APPLICATION OF SPONGE BATH AND DRY CORD CARE FOR THE PREVENTION OF UMBILICAL CORD INFECTION IN NEONATES: A CASE STUDY IN PRIMARY CARE

Dewi Nur Sutiawati[1*], Tatik Setiarini[2], Desi Irsanti[3]
[1,2,3]Universitas Bhakti Kencana (Indonesia)

**Corresponding author: dewi.nur@bku.ac.id*

Abstract

Umbilical cord infection is one of the health problems that may occur in neonates and can potentially progress to systemic infection if appropriate cord care is not provided. Maintaining the umbilical cord clean and dry is an important approach to preventing infection. This case study aimed to describe the application of sponge bath and dry cord care as part of nursing care for neonates at risk of umbilical cord infection. A descriptive case study design was used involving two neonates diagnosed with risk for infection. Nursing care included assessment, nursing diagnosis, planning, implementation, and evaluation. The primary intervention was Infection Prevention (I.14539), including monitoring for signs and symptoms of infection, application of sponge bath and dry cord care, hand hygiene, and maternal education regarding umbilical cord care and signs of infection. The findings showed improvement in umbilical cord conditions in both subjects. Umbilical cord discharge gradually disappeared, erythema in one subject resolved, and no swelling, foul odor, or increased body temperature was observed. The umbilical cords separated physiologically on the fifth day in the first subject and the seventh day in the second subject. The application of sponge bath and dry cord care may be incorporated into neonatal nursing care to maintain umbilical cord cleanliness and dryness and to support the prevention of infection risk.

Keywords: Dry Cord Care, Neonates, Infection Risk, Sponge Bath, Umbilical Cord

1. INTRODUCTION

A newborn is defined as an infant younger than 28 days of age (1). Newborns undergo a process of adaptation, which refers to the physiological adjustment required to transition from intrauterine life to life outside the womb. This adaptation period generally occurs during the first month or longer after birth and involves several body systems, including the respiratory system, circulatory system, thermoregulatory system, and the ability to obtain and utilize glucose. Several factors may influence neonatal adaptation, including the mother's pregnancy history and the condition of the newborn (2). The neonatal immune system is still immature, making newborns particularly vulnerable to various infections and allergic reactions (3).

The World Health Organization (WHO) (2024) reported that 2.3 million children die within the first 20 days of life. Worldwide, approximately 130 million babies are born each year, with an estimated 4 million deaths occurring during the first four weeks of life, of which approximately 1.5 million deaths are caused by (4). Infection accounts for approximately 36% of neonatal deaths worldwide, and neonatal sepsis may originate from umbilical cord infections. The prevalence of umbilical cord infection among newborns ranges from 3% to 5% (3). In Southeast Asia, an estimated 220,017 infant deaths are associated with inadequate hygiene during umbilical cord care. Therefore, cleaning the umbilical cord with alcohol is not recommended because it may delay the healing and drying process (5).

The 2018 Basic Health Research (Riset Kesehatan Dasar/Riskesdas) conducted by the Ministry of Health of the Republic of Indonesia reported that umbilical cord care practices among newborns in

Indonesia remain varied. Nationally, the most common method of umbilical cord care was the application of povidone-iodine (Betadine) or alcohol (48.0%), followed by no specific treatment and allowing the cord to dry naturally (41.5%). Other practices included the use of powdered medication (1.3%), herbal or traditional medicines (3.0%), and unknown methods of care (6.2%) (6).

Data from the Ministry of Health (2022) indicate that the neonatal mortality rate in Indonesia remains relatively high. One of the causes of neonatal mortality is infection. Research has shown that 33% of neonatal tetanus cases are associated with omphalitis and sepsis. Omphalitis is a localized infection of the umbilical cord that primarily affects newborns. Therefore, appropriate umbilical cord care is essential to prevent the development of omphalitis (7).

Data from DKI Jakarta Province based on the 2018 Riskesdas showed that the majority of umbilical cord care practices in DKI Jakarta involved no specific treatment and allowing the cord to dry naturally (53.1%), followed by the use of povidone-iodine or alcohol (41.3%), powdered medication (0.3%), herbal or traditional medicines (0.7%), while 4.6% of cases used unknown methods of care (Ministry of Health, 2018). Meanwhile, 198 infant deaths were reported in East Jakarta in 2020, with an incidence rate of 6 per 1,000 live births. Fatal complications were primarily associated with neonatal tetanus (16.3%) and sepsis (5.9%) (8).

Secondary data from the Central Statistics Agency (Badan Pusat Statistik/BPS) of DKI Jakarta in 2022 showed that the population aged 0–4 years reached 238,040, consisting of 122,065 males and 115,975 females. These figures indicate a substantial number of infants and young children requiring special attention in health services, particularly during the neonatal period (0–28 days), when newborns are particularly vulnerable to infection. BPS data for 2022 also recorded 4,340 births in East Jakarta. More specifically, Cipayung District ranked second in terms of the number of births, with 3,017 births. This condition further emphasizes the urgency of improving the quality of neonatal health services, particularly through appropriate umbilical cord care to prevent infection (9).

In nursing practice, the condition of newborns who are vulnerable to invasion by pathogenic microorganisms can be identified as the nursing diagnosis Risk for Infection. According to the Indonesian National Nurses Association (Persatuan Perawat Nasional Indonesia/PPNI) in the Indonesian Nursing Diagnosis Standards (Standar Diagnosis Keperawatan Indonesia/SDKI), Risk for Infection is defined as a condition in which an individual is at risk of increased invasion and proliferation of pathogenic microorganisms that threaten health. Therefore, inappropriate umbilical cord care may increase the likelihood of infection in neonates and requires appropriate nursing interventions for prevention (14).

The World Health Organization (WHO) emphasizes the importance of clean and dry cord care as an effort to prevent infection in newborns. Postpartum mothers who have positive attitudes toward infant health are more likely to comply with these principles, including maintaining umbilical cord hygiene, avoiding the application of unrecommended traditional substances, and monitoring for signs of infection (10). Sitepu et al. (2021) explained that several measures can be undertaken to prevent neonatal mortality, with a focus on optimal prenatal care, including hygienic delivery practices and hygienic umbilical cord care. A mother's ability to care for her newborn's umbilical cord is one of the factors that may influence the infant's growth and development. However, many mothers do not know how to care for their newborn's umbilical cord properly or are unable to perform the care adequately (7).

One technique that can be used for dry umbilical cord care is the sponge bath technique, which involves bathing or cleaning the neonate by washing the entire body from the head to the feet without immersing the infant in a bathtub. A sponge bath is performed in neonates until the umbilical cord becomes dry. Through this method, neonates can receive adequate hygiene care. In addition, this method helps prevent the umbilical cord from becoming wet and supports the drying process of the umbilical cord (11). Appropriate umbilical cord care is particularly important for mothers, especially postpartum mothers, so that they can provide optimal care for their newborns, allowing the infants to grow and develop healthily without experiencing infection through the umbilical cord (10).

The assessment instrument for umbilical cord infection based on the Indonesian Nursing Outcome Standards (Standar Luaran Keperawatan Indonesia/SLKI) for the nursing diagnosis Risk for Infection indicates that the expected outcome is a reduction in infection risk factors, characterized by clean body surfaces, a dry umbilical cord, and the absence of signs of infection such as erythema, edema, or umbilical cord exudate. Assessment is conducted through observation of the umbilical cord condition

and the cleanliness of the infant's body before and after the application of the sponge bath technique (15).

Various studies on newborn care have been conducted, particularly those focusing on umbilical cord care and infant bathing practices. One strategy for preventing neonatal infection is to maintain the infant's body hygiene while keeping the umbilical cord clean and dry. Therefore, safe and appropriate bathing methods for newborns are essential. The sponge bath technique is one approach that may be used because it can maintain infant hygiene while keeping the umbilical cord dry. This technique can be applied to normal, premature, and low-birth-weight infants and may help reduce the risk of infection in newborns.

Based on the background described above and the prevalence of morbidity among newborns in East Jakarta, particularly in the Cipayung Community Health Center area, the authors conducted a case study to directly evaluate the application of nursing care in two neonatal subjects as an approach to preventing umbilical cord infection.

2. METHODOLOGY

This study employed a descriptive case study design to describe the implementation of nursing care in two neonates at risk of umbilical cord infection. The subjects consisted of two neonates, both of whom were one day old at the time of the initial assessment. Both neonates had umbilical cord conditions that required monitoring and care to prevent infection. The nursing care process included assessment, nursing diagnosis, planning, implementation, and evaluation. The nursing diagnosis established for both subjects was Risk for Infection (D.0142) related to increased exposure to pathogenic organisms from the environment.

The intervention was based on Infection Prevention (I.14539), with Infection Level (L.14137) as the expected outcome. The interventions included monitoring for local and systemic signs and symptoms of infection, implementing sponge bath and dry cord care, performing hand hygiene before and after contact with the neonate, and providing education to the mothers regarding proper handwashing, umbilical cord care, signs and symptoms of infection, and the sponge bath technique. The interventions were implemented directly and repeatedly throughout the observation period. For the first subject, nursing care was provided for five days until the umbilical cord separated on the fifth day. For the second subject, nursing care was continued until the seventh day, when the umbilical cord separated. Monitoring focused on the condition of the umbilical cord, body temperature, and the neonates' responses to the interventions.

The data were analyzed descriptively by comparing the condition of the umbilical cord before and during the implementation of the interventions. The observed indicators included redness, swelling, discharge, odor, cleanliness and dryness of the umbilical cord, body temperature, and the time to umbilical cord separation.

Ethical Considerations in this case study was conducted in accordance with ethical principles for research involving human participants. Informed consent was obtained from the neonate's parent or legal guardian prior to data collection and implementation of the sponge bath and dry cord care. The confidentiality and privacy of the neonate and family were maintained throughout the study, and all collected data were used solely for scientific purposes. The intervention was performed according to standard nursing procedures while prioritizing the neonate's safety and well-being.

3. RESULTS AND DISCUSSION

3.1 Subject Characteristics

Both subjects were neonates aged one day at the initial assessment. At the initial assessment, the umbilical cords were still attached and had not yet separated. Both infants were considered at risk of infection due to the umbilical cord stump, which may serve as a potential portal of entry for microorganisms. In one subject, the umbilical cord appeared moist and had some fluid discharge; however, no signs of severe infection, such as swelling or redness, were observed. This condition provided the basis for continuous monitoring and consistent implementation of umbilical cord care.

3.2 Nursing Diagnosis and Intervention

The nursing diagnosis for both subjects was Risk for Infection (D.0142) related to increased exposure to pathogenic organisms in the environment. The diagnosis was established on May 13, 2026, for both subjects. The nursing intervention provided was Infection Prevention (I.14539), with the expected outcome of a decreased Infection Level (L.14137). The interventions included monitoring for local and systemic signs and symptoms of infection, performing umbilical cord care using sponge bath and dry cord care, maintaining hand hygiene, and providing education to the mothers.

3.3 Application of Sponge Bath and Dry Cord Care

The sponge bath was performed by cleansing the infant's body using a clean washcloth without immersing the infant in water. The procedure was carried out carefully to maintain the infant's body temperature and minimize excessive moisture around the umbilical cord area. During the procedure, particular attention was given to preventing water or other substances from accumulating around the umbilical cord stump.

Dry cord care was performed by keeping the umbilical cord stump clean, dry, and exposed to air. The cord was not covered unnecessarily, and no additional substances, such as traditional preparations, powders, or antiseptic agents not recommended for routine cord care, were applied. The umbilical area was monitored regularly for changes in color, moisture, discharge, redness, swelling, or other signs suggestive of infection. Hand hygiene was performed before and after contact with the infant and during cord care procedures to minimize the risk of microorganism transmission (12).

The combination of sponge bathing and dry cord care was implemented consistently throughout the observation period. Sponge bathing was selected as an appropriate bathing method during the period when the umbilical cord was still attached because it allowed the infant's body to be cleansed while minimizing direct exposure of the cord stump to water. Meanwhile, dry cord care was intended to support natural drying and separation of the umbilical cord while reducing unnecessary exposure to potential contaminants.

In addition to direct care, the mothers were provided with education regarding the proper technique for performing sponge baths and dry cord care. The mothers were also instructed to maintain hand hygiene before touching the umbilical area, avoid applying unrecommended substances to the cord stump, and keep the cord clean and dry. Education was also provided regarding the recognition of warning signs, including redness or swelling around the umbilicus, foul-smelling discharge, persistent moisture or pus, bleeding, and fever. The mothers were encouraged to seek health-care services promptly if any signs of infection were observed.

The educational approach was intended to strengthen the mothers' ability and confidence to continue appropriate newborn care at home. Thus, the intervention not only focused on direct nursing care but also emphasized maternal involvement and continuity of care as part of infection prevention in neonates.

3.4 Development of Umbilical Cord Condition

The development of the umbilical cord condition in both neonates was evaluated based on the Infection Level (L.14137) outcome according to the Indonesian Nursing Outcome Standards (Standar Luaran Keperawatan Indonesia, SLKI). The assessment focused on clinical indicators associated with the potential occurrence of umbilical cord infection, including redness, swelling, fluid/discharge, unpleasant odor, increased body temperature, and the cleanliness and dryness of the umbilical cord. Each indicator was assessed using a 1–5 scale, with 1 = increased, 2 = moderately increased, 3 = moderate, 4 = moderately decreased, and 5 = decreased. A higher score indicated a greater reduction in signs or indicators of infection and an improvement in the neonate's condition. The development of the umbilical cord condition before and after the application of sponge bath and dry cord care is presented in Table 1.

Table 1. Development of Umbilical Cord Condition Based on the Infection Level Outcome (L.14137) Before and After the Application of Sponge Bath and Dry Cord Care

IAssessed Indicator	Subject 1 Before	Subject 1 After	Subjek 2 Before	Subjek 2 After
Redness around the umbilical cord area	3	5	2	5
Swelling around the umbilical cord area	5	5	5	5
Fluid/discharge from the umbilical cord	3	5	3	5
Unpleasant odor from the umbilical cord	5	5	5	5
Increased body temperature	5	5	5	5
Umbilical cord remains clean and dry	3	5	3	5
Umbilical cord separation	Not yet separated	Day 5	Not yet separated	Day 7

Source: Primary Data (2026)

Based on the evaluation of the Infection Level (L.14137) outcome, the development of the umbilical cord condition in both subjects showed an improvement following the application of sponge bath and dry cord care. In Subject 1, the initial assessment showed moderate redness, moderate fluid/discharge, and a moist umbilical cord. During the observation period and implementation of the intervention, the redness and swelling were no longer observed, while the fluid/discharge gradually diminished until the umbilical cord became clean and dry. The umbilical cord separated on the fifth day. In Subject 2, the initial assessment showed markedly increased redness and fluid/discharge from the umbilical cord. During the observation period, both indicators gradually resolved. No swelling or unpleasant odor was observed, and the body temperature remained within the normal range. The umbilical cord separated on the seventh day.

Overall, the outcome scores demonstrated a shift toward the decreased category (score 5) for the observed indicators of infection. Following umbilical cord separation, the umbilical area appeared clean and dry, with no signs of infection observed in either neonate.

3.5 Discussion

The observation results for Subject I before the intervention showed the presence of fluid around the umbilical cord area, redness, and irritability, with a body temperature of 36.5°C. After the application of the sponge bath and dry cord care techniques for five days, the observations showed favorable improvement in the condition of the umbilical cord. The fluid around the umbilical cord began to decrease on the second day and was no longer observed on the third day. During the observation period, no redness, swelling, or unpleasant odor was observed around the umbilical cord. The umbilical cord gradually became drier and separated on the fifth day, while the body temperature remained within the normal range.

In Subject II, before the intervention, redness and fluid were observed around the umbilical cord area. The infant appeared irritable, with a body temperature of 36.9°C. After the application of the sponge bath and dry cord care techniques for seven days, the condition of the umbilical cord showed favorable improvement. The redness around the umbilical cord resolved following the care provided, while the fluid gradually decreased until it was no longer observed. During the observation period, no swelling or unpleasant odor was observed around the umbilical cord. The umbilical cord gradually became drier and separated on the seventh day. The umbilical area following cord separation appeared clean and dry, while the body temperature remained within the normal range.

Redness, swelling, discharge, unpleasant odor, and increased body temperature are signs that should be monitored when assessing the condition of the umbilical cord as part of early detection of infection (13). Therefore, all of these indicators should be monitored regularly throughout the umbilical cord healing process. These findings are consistent with the study by Nujulah et al. (2022), which stated that observation of the umbilical cord condition is an important component of neonatal care because it

enables the detection of changes in the umbilical area and provides a basis for determining infection-prevention measures (9). Similarly, Ningsih et al. (2025) reported that the application of dry cord care can maintain the umbilical cord in a clean and dry condition, thereby helping to prevent the development of signs of infection during the healing process (3).

Based on these observations, the nursing intervention involving the application of the sponge bath technique combined with dry cord care throughout the observation period is recommended as a preventive nursing measure (12). his intervention aims to maintain the infant's body cleanliness, keep the umbilical cord clean and dry, support physiological umbilical cord separation, and prevent umbilical cord infection. The study focused on the nursing problem of risk for infection in both subjects, referring to the Indonesian Nursing Intervention Standards (Standar Intervensi Keperawatan Indonesia) (16). using an Infection Prevention and Umbilical Cord Care approach. The interventions included applying the sponge bath technique, performing dry cord care, keeping the umbilical cord clean and dry, avoiding unnecessary covering of the umbilical cord with gauze or an abdominal binder, and providing education to the mothers regarding proper umbilical cord care at home.

The observations of both subjects indicated that the application of the sponge bath technique combined with dry cord care resulted in favorable improvement in the condition of the umbilical cord. These findings are supported by Sihombing et al. (2024), who reported that dry cord care was effective in maintaining the umbilical cord in a clean and dry condition, accelerating the drying and separation process, and reducing the occurrence of signs of infection such as redness, swelling, discharge, and unpleasant odor in the umbilical area (8). Santi et al. (2022) also reported that open umbilical cord care (dry cord care) creates a dry environment that inhibits microorganism growth and supports the physiological healing process of the umbilical cord (13). In addition, the application of the sponge bath technique helps maintain the infant's overall cleanliness without excessively wetting the umbilical cord, thereby helping to control moisture around the umbilical area and minimize the risk of microorganism contamination.

4. CONCLUSIONS

The findings of this case study involving two subjects indicate that the application of the sponge bath technique combined with dry cord care resulted in favorable improvement in umbilical cord condition as part of infection prevention. Parents were able to maintain the cleanliness and dryness of the umbilical cord, thereby supporting the healing process of the umbilical wound and preventing umbilical cord infection. The combination of sponge bath and dry cord care may be applied as one of the preventive measures for infection in neonates at risk of infection following umbilical cord cutting.

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