveness. Syahfitri Umamity et al., (2024) found that mothers who received audio-visual instruction showed significantly greater improvement in knowledge and practical skills compared to those who received conventional verbal counseling. The strength of audio-visual media lies in its ability to present step-by-step demonstrations, reduce misunderstanding, and create stronger memory retention through simultaneous visual and auditory stimulation. Likewise, research by Sihombing & Noviyani (2024) demonstrated that video-assisted teaching helped mothers better understand newborn hygiene practices and improved confidence in performing cord care correctly. These findings are highly relevant to the objectives of the present study, suggesting that audio-visual education is a suitable and promising approach to enhancing maternal knowledge and reducing infection risks.

Taken together, the results of this study align with the broader body of evidence underscoring the importance of maternal education in promoting newborn health. The findings reinforce that improving maternal knowledge particularly through engaging and accessible methods such as audio-visual media can lead to meaningful reductions in umbilical cord infections. The presence of even a small proportion of mothers with low knowledge levels highlights the necessity of ensuring that educational interventions reach all segments of the maternal population. Consistent with the results of previous research, this study demonstrates that knowledge is not merely an informational asset but a key component of effective newborn care and infection prevention. Strengthening educational strategies is therefore essential to ensure that all mothers, regardless of age, education, or occupation, can perform proper umbilical cord care and safeguard their infants' health.

4. CONCLUSION

The results of this study show that maternal characteristics, particularly knowledge of umbilical cord care, play a central role in preventing cord-related infection risks. Although most mothers demonstrated good knowledge, a portion still had limited understanding, which was reflected in the presence of infection risk among some newborns. The strong negative correlation between knowledge and infection complications indicates that higher maternal knowledge is closely associated with safer cord care practices and reduced likelihood of neonatal infection.

These findings highlight the importance of strengthening educational interventions for primigravida mothers, with audio-visual media serving as a highly suitable method to enhance comprehension and retention of essential care practices. Improving maternal knowledge ensures that proper cord care can be consistently applied at home and supports overall neonatal health. Continued efforts to provide accessible, engaging, and standardized education are essential to minimize preventable complications and promote safe newborn care practices.

Acknowledgement

The heading should not be given a number and should instead be considered as a subsubsection heading.

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