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Effect of Pad Warm f or Prevention Hypothermia In Newborn At The Household Level at Kabupaten Karawang

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ABSTRACT

Background: The body temperature of newborns is very vulnerable to changes in room temperature, especially during the first day of birth and the neonatal period. Baby care has an important role in ensuring the stability of body temperature during the adaptation period. Prevention of hypothermia in newborns aims to maintain a stable body temperature by avoiding exposure to cold and wind. Most parachute materials contain plastic, the basic ingredients of which are polyester, which have the properties of a waterproof and heat-resistant material, often used as a material for warm jackets in cold climates because of its ability to withstand the wind. Research objective: to determine the effect of a Padwarm or warm sleeping bag in preventing hypothermia in normal newborns. Method: this type of research is Quasy Experiment with the design "One group pre test-post test design" the study sample is 35 normal newborns. The sampling technique is accidental sampling, the analytical test used is the Wilcoxon Signed Rank Test. Results: there is a significant difference between before using Padwarm and after using Padwarm where the average temperature before use was 36.26°C; 95% CI (36.21 - 36.31) and the average temperature after use was 36.709°C; 95% CI (36.652 -36.765) p value of 0.000. Suggestion: Padwarm warm sleeping bags can be an alternative choice for baby sleeping bags in early neonates.

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1. INTRODUCTION

The body temperature of newborns is very susceptible to changes in room temperature, especially the temperature on the first day of birth and the neonatal period (Hutagaol et al., 2014). The results of the 2014 Riskesdas showed that the mortality rate for newborns was 34/1000 KH. Incidents of infant mortality often occur in the age period 0-6 days and 7-28 days. The underlying causes of these deaths include the neonatal period 0-6 days due to hypothermia 7%, postmaturity 3%, bleeding disorders and jaundice 6%. And the age of 7-28 days is a nutritional deficiency of 3%, yellow 3%, sudden death syndrome 3%.

The danger of hypothermia causes constriction of blood vessels, which results in anerobic metabolism, increases oxygen demand, results in hypoxemia and continues with death (Moffatt, 2013). The impact of hypothermia that will occur in newborns if not treated immediately is hypoglycemia, excessive oxygen consumption, delayed transition of fetal-to-neonatal circulation, respiratory syndrome disorders, metabolic acidosis, coagulopathy, intracranial hemorrhage, sepsis and even death (Juaria, 2017).

Thermoregulation in newborns is not optimally able to balance between heat production and heat loss in an effort to maintain body temperature in normal circumstances (Knobel et al., 2007). Newborns often experience hypothermia because of their inability to maintain body temperature, immature subcutaneous fat, large body surface compared to body mass, and cold environmental temperatures. In addition, newborns are not yet able to regulate their body temperature independently, so it is necessary to take precautions to avoid hypothermia (Villanueva-Garcia et al., 2020).

One of the adaptation processes that occurs in newborns is the baby's body's ability to maintain body temperature under normal circumstances, namely in the temperature range of 36.5°C-37.5°C. Newborns tend to lose heat 4 times faster than adults, this is because newborns have a large surface area compared to adults (Sari, 2020). Newborns have little fat to protect, which is about 16% BW in 3.5 kg newborns compared to adults, which is 20- 30% (Tomsits et al., 2010). In the first 30 minutes a baby can experience a temperature drop of 3-4°C, at room temperature 20-25°C the baby's skin temperature drops by around 0.3°C (Luthfiyah et al., 2021).

Baby care has an important role in stabilizing body temperature during the adaptation period, especially in early life at the age of 0-7 days or early neonates. Prevention of hypothermia in newborns aims to maintain body temperature stability by avoiding exposure to cold, such as blanketing to avoid wind gusts (Lunze et al., 2012). The results of the quote found that a high prevalence of hypothermia has been widely reported even from tropical countries, WHO has recommended care to maintain heat in newborn care but hypothermia continues to be a common condition in neonatal which are not documented and receive less treatment.

Baby care has an important role in ensuring the stability of body temperature during the adaptation period of newborns by paying attention to the mechanism of the process of losing body temperature such as through evaporation, conduction, radiation and convection (Setiyawan et al., 2019). The ways to treat hypothermia in newborns are to maintain a stable body temperature by avoiding exposing the baby to cold, such as covering the baby, keeping

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the baby away from gusts of wind and not placing the baby in an open space without being covered (Bissinger et al., 2010).

One of the factors that can prevent hypothermia in newborns is to carry out adequate warming procedures (Wildan et al., 2015). There are several ways that are often used to prevent and treat hypothermia in normal newborns, namely skin to skin contact, using the Kangaroo Method, putting the baby to sleep under a warm lamp and using baby blankets or ironed cloth beforehand (Tauriana et al., 2020). The main function of the blanket is to keep the baby warm and wrap it so that the baby's muscles and bones can grow perfectly. The blanket also gives a feeling of comfort and security to the baby. It can be seen when he cries when he is cold. After being given a blanket, the baby looks calm with the crying that subsides.

In this research a baby sleeping blanket product was designed in the form of a sleeping bag with a head cover called Padwarm made from parachute of the metallic type covered with dacron with the same type of material on the outside and inside of the warm bag. This type of metallic parachute is a type of fabric commonly used in winter jackets that are dark, shiny, soft and not stiff. Metallic parachute is a type of polyester fabric which has very thin fabric characteristics, tends to be water-resistant and wind-resistant. In addition, the advantages of metallic parachute are that it is easy to clean, dries quickly and does not cause odor.So it is suitable for use as a sleeping bag which does not always have to be cleaned after use because of the nature of the fabric which does not absorb sweat easily but tends to be warm. Polyester is a plastic- based material that has been widely used in several studies related to preventing heat loss in LBW and premature newborns such as the wrapping method and the use of hypothermic baby blankets to prevent hypothermia in LBW babies. In addition, the use of a heat insulation blanket method made of cotton coated with aluminum foil and plastic in preventing a decrease in body temperature in white rats (Young et al., 2006). Polyester is a plastic-based material that has been widely used in several studies related to preventing heat loss in LBW and premature newborns such as the wrapping method and the use of hypothermic baby blankets to prevent hypothermia in LBW babies.

The number of cases of death and morbidity of normal newborns that cause hypothermia has not been widely reported, several studies have explored more public knowledge about hypothermia. Hypothermia occurred in normal post-cesarean newborns in 23% (49 cases) of 184 deliveries. For every 100 g of decreased birth weight, the risk of hypothermia increased by 7.4% (95% CI: 4.4% - 10.5%), at birth weight limits between 3000 – 2500 grams and the risk is getting stronger and bigger in babies with underweigh. Number of babies in 2016 in Kab. Karawang as many as 140 cases at the age of 0-6 days and 29 cases at the age of 7-28 days. The causes include 1 case of tetanus, 3 cases of infection, 86 cases of low birth weight babies and 53 cases of asphixia. While the number of neonatal deaths in 2020 in Kab. Karawang was known as many as 122 cases, the causes of which include: LBW (59), asphyxia (33), congenital abnormalities (19), others (11). Meanwhile, the incidence of neonatal morbidity in 2020 is asphyxia (456), LBW (810), jaundice (983), infection (396), congenital abnormalities (63), others (1429). (Dinkes Karawang., 2020). The causes include: LBW (59), asphyxia (33), congenital abnormalities (19), others (11). Meanwhile, the incidence of neonatal morbidity in 2020 is asphyxia (456), LBW (810), jaundice (983), infection (396), congenital abnormalities (63), others (1429). The causes include: LBW (59), asphyxia (33),

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Based on this background, researchers tried to design a padwarm blanket using the basic material of the winter jacket as an alternative method of preventing hypothermia in normal newborns in preventing hypothermia in early neonates (0-7 days). The difference between Padwarm products and basic materials circulating in the market is that the nature of these warm bag blankets is that they are able to withstand cold from gusts of wind and are watertight while common products that are often used by the general public in the market are made from cottonnwhich is cool, cool to the skin and easily absorbs sweat. Padwarm finished goods have been tested for wind resistance in the Air Performance test on air/wind permeability at the Indonesian Textile Center, Ministry of Industry, Bandung with result 1.bBased on the above background, the formulation of the problem in this study is: is there any effect of Padwarm as a newborn sleeping bag blanket in preventing hypothermia at the household level.

2. METHODS

The type of research used was a quasy experiment with the "One group pre test-post test design". The independent variable in this study was Padwarm warm bag blankets and the dependent variable was changes in body temperature. The subject of observation in this study was changes in body temperature of newborns before and after treatment using warm sleeping bags/Padwarm. Then monitoring was carried out for 3 days. On the first day, body temperature was measured before treatment and on days 2-3, monitoring was carried out while using the Padwarm warm bag blanket.

4. RESULTS AND DISCUSSION

Table 1.

Distribution of Average Infant Body Temperature Monitoring on Days 1 to 3 In the Working Area of the Loji Community Health Center, Karawang Regency

2020 year

No.	Characteristics	n(35)	%
1	**Baby**		
	Gender		
	Man	19	54,3
	Woman	16	45,7
		35	**10.0**
	Birth weight (grams)		
	2500-3000	13	37,1
	3100-4000	22	62,9
		35	**100.00**

Based on the table Table 1. Frequency distribution based on the characteristics of the respondents found that the most sex was male by 54.3 percent (19 respondents), the highest birth weight of newborns was between 3100-4000 grams as much as 62.9 percent (22 respondent).

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Table 2.

The results of monitoring the average baby's body temperature on days 1 to 3 In the Working Area of the Loji Community Health Center, Karawang Regency 2020 year

Monitoring	Flat Flat	SD	Range (Min – max)	95% CI
Day 1 temperature	36,26	0.1459	35.8 - 36.4	36.21 - 36.31
Day 2 temperature	36,709	0.1634	36.2 - 37.5	36.653 - 36.765
Day 3 temperature	36,731	0.1278	36.3 - 37.0	36.668 - 37.775

Based on Table 2. The distribution of the frequency of respondents as a result of measuring the body temperature of newborns carried out for 3 days obtained an average temperature on day 1 of 36.26 with a lowest temperature of 35.8 ° C and a highest of 36.4 ° C in the average temperature range the second day the average newborn was 36,709 and the third day monitoring found 36,731 were in the normal body temperature category.

Analysis Result

Table 3.

Comparative Analysis of BBLN Body Temperature Before Use and After Use of Padwarm

Measurement		Means	SD	Range	95% CI	Z	*p**
Before	Day 1 temperature	36,26	0.1459	35.8 – 36.4	36.21 – 36.31	-5.201b	.000
After	Day 2 temperature	36,709	0.1634	36.2 – 37.5	36,652 -36,756		
Before	Day 1 temperature	36,26	0.1459	35.8 – 36.4	36.21 – 36.31	-5.195b	.000
After	Day 3 temperature	36,709	0.1634	36.2 – 37.5	36,652 -36,756		

**p≤0.05 Wilcoxon Signed Rank Test*

Based on the results of the Wilcoxon Signed Rank Test calculation, the Z value obtained is -5.201 with a p value (Asymp. Sig 2 tailed) of 0.000 so the hypothesis decision is to accept HI or which means there is a significant difference between before using padwarm and after using Padwarm.

Table 4.

Distribution of Average Body Temperature of Infants before Using Padwarm and During Use of Padwarm Day 2 in the Working Area of the Loji Health Center, Karawang Regency, 2020

S variable		N	MeanRanking	Sum of Ranks
Temperature_Mean_Post 1 – Temperature_Average_Pre-Intervention	Negative Rank	0a	.00	.00
	Positive Ranks	35b	18.00	630.00
	ties	0c		
	Total	35		

Based on Table 4. Distribution of the average body temperature of newborns during Pre-use and Post-use, it is obtained that the Negative rank between the baby's body temperature before and after using Padwarm 1 is 0 on both the N value. The mean rank and the Sum of Ranks of these results showed no decrease in temperature from the temperature before using

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the padwarm to the temperature after using the padwarm. In the positive ranks between before and after the use of padwarm I there were 35 data meaning that 35 babies had an increase in body temperature from before using Padwarm and after using padwarm. The average increase in the baby's body temperature is 18.00 and the total increase in the baby's body temperature (sum of ranks is 630.00).

Comparison of Average Body Temperature of Newborns

In the average temperature range of day 1, the average newborn on day 1 of life experiences cold stress or cold stress, which is called mild hypothermia. On the 2nd day of monitoring, the average temperature range for newborns was between 36.709 and 3. When using a warm sleeping bag, the average baby's temperature was 36.709 and 36.731, which were in the normal body temperature category.

The results of research on the body's response of newborns showed that the average baby on the first day (24 hours) postpartum experiencing hypothermia experienced mild cold stress or hypothermia (shabu 36-36.5) in each measurement. These results are in line with Zulala's research, et al 2018. The most common hypothermic events in normal newborns occurred at the 30th minute of 54.7% and the least at the 24th hour of 21.9% (Zulala, Sitaresmi, & Sulistyangsih, 2018). The loss of body heat is caused by the process of losing heat in infants through the transfer of body heat to the surrounding environment in the form of evaporation, namely heat loss due to evaporation, conduction through direct contact between the baby's body and a cold surface, convection through cold air in the delivery room and radiation when the baby is placed close to objects that have a temperature less than the baby's body temperature (Ministry of Health, 2013, Kosim et al., 2014; Knobel-dail, 2015), cited Zalala., 2018). Thus a newborn baby at 24 hours of age is likely to experience hypothermia, especially if the 10 warm chains are not properly attended to when the client brings the baby home.

For every 100 g of decreased birth weight, the risk of hypothermia increased by 7.4% (95% CI: 4.4% - 10.5%), at birth weight limits between 3000-2500 grams and the risk is getting stronger and bigger in babies with underweight. So that it is possible for normal babies to have a risk of hypothermia of 7.4% plus if their weight is <2500 grams the risk increases. In this study, infants were assessed at the age of 1 day or 24 hours after returning from the health facility. the incidence of mild hypothermia in these infants is probably due to the warm chain when returning home or the process of adapting the baby to a home environment that is different from the environment of health facilities such as the DTP / BPM Health Center with heated baby boxes and warm rooms. So mild hypothermia occurs in these babies.

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Comparative Analysis of BBLN Body Temperature Before Use and After Use of Padwarm

Changes in body temperature on day 1 before using a warm sleeping bag and after using it showed that there was a significant difference between before using Padwarm and after using Padwarm of -5.201 with a p value of 0.000 as well as monitoring results on day 3. The results showed that there was a change in the body temperature of newborns when they were put on a sleeping bag compared to before using a warm sleeping bag. The warm/Padwarm sleeping bag that was tested on the sample was made using a metallic parachute material which has a basic material similar to Polyester or is made of plastic elements. The results of the study of polyester materials are materials that are often used in winter warm jackets. Polyester is a plastic-based material that has been widely used in several studies related to the prevention of heat loss in LBW and premature newborns such as the wrapping method and the use of hypothermic baby blankets to prevent hypothermia in LBW .

The warm sleeping bag / Padwarm made from parachute of the metallic type is made of fine dacron layers and then sewn with the same type of material on the outside and inside of the warm bag. This type of metallic parachute is a type of fabric commonly used in winter jackets that are dark, shiny, soft and not stiff. Metallic parachute is a type of polyester fabric that has the characteristics of a very thin fabric, tends to be water-resistant and wind-resistant. Padwarm finished goods have been tested for wind resistance in the Air Performance test on air/wind permeability at the Indonesian Textile Center, Ministry of Industry, Bandung with results 1. The smaller the DTU (Air Permeability) value of a material, the better its ability to hold air from the outside. So based on the results of this study that the use of Padwarm warm sleeping bags can reduce the risk of hypothermia in newborns aged 1-3 days.

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5. CONCLUSION

The average body temperature of newborns before using the Padwarm warm sleeping bag was 36.26°C with a 95% CI (36.21°C - 36.31°C).

The average body temperature of newborns after using the Padwarm warm sleeping bag on day 2 and day 3 was 36.7090C with a CI of 95% (36.652°C -36.765°C) and 36.731°C with a CI of 95 % (36.668°C - 37.775°C).

There was a significant difference between before and after using Padwarm warm sleep of -5.201 with a p value of p 0.000.

6. SUGGESTION

Padwarm warm sleeping bags can be an alternative option to prevent hypothermia in normal newborns.

In order for the effectiveness of the tool to be tested properly, it is necessary that sleeping bags be tested in areas where the air tends to be cool so that they can be more useful. It is necessary to develop designs for additional basic materials and models as well as thermal and comfort testing so that these blankets can be more useful for the general public, especially for the care of LBW babies.

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