

# The Effect of Black Clothing on Prevention of Hypothermia in Newborns

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Hypothermia in the newborn (BBL) due to the temperature control center is not adequate, inadequate body insulation for a thin, flat layer. Hypothermia accounts for 6.3% of infant deaths. Continuous hypothermia causes respiratory acidosis, respiratory distress ending death, apparel effect on body temperature. Black clothing absorbs heat radiation has properties very well. This study aimed to influence their use in the prevention of hypothermia BBL interventional research methods with Post Test Only Control Group Design. The population of the entire BBL Central Lampung hospitalization in a health center for six months. Samples were 98 infants, 49 infants intervention group, the control group of 49 infants. Analysis of using independent t-test. The resulting increase in body temperature BBL using the regular black clothes 0.3531°C, increased body temperature in addition to the use of black clothing 0.0510°C. The results of the statistical test p-value of 0.000, meaning that there is the effect of the use of black clothing to the increase in body temperature BBL. Conclusions black clothes more effectively prevent hypothermia in the BBL. Suggestion black clothing is recommended for BBL to prevent hypothermia.

**Keywords:** *Clothing, Baby, Hypothermia.*

## Introduction

The newborn is a newborn child of a mother intrauterine to extrauterine life, which requires the baby is in a state of physiological independence. This period was a transitional period because it requires quick adaptation to the baby, especially related to body temperature (Varney, Kriebs, & Gegor 2008).

The body temperature is the difference in the amount of heat produced by the body, and the amount of heat lost to the environment. A central regulator of body temperature regulates the

body temperature is called the thermoregulator located in the hypothalamus. By hypothalamic temperature adjustment mechanism is controlled through a particular receptor called "Did you mean: Thermoreceptor." There are two Did you mean: thermoreceptor, namely, thermoreceptor peripheral skin temperature monitoring throughout the body and distribute information regarding changes in skin temperature to the hypothalamus. The central Thermoreceptor monitor changes in core temperature, which is located in the hypothalamus, nervous system, and abdomen (Sherwood, 2001).

It also regulates body temperature regulation through the balance of production and heat loss. Heat production is a primary metabolic additional product. Resulting in internal organs, especially the liver, brain, heart, and skeletal muscle during work. So the speed of heat production is influenced by several things. Namely, the basal metabolic rate of all cells of the body, speed up metabolism caused by muscle activity including muscle contraction caused chills, metabolism additional caused by the hormone thyroxine, growth hormone, and testosterone on the cell metabolism. Other caused by the effects of epinephrine, norepinephrine, and sympathetic stimulation to the cell. An increased metabolism caused by increased chemical activity within the battery itself, especially when the cell temperature increases. Heat loss from the body is affected by the condition of the blood vessels and skin thickness. The heat generated from the heart, brain, heart, skeletal muscle is delivered to the skin by blood vessels. The heat from the skin and then released into the air. Thus the rate of heat loss is determined by the speed to be conditioned eat from the heat source to the surface, in this case, the blood flow and nerve sympathies role, and heat speed to the surroundings delivered from the surface, in this case, the insulating body plays a role (Guyton, MD, 1997). In addition to the blood flow and nerve, the heat-insulating body also contributes to the loss of body heat. The insulating body is made of skin, subcutaneous tissues, especially fat. Fat is a vital heat insulator being able to distribute the heat 1/3 of the other networks. So the thicker the insulating body, body heat expenditure into the surrounding environment is getting slower and thinner insulating body, lose body heat faster (Sherwood, 2001).

Adaptation physiology of the newborn against temperature, including rapid adaptation. But in the infant center regulating body temperature has not been functioning well, seeing control of body temperature in newborns has not been adequate until two days after birth (Fraser & Cooper, 2009). In addition to thermoforming infants through only one source, namely chocolate and fat metabolism or nonshivering thermogenesis (Varney, Kriebs, & Gegor 2008).

Brown fat-burning, although it can cope with cold stress on the baby because it produces heat, but should be anticipated to prevent excessive burning, Kaena burning brown fat needs oxygen three times more than other tissues of the body. So feared unintended effects occur, namely, the transfer of oxygen and glucose from the central regulator of vital such as the brain and heart muscle. Besides the availability of brown fat as a source of heat in the baby just enough for 2-4 days in infants born at term (Fraser & Cooper, 2009).

In addition to the baby fat layer subtotal, as good temperature insulator is thin to provide poor body insulation, resulting in an accelerated transfer of heat to the core of the skin and then into the environment. Vasoconstrictor mechanism which serves to prevent heat loss is not functioning correctly so that the baby is very susceptible to cold stress experienced and continues to experience below-average body temperature or hypothermia (Varney, Kriebs, & Gegor 2008).

Hypothermia is a state of body temperature below 36.5 degrees Celsius. A value baby's body temperature is known by measuring the temperature. The average body temperature in newborns is 36.5-37°C. If the newborn's body temperature 36.0-36.4°C, meaning the baby suffered mild hypothermia (cold stress). If the temperature of newborns 32.0-35.9°C, saying the baby suffered moderate hypothermia. And if the temperature of newborns less than 32C, it means that the baby suffered severe hypothermia. Temperature measurement in newborns can be done by using a thermometer or by feeling the baby's skin (touch votes) and observing other signs. Baby's temperature should be monitored closely, especially in infants with special conditions such as infants suspected of having hypothermia or hyperthermia. Temperature measurement should be performed regularly with a specified interval. Usually, the temperature is measured every four hours, or at least three times a day, to monitor the incidence of hypothermia.

Hypothermia in newborns prone to happen, other than because of the condition of the baby's body is still adaptation, factors of care that is not right also contributed, such as drying the baby's body is not perfect, wear clothes that are not appropriate, the separation of the baby from the mother and removal procedures are not adequate when moving the baby, the cause of hypothermia ((JNPK-KR), (IDAI) and (POGI), 2008).

The results showed that at the beginning of birth, a baby's temperature is within the range that is not stable. Research (Qonitun and Utaminingsih, 2018) explain from 29 infants 25 infants (86.21%), experiencing unstable temperature after birth. According to (Amelia & Iszati, 2015), the baby's body temperature after delivery ranged 36,5°C, which is a hazardous range for hypothermia. According to (Dzakiyyah Wildfire and Febriana, 2017). The newborn's body temperature is at its low normal range, 36.539 degrees Celcius. This situation explains that hypothermia may occur during the first few hours after birth. Decrease in body temperature can occur when a newborn and yet in the clear from the amniotic fluid that allows infants lose body heat (Yuliantini & Ekayani, 2017). Hypothermia is caused also by the environmental change that is from the time in the womb to life outside the womb because the newborn's body not yet ready to adapt to new environments (Idayanti, 2015).

Hypothermia is a damaging impact on the baby. Hypothermia causes vasoconstriction of blood vessels, resulting in decreased lung and occurs purpose respiratory acidosis, respiratory distress

resulting in the resumption of the heart valves. Furthermore, it can end up with the death of the baby (Varney, Kriebs, & Geger 2008).

Infant mortality in Indonesia is still relatively high compared with other ASEAN member countries, namely, 4.6 times higher than Malaysia, 1.3 times higher than the Philippines, 1.8 times higher than Thailand. Infant Mortality Rate (IMR) in Indonesia is still relatively high. According to the Indonesian Demographic Health Survey (IDHS) in 2007, known IMR 34/1000 live births (Dep.Kes, RI 2009). This figure is far from being targeted by the government in Healthy Indonesia 2010. Namely, the reduction of IMR is 15/1000 live births in 2010 (DepKes RI Dirjend Pelayanan Medik dan Dirjend Bina Kesehatan Masyarakat, 2002).

Infant mortality seen from the age when the baby died, based on the Household Health Survey (Survey) in 2001, approximately 47% of deaths occur in the neonatal period, the first 28 days of life (DEPKES RI, 2002). Riskesdas (2007), the incidence of infant deaths occur in the neonatal period is approximately 55.8% and about 78.5% of the deaths occur in the perinatal period is 0-6 days of age, (Dep.Kes.RI, 2010). One of the causes of infant mortality is hypothermia or below average body temperature of 6.3%.

Weighing the impact of hypothermia is necessary to prevent it. Efforts are being made through the efforts of early breastfeeding initiation. One of the benefits of early breastfeeding is keeping the baby's body warm. This is the result of research by (Chaidir, 2016), which explains that there are differences in the newborn's body temperature before and after the early initiation of breastfeeding with a p-value of 0.0001. According to research results (Setyorini, Rustina, and Nasution, 2011). There is increasing after the baby's body temperature is done early initiation of breastfeeding with a p-value of 0.000. Research result (Ekawati, 2015) describes the average increase in body temperature after the first start of breastfeeding babies increase 1-3°C. Efforts to prevent heat loss in newborns can be made as well by adjusting the temperature tendency before the baby is born. According to research results (Wibowo, Salimo, & Hidayah, 2017). Operasai room temperature (24°-26C) will raise the temperature median of preterm infants.

Procedures to prevent hypothermia in newborns has also been done with a delay of 6 hours bath, baby skin contact, and mother, as well as the baby's head and body wrap (Direktorat Kesehatan Anak Khusus, 2010). According to research (Hutagaol, Darwin, and Yantri, 2014), prevention of the baby's body heat loss can also be done by conducting a series of activities, which soon dry out, wrap the newborn, providing a warm delivery room and the ideal ambient temperature. Carries a friendly chain after birth can reduce 1.4 times the risk of hypothermia in newborns.

The skin contact method to the mother or baby kangaroo method is a method to warm the baby. According to research results Utami (2010), kangaroo method implementation can increase the newborn's body temperature. Research result (Farida & Yuliana, 2017). Explaining that the

baby skin to skin contact of mother or father can improve 1 derajat Celsius temperature after skin contact for 2 hours. According to (Setiyawan, Prajani, & Agussafutri, 2019), skin contact for 1 hour between low birth weight baby's skin with the mother's skin, increasing the baby's temperature as much as 0,41C. According to research results (Heriyeni, 2018), that an increase in temperature of the baby's body into 37.10°C, 35,49°C, with a p-value of 0.000 after the baby's skin contact with the mother's skin.

Touch is the prevention of hypothermia. It is consistent with the results of research (Hikmah, Rustina, & Pujasari, 2011), which explains that touch therapy in premature infants can increase body temperature with a p-value of 0.000. Research result (Saprudin & Sari, 2018) explains there are significant therapeutic touch or nesting on the baby's body temperature. Baby's body temperature can also be controlled by music therapy. According to research results (Aini, Hartini, and Nurullita, 2015) explains that gamelan music can increase a baby's temperature from 35,38°C be 36,14°C, with p-value 0.000. Research result (Hariati, Rustina, & Handiyani, 2010) explain that lullaby music therapy given every 30 minutes a day for three days can increase the newborn's body temperature. The results of the study (Putriana and Aliyanto, 2018), with the Quran murrotal therapy, which is given for 30 minutes a day, can increase the body temperature of low birth weight babies.

Used the baby clothes supposed to influence the baby's body temperature. According to the results of research (Sudarmi, Supriatiningsih, & Novadela, 2019) that there is the influence of the baby's body temperature is applied early initiation of breastfeeding blanket when IMD with a value of 11.83 and the value of F (Ftabel 3.92). Also, the results of research (Maryamah, Raksanagara, Rashad, & et al., 2019) which explains that the use of hypothermia baby blanket can increase body temperature low birth weight infants with a p-value of 0.001.

The use of specific colors of clothing can also be used to keep babies warm. Clothing serves to protect themselves from outside influences such as heat or cold temperatures. In hot conditions, clothing protects the body from being burned by the sun. Meanwhile, when the cold, clothing serves to warm the body, due to its thermal insulation properties. In addition to the comfort of dressing, the material is also determined by the color of the dress. Bright colored clothes as white have features that reflect sunlight. At the same time, dark colors absorb light clothing sun (Noor Mufida, Shukri ahsani, and Prasetya Aji, 2016), the Black dress can absorb heat very well. The black apparel surface has absorbent properties as excellent heat radiation, especially when the object surface temperature is lower than the temperature of the surrounding environment.

Thermal radiation is the radiant energy of an object due to the influence of body temperature. Thermal radiation is always there for each purpose. However, not all thermal radiation can be seen by the eye. Anyone with mudah objects absorbs radiation, and there are efficiently emit radiation. A black body is an object that absorbs all radiation that fell to him. A black body is

an object that can absorb all the radiation it receives and can radiate throughout the radiation it receives. However, the number and type of radiation emitted is very dependent on the temperature of the black body (Talarosha, 2005). Black body surface is a surface that has the properties as the radiation-emitting and absorbing radiation is excellent. If the surface temperature is higher than the surrounding environment will emit black body radiation. However, if the surface temperature is lower than the temperature of the surrounding environment will be absorbing black body radiation. A black body is a system that can absorb all the radiation of heat on the object. The research results from Hanif and Suwondo (2018) of thermal radiation, explaining that the black color surface absorbs more heat than the white surface. According to (Talarosha, 2005), a building whose surface using black paint, able to absorb the heat of up to 94%. This means that the black color best used in situations that require the absorption of heat or heat more.

Newborns are particularly vulnerable to cold or stress the body temperature below normal. It is not only due to physiological factors such as thermoregulation infants who have not been capable at birth; insulation body fat is thin. The mechanism vasoconstrictor is not functioning correctly. The source of heat production, which is only dependent on metabolism and careless right after the baby is born like, not drained correctly, use clothes that are not fixed and inadequate transportation. The number of risk factors for hypothermia may continue to decline in the extreme temperatures in newborn babies, the use of the color of clothes on the baby after birth should be considered as the right choice.

## Methods

Quantitative research with interventional study design approaches Post Test Only Control Group Design. The study consisted of an intervention group and a control group. Determination of the intervention group and the control group based on randomisation. Measurement of the dependent variable one-time measurement, that is, after giving treatment in the intervention group and one in the control group. The results of the study then compared. Treatment carried out with masking or disguise, i.e., a single mask or a single-blind, meaning that the subject does not know the intervention provided.

The research was conducted in five Inpatient Health Center in Central Lampung region. Population affordable all newborns in Inpatient Health Center between July and December, which met the selection criteria. Inclusion criteria consisted of newborns at term, normal vaginal delivery process, age less than two days. Exclusion criteria included, newborn babies with complications of pregnancy and childbirth, cared for in incubators and the baby's mother is not willing as respondents,

The sample size was calculated using a sample size calculation hypothesis test against an average of two independent populations. Calculation of the samples with the Power and Sample

Sise Calculation Version 3.0.43, test the hypothesis for the mean difference of the two people. In the previous study, values obtained the standard deviation of the average population of 0.5. In contrast, the average difference in the community was 0.3, with  $\alpha = 0.05$  and a power of 80% (0.84), then obtained a sample of 49 newborns in the intervention group and 49 newborns in the control group, to reject the null hypothesis.

The sampling technique used nonprobability sampling with purposive sampling types. All newborns who came to the clinic inpatient and met the inclusion criteria included in the study subjects until the required number of questions met. Random allocation or randomisation performed to determine the items to be included as an intervention group and a control group. Randomisation research was done by simple randomisation, using a random number table. The intervention group to 0-4, while the control group for the numbers 5-9. Each number is corresponding to random numbers in a sealed envelope. At the time of the study subject or the representative selecting containers without a public figure in it. The results of the chosen value basis for determining the intervention and control groups. The intervention group was dressed in black clothing while the control group dressed in white clothes with the same material — controlled room at a temperature of 28 degrees Celsius. After a 2-hour examination, body temperature returned to using a mercury thermometer, used a mercury thermometer is a thermometer to read the minimum scale of 35°C. Axillary temperature measurement is done, though, because it is better than the rectum. After all, it is safer, more comfortable, cleaner, and without risk to the baby. Also, according to research (Nusi, Danes, and Moningka, 2013), Explains that there are differences in measurement results axillary temperature using a thermometer and a digital so that measures just use the mercury thermometer. The measurement results are calculated on a scale of degrees centigrade.

## Results and Discussion

Univariate Analysis, Results of univariate analysis aim to describe the newborn's body temperature that wearing clothing in addition to black and white colors, namely black. The results of the study are described in Table 1 as follows:

**Table 1. Body Temperature Measurement Result Newborn**

Frequency	BBL with clothes other than black n (49)	BBL dressed in black n (49)
-Rata average temperature rise	.0510	.3531
minimum	-1.00	-.60
maximum	1:40	1:50

Based on Table 1 it can be seen that out of 49 newborns who wear clothes other than black, after the temperature measurement result the average increase the newborn's body temperature is 0.0510 ° C. While the results of temperature measurements in newborns who wear black, the average rise in the baby's body temperature is 0.3531 ° C.

The bivariate analysis, The results of the bivariate analysis aimed to determine the effect of the use of black color clothing against the newborn's body temperature, a review of parametric statistical tests independent t-test with CI 95% or  $\alpha = 0.05$ . The results are described in Table 2.

**Table 2. Distribution of Average Effect of Clothing Color Black Against Body Temperature Newborn baby.**

Variable Clothes	mean	SD	SE	p-value	n
Pakistan Color Black	0.3531	.33423	.04775	0000	49
Besides clothing color Black	0.0510	.43355	.06194		49

Based on Table 2, obtained an average yield of the effect of temperature on the use of black color clothes in the newborn is 0.3531°C with a standard deviation 0.33423°C, while for the effect of temperature on the use of clothes other than black in newborns is 0.0510°C with a standard deviation 0.43355°C. The results of the statistical test p-value = 0.000, significant at alpha 5% seen no significant effect on the average increase in body temperature of newborns among those who received the black color clothing with clothing colors other than black.

The survey results revealed that the average effect of or increase in body temperature of newborns after use clothes other than black is 0.0510°C. While the rise in body temperature of newborns who dressed in black color clothes for 2 hours, an increase in average body temperature rises 0.3531°C. This situation shows that there is a difference in temperature rise in newborns who use black clothes of 0.3021 ° C. The increase in body temperature of newborns already apparent, although only for 2 hours dressed in a black outfit. He indicates that black color clothes better than clothes other than black in raising the body temperature of the newborn. Black clothing is also able to maintain the body temperature of the infant. It can be seen in Table 1, 100°C) so that black color clothing tends able to keep the newborn's body temperature.

The influence of the black clothes of the newborn's body temperature. The results of the statistical test p-value = 0.000, significant at alpha 5% seen no significant effect on the average temperature of newborns among those who received the black color clothes with clothes other than black. Babies who are dressed in black garments after birth have a higher temperature rise

and decrease the minimum temperature when compared to infants who put on clothes other than black. Based on data from this study is by theory, the black body is a system that can absorb all the radiation of heat on the object. Thus when objects or clothing in black on the surface or touching the baby's skin for use as clothing or to wrap the baby,

Newborns experienced a period of reasonably vulnerable to the occurrence of hypothermia. The period after the baby is born a dynamic adaptation period or transition for the baby because the new moves from intrauterine life full reliance on extrauterine life to the mother that requires the baby are in a state of physiological independence. (Varney, Kriebs, & Gegor 2008) This period began after delivery and continued for several weeks. Infant in the transitional period must obtain quick and appropriate care. It depends on the baby's condition at room temperature or ambient temperature when they are born so that the improper care delivery and baby's overdue adaptation shortfall in the transitional period that affects infant mortality. (Varney, Kriebs, & Gegor 2008).

Especially when the baby is born in a condition Infant Low Birth Weight (LBW) is less than 2500 grams. The LBW infants are at particular risk of hypothermia. Hypothermia can occur during the first few hours after birth, and cause adverse effects for the baby. Hypothermia causes vasoconstriction of blood vessels, resulting in decreased lung and occurs purpose respiratory acidosis, respiratory distress resulting in the resumption of the heart valves. Furthermore, it can end up with the death of the baby. According to (Dep.Kes. RI, 2010), hypothermia or below average body temperature accounted for 6.3% of infant deaths. Risk reduction is because of the heat control centers not robust newborns to 2 days after birth. Also, a thin layer of fat provides an insulation subtotal weak body, a comprehensive comparison between the body surface area and body mass infant, causing the baby is very susceptible to body heat loss, and hypothermia occurs (Fraser & Cooper 2009). Newborns to be clothed in black will increase the temperature and or able to maintain their body temperature so that the incidence of hypothermia will decrease or reduced. Thus the use of black color clothes in the newborn can reduce infant mortality caused by hypothermia.

Clothing for use by infants after birth affects the baby's body temperature, especially from the aspect of color. During this time, no specific provisions related to the color of the clothes worn by a newborn baby. However, the actual selection of colors contributes to body temperature, such as the results of this study, which proves the color black used clothing baby after birth, can increase the baby's body temperature better than babies who wear clothing other than black.

The radiant energy object due to the influence of temperature or the so-called thermal radiation is always a purpose. However, not all thermal radiation can be seen by the eye. No objects that can easily absorb the radiation and there is easily emitting radiation. A black purpose is an object that absorbs all radiation that fell to him. A black objective is an object that can absorb all the radiation it receives and can radiate throughout the radiation received, including black

garments. The black dress surface has absorbent properties as excellent heat radiation, especially when the object surface temperature is lower than the temperature of the surrounding environment. However, the number and type of radiation emitted are very dependent on the temperature of the black body.

The black body surface is a surface that has the properties as the radiation-emitting and absorbing radiation is excellent. If the surface temperature is higher than the surrounding environment will emit black body radiation. However, if the surface temperature is lower than the temperature of the surrounding environment will be absorbing black body radiation. Black body capable of absorbing all the heat radiation on the object. Thus when objects or black cloth on the surface or touching the baby's skin for use as clothing or to wrap the baby, which is when the body temperature tends born lower than the ambient temperature, the black cloth will absorb heat radiation and can heat baby's body. If the surface temperature is higher than the surrounding environment will emit black body radiation. However, if the surface temperature is lower than the temperature of the surrounding environment will be absorbing black body radiation. Black body capable of absorbing all the heat radiation on the object. Thus when objects or black cloth on the surface or touching the baby's skin for use as clothing or to wrap the baby, which is when the body temperature tends born lower than the ambient temperature, the black cloth will absorb heat radiation and can heat baby's body. If the surface temperature is higher than the surrounding environment will emit black body radiation. However, if the surface temperature is lower than the temperature of the surrounding environment will be absorbing black body radiation. Black body capable of absorbing all the heat radiation on the object. Thus when objects or black cloth on the surface or touching the baby's skin for use as clothing or to wrap the baby, which is when the body temperature tends born lower than the ambient temperature, the black cloth will absorb heat radiation and can heat baby's body. Black body capable of absorbing all the heat radiation on the object. Thus when objects or black cloth on the surface or touching the baby's skin for use as clothing or to wrap the baby, which is when the body temperature tends born lower than the ambient temperature, the black cloth will absorb heat radiation and can heat baby's body. Black body capable of absorbing all the heat radiation on the object. Thus when objects or black cloth on the surface or touching the baby's skin for use as clothing or to wrap the baby, which is when the body temperature tends born lower than the ambient temperature, the black cloth will absorb heat radiation and can heat baby's body.

Based on the results of this study, our researchers recommend to all health workers, especially workers midwife who has authority to conduct newborn care for wearing black in providing midwifery care to newborns to prevent hypothermia, to reduce and or reduce the number of infant deaths caused by the disruption of hypothermia in newborns. The results of this study are expected to contribute to the development of midwifery care in newborns.



## **Conclusion**

Based on the results of this study concluded that newborns are dressed in black clothes, increased body temperature better, and decreased body temperature lower when compared to newborns who are dressed in clothes other than black after birth. Thus, the black clothing that is applied after the baby is born proven to prevent hypothermia in newborns. Advice for newborn care enforce the use of black color clothes in the infant to avoid hypothermia.

## REFERENCES

- Aini, K. N., Hartini, S., & Nurullita, U. (2015). Pengaruh Terapi Musik Gamelan terhadap Suhu Tubuh Bayi Berat Badan Lahir Rendah (BBLR) di RSUD Sunan Kalijaga Demak. *Jurnal Ilmu Keperawatan dan Kebidanan (JIKK)*, 1-8.
- Amelia, R., & Iszati, R. (2015). Pengaruh Inisiasi Menyusu Dini (IMD) terhadap Suhu Tubuh Bayi Baru. *Jurnal Ilmu Kesehatan 'Afiyah*, 2.
- Chaidir, R. (2016). Pengaruh Inisiasi Menyusu Dini Terhadap Suhu Tubuh Bayi Baru Lahir Di Bpm Padang Panjang. *Jurnal Ipteks Terapan*, 20-26.
- DEPKES RI. (2002). *Pedoman Teknis Audit Maternal Perinatal Di Tingkat Kabupaten Kota*. Jakarta: DEP.KES RI.
- DepKes RI Dirjend Pelayanan Medik dan Dirjend Bina Kesehatan Masyarakat. (2002). *Pedoman Teknis Audit Maternal-Perinatal Di Tingkat Kabupaten/Kota*. Jakarta: DepKes RI.
- Dep.Kes. RI, K. K. (2010). *Pelayanan Kesehatan Neonatal Esensial Pedoman Teknis Pelayanan Kesehatan Dasar*. Jakarta: Kementerian Kesehatan.
- Direktorat Kesehatan Anak Khusus. (2010). Panduan Pelayanan Kesehatan Bayi Baru Lahir Berbasis Perlindungan Anak. *Kementerian Kesehatan Republik Indonesia*, pp. 1–68.
- Dzakiyyah Wildan, H. and Febriana, P. (2017). Pengaruh Inisiasi Menyusu Dini Terhadap Kejadian Hipotermia Pada Bayi Baru Lahir Di Puskesmas Sumbersari Kabupaten Jember. *Saintika Medika*, 11(1), p. 34. doi: 10.22219/sm.v11i1.4193.
- Ekawati, H. (2015). Pengaruh Inisiasi Menyusu Dini (IMD) terhadap Perubahan Suhu Tubuh pada Bayi Baru Lahir di Klinik Bersalin Mitra Husada Desa Pangean Kecamatan Maduran Kabupaten Lamongan. *Jurnal Surya*, 7.
- Farida, D., & Yuliana, A. (2017). Pemberian Metode Kangaroo Mother Care (KMC) terhadap Kestabilan Suhu Tubuh dan Berat Badan Bayi BBLR di Ruang Anyelir Rumah Sakit Umum RA Kartini Jepara. *Jurnal Profesi Keperawatan*, 4, 99-111.
- Fraser, D., & Cooper, M. (2009). *Buku Ajar Bidan MYLES, Ed 14*. Jakarta: EGC.
- Guyton,MD, A. (1997). *Fisiologi Manusia dan Mekanisme Penyakit*. Jakarta: EGC.
- Hanif, R. F. and Suwondo, N. (2018). Pengembangan eksperimen serapan kalor pada radiasi cahaya oleh permukaan berwarna hitam dan permukaan berwarna putih berbasis Arduino-LINX-LabView. *Seminar Nasional Quantum*, 25, pp. 659–663. Available at: <http://seminar.uad.ac.id/index.php/quantum/article/viewFile/333/280>.
- Hariati, S., Rustina, Y., & Handiyani, H. (2010). Peningkatan Berat Badan dan Suhu Tubuh Bayi Prematur Melalui Terapi Musik Lullaby. *Jurnal Keperawatan Indonesia*, 13, 160-166.

- Heriyeni, H. (2018). Pengaruh Metode Kanguru terhadap Stabilitas Suhu Tubuh Bayi di Ruang Perinatologi Rumah Sakit Umum Daerah Bengkalis. *Meanara Ilmu*, 12, 86-93.
- Hikmah, E., Rustina, Y., & Pujasari, H. (2011). Peningkatan Suhu Bayi Prematur Melalui Terapi Sentuhan. *Jurnal Keperawatan Indonesia*, 14, 179-184.
- Hutagaol, H. S., Darwin, E., & Yantri, E. (2014). Pengaruh inisiasi menyusui dini (IMD) terhadap suhu dan kehilangan panas pada bayi baru lahir. *Jurnal Kesehatan Andalas*.
- Idayanti, T. (2015). Pengaruh Inisiasi Menyusui Dini (IMD) terhadap suhu tubuh bayi baru lahir di BPS Heppy Rina desa Seduri Mojosari dan Bidan Kurnia Indriyanti desa Bulusari Gempol. *Jurnal Ilmiah Ilmu Kebidanan*.
- JNPK-KR, N. C. T. N., (IDAI), the I. P. S. and (POGI), the I. S. of O. and G. (2008). Pelayanan Obstetri Dan Neonatal Emergeni Komprehensif (Ponek). p. 91.
- Kemendes. (2010). *Pelayanan Kesehatan Neonatal Esensial Pedoman Teknis Pelayanan Kesehatan Dasar*. Jakarta: Kementerian Kesehatan RI.
- Mariati, M. (2015). Pengaruh Pendamping Persalinan Terhadap APGAR Score Bayi Menit Pertama. *Jurnal Ipteks Terapan*. Lembaga Layanan Pendidikan Tinggi - LLDIKTI - Wilayah X. doi: 10.22216/jit.2014.v8i3.7.
- Maryamah, A., Raksanagara, A. S., Rasyad, A. S., & dkk. (2019). Pengaruh Penggunaan Hipothermic Baby Blanket dalam meningkatkan dan Menstabilkan Suhu Tubuh BBLR di RSUD Dr. Slamet Garut. *Jurnal Sistem Kesehatan*, 5, 24-30.
- Noor Mufida, H., Syukri Ahsani, M. and Prasetya Aji, M. (2016). "Thermal Conditioning" Untuk Mengurangi Dampak Panas Pada Pakaian Dengan Kombinasi Warna', V, pp. SNF2016-MPS-19-SNF2016-MPS-24. doi: 10.21009/0305020204.
- Nusi, D. T., Danes, V. R., & Moningga, M. E. (2013). Perbandingan Suhu Tubuh Berdasarkan Pengukuran Menggunakan Termometer Air Raksa dan Termometer Digital pada Penderita Demam di Rumah Sakit Umum Kandou Manado. *Jurnal e-Biomedik (eBM)*, 1, 90-196.
- Qonitun, U. and Utaminingsih, S. (2018). Gambaran Kestabilan Suhu Tubuh Bayi Baru Lahir Yang Dilakukan Inisiasi Menyusu Dini (IMD) (Di Ruang Mina RS Muhammadiyah Tuban). *Jurnal Kebidanan*, 10(1), p. 7. doi: 10.30736/midpro.v10i1.58.
- Saprudin, N., & Sari, I. K. (2018). Pengaruh Penggunaan Nesting terhadap Perubahan Suhu Tubuh Saturasi Oksigen dan Frekuensi Nadi pada Bayi Berat Badan Lahir Rendah di Kota Cirebon. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, 9, 16-26.



- Setiyawan, Prajani, W. D., & Agussafutri, W. D. (2019). Pengaru Pelaksanaan Kangaroo Mother Care (KMC) Selama Satu Jam terhadap Suhu Tubuh Bayi Berat Badan Lahir Rendah (BBLR) di Ruang Perinatologi RSUD Pandan Arang Boyolali. *Jurnal Keperawatan Global*, 4, 1-73.
- Setyorini, Y., Rustina, Y., & Nasution, Y. (2011). Peningkatan Suhu Bayi Baru Lahir dan Ibu Melalui Inisiasi Menyusu Dini. *Jurnal Keperawatan Indonesia*, 14, 45-50.
- Sherwood, L. (2001). *Fisiologi Manusia dari Sel ke Sel*. Jakarta: EGC.
- Sudarmi, Supriatiningsih, & Novadela, N. I. (2019). Pengaruh Penggunaan Selimut Inisiasi Menyusu Dini (SIMDi) terhadap Suhu Tubuh Bayi Saat Inisiasi Menyusu Dini (IMD). *Jurnal Kesehatan*, 10, 67-73.
- Talarosha, B. (2005). Menciptakan Kenyamanan Thermal Dalam Bangunan. *Jurnal Sistem Teknik Industri*, 6(3), pp. 148–158.
- Utami, A. P. (2010). Pengaruh penerapan metode kanguru terhadap peningkatan suhu bayi baru lahir (di BPS Kasih Ibu Ny. Soenarlin Jatorogo Tuban).
- Varney, H., Kriebs, J., & Gegor, C. (2008). *Buku Ajar Asuhan Kebidanan*. Jakarta: EGC.
- Wibowo, S., Salimo, H., & Hidayah, D. (2017). Perbedaan Pengaruh antara Pengaturan Suhu Ruang Operasi 24-26 Derajat Celcius dan 20-22 Derajat Celcius terhadap Suhu Bayi Lahir Kurang Bulan. *Jurnal Sari Pediatri*, 18, 391-396.
- Yuliantini, N. M., & Ekayani, N. P. (2017). Pengaruh IMD (Inisiasi Menyusui Dini) terhadap perubahan suhu tubuh bayi baru lahir di wilayah kerja puskesmas gunungsari tahun 2017. *Media Bina Ilmiah*.