The International Science of Health Journal
Vol.1, No. 1 March 2023
e-ISSN: 2986-6820; p-ISSN: 2986-6855, Pages 01-08

The Effectiveness Of Aluminum Foil Swaddling On Increased Body Temperature Of Newborns At The Midwife's Independent Practice Sulistyo Rahayu Central Lampung

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ABSTRACT : *Newborns lose heat 4 times more than adults. This heat loss causes a drop in temperature. In the first 30 minutes the temperature drops between 3-4 degrees Celsius. In addition, the body's heat regulation center is not functioning perfectly, which makes it easier for babies to lose heat through evaporation, radiation conduction, or conventions and cold temperatures in the environment where babies are born can make babies hypothermic. The initial survey conducted at PMB Sulistyo Rahayu in 2021 found 158 deliveries with an average monthly delivery of between 13-15 deliveries, and the number of newborns with mild hypothermia was 11 babies. The treatment for hypothermic babies at TPMB Sulistyo Rahayu uses the kangaroo method and cloth swaddles. The purpose of this study was to determine the effectiveness of using aluminum foil swaddles in increasing the baby's body temperature. This research is a quantitative research, with an experimental study method with a pretest-posttest research design with a control group. The sample in this study was 36 babies using simple random sampling technique. The results of the study showed that the use of aluminum foil swaddles increased the baby's body temperature more effectively than cloth swaddles (p value = 0.000). The results of this study are expected to provide output in the form of articles in Sinta accredited journals and instant aluminum foil swaddles that can be used by midwives to treat hypothermia in newborns at the Mandiri Midwife Practice.*

Keywords: *cloth swaddle, aluminum foil, hypothermia, BBL*

INTRODUCTION

Newborns lose heat 4 times more than adults. This heat loss causes a drop in temperature. In the first 30 minutes the temperature drops between 3-4 degrees Celsius. In addition, the body's heat regulation center is not functioning properly. can make it easier for babies to lose heat through evaporation, radiation conduction, or convention and cold temperatures in the

Received on January 30th, 2023; Revised on February 13nd, 2023; March 12nd, 2023
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environment where babies are born can make babies hypothermic (Catur, A., 2019)

The baby's low temperature causes metabolic and physiological processes to slow down. Respiratory speed, heart slows down, low blood pressure and loss of consciousness so that if left untreated it can cause death (Indrayani & Djami, 2016). In 2019 the Infant Mortality Rate (IMR) in the world increased from 45.7% to 65.4% in 2017 to 2019. Meanwhile the mortality rate in Southeast Asian countries was lower than the world's IMR, namely Vietnam 38%, Philippines 36%, Thailand 30%, Malaysia 11%, Singapore 5%.

The infant mortality rate in Indonesia is 47% (WHO, 2019). Based on data from the 2019 Indonesian demographic and population survey (IDHS), the Infant Mortality Rate in Indonesia in the 5 year period (2015-2019) was 32 per 1,000 live births. The Infant Mortality Rate in 2019 was 34 per 1,000 live births, an increase compared to 2017 data of 26 per 1,000 live births, with a 2018 target of 32 per 1,000 live births.

60% of infant deaths in Indonesia occur during the neonatal period, 36% of infant deaths are caused by improper handling in the first 1 hour of newborns and 80% of child deaths occur during infancy. The infant mortality rate in Indonesia caused by hypothermia is 3.5% out of 47% (Ministry of Health RI, 2019). The infant mortality rate in the Central Lampung region is still high, where from 2017 to 2019 the mortality rate increased by 60.46% from 2.6% to 4.3%. In addition, the infant mortality rate less than 48 hours also increased by 61.26% from 1.85 to 3.02. (Riskesdas, 2019).

The inability of the baby's body to store heat due to the small amount of subcutaneous fat makes the baby's body temperature regulation system imperfect, can make it easier for the baby to lose heat through evaporation, radiation conduction, or convention and cold temperatures in the environment where the baby is born can make the baby hypothermic (Setiawati 2014) . Although the exact incidence of this condition is unknown, it is estimated that 17 million newborns experience hypothermia each year in developing countries including Indonesia, an incidence of 60% to 85% has been documented (WHO, 2018). Infant mortality occurs mainly in developing countries by 92%. Infant health tends to receive less attention (WHO, 2019).

Hypothermia is the main cause of newborn morbidity and mortality in developing countries. It is estimated that 17 million newborns experience hypothermia each year in developing countries including Indonesia, an incidence of 60% to 85% has been documented. When hypothermia occurs, the first action that must be taken is to warm the baby. Baby swaddle

is a commonly used way to warm the baby's body. Swaddling can make babies calmer, warmer and prevent babies from losing heat and can stabilize their body temperature (Damayanti, et al., 2019). The initial survey conducted at PMB Sulistyo Rahayu in 2021 found 158 deliveries with an average monthly delivery of between 13-15 deliveries, and the number of newborns with mild hypothermia was 11 babies. The treatment for hypothermic babies at TPMB Sulistyo Rahayu uses the kangaroo method and cloth swaddles.

Another way to prevent hypothermia in newborns is through the use of aluminum foil swaddles for newborns during the first hour after birth. Aluminum foil acts as an insulator which is used to minimize the transfer of heat energy by conduction, convection and radiation. Aluminum foil can be used as an insulator for baby blankets to reduce the decrease in body heat / baby's temperature after birth (Afsari, 2019).

Research conducted by Nofda lelisma at Perintis Padang in 2019 concluded that the use of cloth swaddles and Skin Wraps can increase body temperature in Newborns and the use of Skin Wraps is more influential in increasing body temperature. With the result that when cloth swaddles were done there was an increase of 0.44 and when Skin Wrap was done there was an increase of 1.29 with a p value of 0.05. Aluminum foil material, this material is very suitable for making instant swaddles which can be used to increase the body temperature of newborns or prevent a decrease in heat in newborns.

Based on the description above, the researcher is interested in conducting research on the effectiveness of using aluminum foil swaddles in increasing the baby's body temperature.

METHOD

This research is a quantitative research, with an experimental study method with a pretest-posttest research design with a control group. The sample in this study was 36 babies using simple random sampling technique. The treatment for hypothermic babies at TPMB Sulistyo Rahayu uses the kangaroo method and cloth swaddles. The purpose of this study was to determine the effectiveness of using aluminum foil swaddles in increasing the baby's body temperature.

RESULT

1. The results of the implementation of the research were obtained:

Table 1 Characteristics of Respondents

No	Characteristics	n	Persentase
1.	**BB Born**		
	Normal	36	100%
	BBLR	0	0%
2.	**Birth history**		
	Normal	36	100%
	Prematur	0	0%
3.	**Use of air conditioning**		
	No	31	86,10%
	Yes	5	13,90%
4.	**Room temperature**		
	$> 20^0$ C	36	100%
	$\leq 20^0$ C	0	0%

Based on the data in table 1, it can be seen that 100% of respondents with normal birth weight, 100% of respondents with normal birth history, most did not use air conditioning (86.1%) and room temperature above 20 ^{0}C.

A. Data analysis

Based on the normality test using the Shapiro Wilk test, the p value for each group is <0.05 so that the data to be tested is not normally distributed. Based on the results of the normality test, the difference test for data analysis of the treatment and control groups before and after treatment (pairs) used the Wilcoxon test and to see differences between the treatment group (aluminum foil swaddle) and the control group (cloth swaddle) used the Mann Whitney test (Sumardiyono , et al., 2020).

1) The results of the analysis of differences in body temperature of newborns before and after using aluminum foil swaddles can be seen in the table below.

Bivariate analysis was performed using the Wilcoxon test to determine differences in results before and after using aluminum foil swaddles. Based on the analysis results obtained:

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Table 2
Hasil uji wilcoxon Experiment Group (Aluminum Foil Wrap)

Group	n	Median (min-maks)	Z	*p*
Before	18	36,38 (35,70 -36,70)	-3,378	0,000
After	18	37,19 (37,0 - 37,40)		

Based on the results of the analysis in table 2, the median value after using aluminum foil swaddle was 37.19, which was 37.19 higher than before using aluminum foil swaddle, which was 36.38. The difference in the median score is statistically significant (Z = -3.378: p value 0.000 (<0.05)). Thus aluminum foil swaddle can increase body temperature in newborns.

2) The results of the analysis of differences in the body temperature of newborns before and after using cloth swaddles can be seen in the table below.

Table 3
Hasil Uji Wilcoxon Control Group (Cloth swaddle)

Group	n	Median (min-maks)	Z	*p*
Before	18	36,50 (35,60 -36,70)	-3,035	0,002
After	18	36,50 (35,70 -36,80)		

Based on table 3, the median value after using cloth is the same, namely 35.50, although statistically there is a significant difference (Z = --3.035: p value 0.002 (<0.05)). Thus cloth swaddles can increase body temperature in newborns.

3) Results of analysis of differences in body temperature at BBL between the experimental group (aluminum foil swaddle) and the control group (cloth swaddle).

To find out the difference between the experimental group and the control group a bivariate test was carried out using the Mann Whitney test, which can be seen in the table below:

Table 4
Hasil uji Mann Whitney Experiment and Control Group

Group	n	Median (min-maks)	U	*p*
Eksperiment	18	37,19 (37,0 - 37,40)	0,000	0,000
Control	18	36,50 (35,70 -36,80)		

Based on the results of the analysis, the results obtained were p value = 0.000 (<0.005). So that there is a significant median difference between aluminum foil swaddle and cloth swaddle on the increase in baby's body temperature. Thus aluminum foil swaddles are more effective in increasing the baby's body temperature.

DISCUSSION

1. Differences in baby's body temperature before and after using aluminum foil swaddle

Based on the research results, it was found that the median body temperature of infants before using aluminum swaddles was 36.38 0C with a minimum temperature of 35.700C and a maximum of 36.70 0C. The results of this study were lower than those of Damayanti, Y, et al (2019), the results obtained for the body temperature of the BBL before being swaddled and kangaroo mother care were an average of 36.7 0C. According to Indrayani & Djami (2016) a baby is said to be hypothermic if the temperature body below 36.5 0C. Based on these data, the body temperature of newborns at TPMB Sulistyo Rahayu was below 36.50C (mild hypothermia/cold stress). This result is likely because the babies used as respondents were newborns. Newborns lose heat 4 times more than adults. This heat loss causes a drop in temperature. In the first 30 minutes the temperature drops between 3-4 degrees Celsius. In addition, the body's heat regulation center is not functioning perfectly, which can make it easier for the baby to lose heat through evaporation, radiation conduction, or convention and cold temperatures in the environment where the baby is born can make the baby hypothermic (Catur, A., 2019).

The results of the bivariate analysis found that there was a significant difference in the median body temperature of newborns (p value = 0.000) before and after using aluminum foil swaddles. In newborns, significant heat loss continues through convection, conduction, and radiation, especially from the exposed parts of the baby's skin. Things that can be minimized by covering the baby using a heat-resistant blanket, swaddling the baby, or wearing loose clothes. It is important to cover the baby's head, and hats with heat-retaining material are more effective than knitted hats by preventing heat loss. Electric heating pads in cribs should be used with caution to avoid burns or overheating the baby (Fraser, 2009).).

Aluminum foil works by conducting heat / insulation, used to minimize the transfer of heat energy. Thermal insulation, only discussed heat transfer by conduction, convection and radiation. Heat flow can be controlled by this process, depending on the nature of the material used. (Mulyo, 2020).

2. Differences in baby's body temperature before and after using cloth swaddle

Based on the research results, the median value after using cloth was the same, namely 35.50, although statistically there was a significant difference (Z = --3.035: p value 0.002 (<0.05)). Thus cloth swaddles can increase body temperature in newborns. The results of this study are not in line with the research of Damayanti, Y., et al (2019), the results of the study found that there was no difference between LBW body temperature before and after swaddling (using swaddling). This difference is possible because the samples used are different. In Damayanti's study, the sample used was LBW while in this study were normal newborns. LBW babies have lower subcutaneous fat tissue and low metabolism so babies with LBW lose heat faster and it is more difficult to experience an increase in body temperature. LBW will quickly lose body heat to hypothermia because the body's heat regulation center does not function properly and LBW metabolism is low (Maternity, et all, 2018).

3. The effectiveness of aluminum foil swaddle compared to cloth swaddle

Based on the results of the analysis, the median results of the experimental group were higher than the control group, namely 37.19 (37.0 - 37.40) and the control group 36.50 (35.70 -36.80) with a p value = 0.000 (<0.005) . So that there is a significant median difference between aluminum foil swaddle and cloth swaddle on the increase in baby's body temperature. Thus aluminum foil swaddles are more effective in increasing the baby's body temperature. The results of this study are in line with the research of Mulyo, et al (2020), it was found that there was an increase in the body temperature of post-cesarean section patients who experienced hypothermia with aluminum foil blankets.

In this study, the results showed that aluminum foil swaddle was more effective than cloth swaddle because the aluminum contained in the swaddle is an insulator, so it can conduct heat well. Aluminum foil can reduce heat loss due to evaporation and radiation cannot pass through the aluminum foil barrier so that it can increase the baby's body temperature (Mulyo et al, 2020).

CONCLUSION AND SUGGESTION

1. There is a difference in the baby's body temperature before and after using the aluminum foil swaddle (p value = 0.000)
2. There is a difference in the baby's body temperature before and after using cloth swaddles (p value = 0.002)
3. Using aluminum foil swaddles can increase the baby's body temperature more effectively than cloth swaddles (p value = 0.000).
4. The results of this study are expected to provide output in the form of articles in Sinta accredited journals and instant aluminum foil swaddles that can be used by midwives to treat hypothermia in newborns at the Mandiri Midwife Practice.

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