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Breast Milk and Umbilical Cord Care in Newborn

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ABSTRACT

Newborns are particularly vulnerable to infectious microorganisms. The appropriate umbilical cord care can prevent infant mortality due to infection. Breast milk protein becomes a new method to fight staphylococcus infection on the skin. The objective of this research was to know the use of breast milk to umbilical cord care in newborns. Research was carried out by quasi experiment, posttest design with control group design. Research was conducted at the independent midwife practice in Yogyakarta. The Sample was 30 of newborns experiment group and 30 for the control group. The experimental group was smearing milk to the cord each time cleaning/drying the umbilical cord. The control group performed cord care by allowing its open dry without being smeared. The release of the cord is measured in minutes and observed in 2 stages (when the umbilical cord is removed and when the scar dries). Analysis is used to by t-test at significance level of 5% ($p = 0.05$). The results showed that there is difference average time required for the release and drying umbilical cord between experimental and control groups. The difference was not significant when the umbilical cord releases, but it becomes significant when umbilical cord wound dries.

Keywords: breast milk, umbilical cord, care

INTRODUCTION

Infant Mortality Rate (IMR) in Indonesia still remains very high. It is estimated that about 4 million babies die in their first year of life. Two-third of the newly born babies die in the first month, and two-third are unable to survive their first week. One of the main leading factor to infant mortality in the first week of life is neonatal sepsis at 12.0%.¹ The Health Profile of Special Province of Yogyakarta in 2011 shows that Infant Mortality Rate in Special Province of Yogyakarta significantly decreases after 1990. In 2010 and 2011, Infant Mortality Rate was equal to 17/1000 live births. In 2012, the result of SDKI showed that Infant Mortality Rate in Special Province of Yogyakarta was relatively higher, reaching 25 / 1,000 live births. There are several factors leading to high mortality rate, such as LBW, asphyxia, sepsis, congenital abnormalities, and others². The Health Profile of Special Province of Yogyakarta in 2014 showed that the highest IMR was found in Kulon Progo Regency at 11.5 per 1000 live births. During previous 5 years, Kulon Progo Regency always had the highest infant mortality rate. In 2010, 3,7% of infant mortality in Special Province of Yogyakarta resulted from sepsis (infection). Of the five districts/cities in Kulon Progo District recorded the highest infant mortality caused by sepsis (44.4%).

Sepsis is an infection caused by a bacterium dwells the infant's blood stream, and this infection potentially causes death. Sepsis found in infants younger than 1 month is possibly caused by tetanus neonatorum. Tetanus neonatorum is a tetanus disease that occurs in neonates (infants whose age are less 1 month). This tetanus is caused by Clostridium tetani, a germ that secretes toxins and attacks the central nervous system. The germ spores enter the baby's body through the umbilical cord, the sole entrance. This happens when the

umbilical cord is removed after the baby was born. The germs are also possible to enter the body during the treatment before the umbilical cord is released. The incubation period is 3-28 days, on average 6 days. If the incubation period is less than 7 days, the disease is more severe and leads to higher mortality³

The umbilical cord is the suitable place for bacterial colonies to form because it serves as the entrance of germs. As the germs enter, they cause the infection of umbilical cord. Treatment of the umbilical cord is one method which can be conducted to reduce mortality caused by cord infection. The principle of umbilical cord care is to maintain the cleanliness and dryness of the umbilical cord. If the mother can not perform umbilical cord care properly, the infection characterized by a wet or sticky cord, unpleasant odor, redness and swelling in the umbilical cord area will occur. If the baby has severe pain, the baby will appear gray and suffer from high fever.⁴ This can result in an increase in infant morbidity, disability and death. Cord infection is not a common problem, so it requires more specific attention from health workers to guide the mother in performing proper umbilical cord care. The ability of mothers to care for the cord carefully and correctly has an important role to reduce the occurrence of umbilical cord infection.

Previous research has suggested that the umbilical cord treatment with Chlorhexidine enables the cord releases faster than that of open dry⁵ Other studies suggest umbilical cord care with breastmilk as the alternative for the treatment with Chlorhexidine. The study concluded that cord care with breast milk accelerates the cord release process, as well as reduces the risk of infection, bleeding and unpleasant odors.⁶

Breast milk proteins are believed to be a new method in fighting bacteria, viruses, parasites, pneumonia and staphylococcus infections of the skin.⁷ The use of breast milk to umbilical cord care is supported by another opinion. The scratched nipple found in breastfeeding moms can be treated by rubbing hind milk on the nipple and areola.⁸ Previous studies have suggested that the release of umbilical cord treated with breast milk is faster than that of alcohol.⁹ Based on this background, the researcher would like to examine the use of breast milk as an alternative of umbilical cord care treatment in newborns.

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METHOD

This research is a quasi-experiment using posttest with control group design which involves direct observation on newborn. The independent variable in the study is the umbilical cord care with breast milk with nominal data scale. The dependent variable is the umbilical cord release duration with scale of ratio data. The population is newborn babies in independence midwiferi practice in Kulon Progo Regency, Province of Yogyakarta. The sample size was obtained from the calculations based on Lemeshow et al. (1997) with 95 percent confidence interval ($\alpha = 0.05$), the estimated proportion of cases 0.48 and 80 percent power ($\beta = 0, 20$). The minimum sample size required for each group is 27 people. The number of samples after added 10% is 30 people for the treatment group and 30 people for the control group. Determination of the subjects entered into the experimental group or control group using simple random sampling.^{4, 10}

The data collected during the research serve as primary data. Techniques of data processing involve editing, cleaning, and entry data. Data analysis is performed in quantitative method in which it aims at achieving the research objectives. Univariate analysis is performed to find out the average duration the umbilical cord needs to release in each groups. Bivariate analysis is performed to analyze the difference of average duration to remove umbilical cord between experimental and control groups. This bivariate analysis is performed by t-test with the significant value 5% ($p=0,05$).

RESULT AND DISCUSSION

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Data were collected during May to September 2016. The selection of research subject was based on inclusion and exclusion criteria. The results of the research on the level of education of respondents in the experimental group and the control group can be seen in Table 1. Table 1 shows that in both groups, the majority of respondents' education level is High School.

Table 1. Respondents' Education Level, parity,

Variable	Experiemental Group		Control Group	
	n	(%)	n	(%)
Education Level				
Elementary School	1	3,3	1	3,3
Junior High School	7	23,3	2	6,7
(Senior High School	21	70,0	22	73,4
Undergraduate	1	3,3	5	16,7
Parity				
Primipara	16	53,3	15	50
Multipara	14	46,7	15	50
The help of baby in infant care				
Yes	11	36,7	12	40
No	19	63,3	18	60

The results of parity of the respondents in the experimental group and the control group can be seen in Table 2. Based on Table 2, it can be seen that in the experimental group, the parity status of most respondents is primipara, and the control group has the same proportion between primipara and multipara. The experimental and control groups, the majority of respondents are not assisted by baby soothsayers in infant care. The average time required for umbilical cord removal in treatment with breast milk (experimental group) was 8,039 minutes (133.98 hours or 5.58 days). In open-treated treatments (controls), the average time required for cord release was 8.911 minutes (148.52 hours or 6.18 days).

The average time comparison required for cord release between the experimental group and the control group was analyzed by using bivariate analysis with t-test at a significant level of 5%. Table 4 shows a difference in the average time required for umbilical cord release between the experimental group and the control group. The value of $p = 0.193$ is greater than 0.05, so the difference is not significant.

Table 2. Difference in the average time required for umbilical cord release between the experimental group and the control group

Types of Care	The average time needed for umbilical cord removal	p-value
Human breast milk care	8.0398	0,193
Open wound care	8.9118	

The average time required for drying umbilical cord scars on treatment with breast milk (experimental group) was 13,389 minutes (223.15 hours or 9.3 days). In open-treated treatments (controls), the average time required for cord release was 15,450 minutes (257.5 hours or 10.73 days).

The mean time comparison required for drying of the umbilical cord scars between experimental and control groups was analyzed by using bivariat analysis with t-test at a significant level of 5%. Table 5 shows a difference in the average time required for drying the scar on the umbilical cord between the experimental group and the control group. The p value = 0.031 is greater than 0.05, so the difference is significant.

Table 3. Difference in the average time required for drying the scar on the umbilical cord between the experimental group and the control group

Types of Care	The average time needed for drying wound due to umbilical cord removal	p-value
Human breast milk care	13.389	0,031
Open wound care	15.450	

³ Treatment of the umbilical cord is one of the keys to reduce mortality due to cord infection. The principle of umbilical cord care is to maintain the cleanliness and dryness of the umbilical cord. If the mother can not perform umbilical cord care properly, infection will occur⁴ Someone's ability is influenced by experience, education, and socio-culture. In this study, those three factors are represented in the characteristics of respondents namely parity, education and infant care assistance by baby soothsayer¹¹. Experience may affect one's behavior.¹² Experience of respondents in this study can be seen from their parity. The results showed that the proportion of primipara and multipara parity between the experimental and control groups was nearly equal. These conditions require the attention of midwives in the care of umbilical cord, especially in primipara.

The education of most respondents in both groups is high school. Education is a conscious effort to develop personality and ability to mature. Mothers with higher levels of education have a better level of knowledge. Thus, it can be assumed that the process of education can improve the critical and rational thinking; therefore, the process of receiving and understanding information runs smoother.¹³ The education level of mothers is closely related to the level of understanding about health care. Therefore, since most mothers graduated from high schools, midwives will have easier process in health care assistance.

Besides parity and education, another factor which affects the ability of mothers in treating the umbilical cord is socio-culture. This factor also determines whether or not a mother can perfectly perform umbilical cord care. The customs of the people represents the cultures prevailing in those societies which are considered unsuitable viewed from the perspective of healthy customs⁴. In this study, socio-cultural factor is the assistance of baby soothsayers in infant care. Inevitably, the presence of baby soothsayers is still quite influential in the community. The results showed that most mothers had not been assisted by baby soothsayers in infant care. Meanwhile, 36.7% of mothers in the experimental group and 40% of mothers in the control group are assisted by baby soothsayers in infant care. This condition should get the attention of the midwife. Midwives are expected to establish partnerships with baby soothsayers to minimize any socio-cultural practices that may be in conflict with health.

The results showed that there was a difference in the average time required for the umbilical cord release and drying of umbilical cord injuries between umbilical cord treatment with human breast milk and open-ended treatments. The difference was not significant in the first observation when the umbilical cord was removed. However, it became significant during the observation which was performed when the umbilical cord wound dried. This condition supports the Kasrae (2015) which states that breast milk has the same ability as 1% hydrocortisone in drying lesions in infants with atopic eczema. Kasrae (2015) recommends breastfeeding as a topical medication on infant wounds because breast milk is more economical and easier to obtain.¹⁴ Breast milk proteins are believed to be a new way of fighting bacteria, viruses, parasites, causing staphylococcus infections of the skin.¹⁵

Breast Milk is indispensable during infant growth and development. In addition to containing nutrients needed by infants, breast milk increases endurance, contains anti-bacterial and anti-virus that protects the baby against infection. The stage of breast milk secretion begins with colostrum at birth, breast milk transition in the first ten days to two weeks after birth and next is mature milk. The content of each stage is useful for newborns, especially the physiological adaptation to life outside the womb. The more mature the milk, the concentration of immunoglobulin, the total protein that is soluble in fat decreases.¹⁵

Breast milk contains immunoglobulins M, A, D, G, and E, and the highest composition is sIgA. IgA secretion in breast milk is a major source of passive immunity acquired for several weeks before endogenous production of sIgA, the highest concentration in the first few days of postpartum.¹⁶ During the post natal period, infants are susceptible to infectious pathogens; therefore, sIgA is an important protective factor against infection. Secretory IgA is an anti-bacterial factor present in breast milk which is in vitro active against various bacteria, ie E. Coli, C. Diphtheriae, K. Pneumoniae, Salmonella, Shigella, Streptococcus, H.

Influenzae including Clostridium tetani. The latter is the cause of tetanus neonatorum which results in infant mortality due to sepsis.¹⁷

Breast milk contains high protein. Proteins contained in breast milk will bind to the protein in the umbilical cord to form an immune reaction; then, apoptosis process occurs. Cell division and growth under genetic control of cells can also experience death under genetic control. This process is called apoptosis or programmed cell death. The genes in these cells play an active role in cell destruction. Protein in breast milk is high enough. In colostrum breast milk, protein reaches 4.1 g% and breast milk transition reaches 1.6 g% . This protein plays a role in the process of repairing damaged cells, accelerating healing process and speeding up the release time of umbilical cord.¹⁸ Human breast milk contains necessary nutrients. It also serves as anti-bacterial and anti-viral factors which protect infants against infection. Several studies have shown that breast milk can reduce the incidence of various infections during infancy. It also helps toddlers against gastroenteritis, respiratory infections, otitis media, neonatal sepsis, and urinary tract infections. .¹⁵

In this study, the final observation of umbilical cord release is performed when the scar has dried. The results showed a significant difference between treatment with breastmilk smear and open dry treatments. Human breast milk is recommended as a topical medicine to cure infant wounds.¹⁴ Mullany et al (2006) study suggests that in umbilical cord treatment with Chlorhexidine, the cord release time is faster than open dryness.⁵ Imdad's research et al (2015) recommends topical antiseptic administration on umbilical cord care.¹⁹ Karumbi, et al (2013) recommends to give 4% Chlorhexidine antiseptics to reduce the risk of sepsis in newborns especially in developing countries.²⁰ Allam et al (2015) states that topical application by smearing milk to the cord is important to accelerate the cord release.²¹ Based on the result of these studies, it is recommended that breast milk can be used as an alternative to umbilical cord care because it contains many immunologically active factors especially antibodies.

CONCLTION AND SUGGESTION

Based on the results of the study, the following conclusions can be drawn: the umbilical cord treatment with breast milk has no effect on the release of umbilical cord.; the umbilical cord care with breast milk affects the drying of umbilical cord rings. Based on the result of research, some following suggestions can be proposed: midwives should use breast milk as an alternative in umbilical cord care, especially during the drying process of umbilical cord scars; further investigators must explore the use of breast milk in the management of problems in infants, especially in the prevention of infection.

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