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Systematic Review

Effectiveness of Early Breastfeeding Initiation (IMD) as an Effort to Preventive Hypothermia in Neonatal: A Literature Study

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ABSTRACT

Background: *Hypothermia is a leading cause of morbidity and mortality in neonates, contributing to complications such as hypoglycemia, metabolic acidosis, hypoxia, growth disturbances, bleeding, shock, and apnea. One effective prevention method is Early Initiation of Breastfeeding (IMD). This study analyzes the effectiveness of IMD in preventing hypothermia in neonates.*

Methods: *This literature review used the PICO (Population, Intervention, Comparison, Outcome) approach. Eleven journals from Elsevier, Google Scholar, ResearchGate, PubMed, and Wiley Online Library, published between 2019 and 2023, were reviewed.*

Results: *The analysis showed that IMD was effective in increasing neonatal body temperature with an average increase of 0.55°C. All journals reviewed concluded that IMD plays a significant role in maintaining the stability of infant body temperature and preventing hypothermia with a p value <0.05.*

Conclusion: *IMD is effective in preventing hypothermia, enhancing breast milk production, promoting bonding between mother and baby, and strengthening the baby's immune system. IMD should be initiated as soon as possible after birth, with a minimum duration of 60 minutes, to prevent hypothermia.*

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INTRODUCTION

Neonatal mortality, defined as death within the first 28 days of life, remains a major global health challenge. In 2017, around 2.5 million neonatal deaths occurred globally, with 7,000 deaths per day—1 million of which happened on the first day and nearly another million within the first week. This critical period is marked by high vulnerability due to a lack of skilled, immediate, and quality care. The leading causes include preterm birth, intrapartum complications, infections, and congenital abnormalities (Huang et al., 2022).

Neonatal hypothermia is a common yet preventable condition that significantly contributes to morbidity and mortality. It can lead to serious complications such as hypoglycemia, metabolic acidosis, hypoxia, shock, and impaired growth. Newborns are

particularly prone to heat loss through evaporation, conduction, convection, and radiation, making thermoregulation a critical concern. Effective temperature management is essential and can be achieved through interventions like warm cloth wrapping, incubators, Kangaroo Method Care (KMC), and Early Initiation of Breastfeeding (IMD (Akhter et al., 2022; Çelik & Çiğdem, 2022; Muthoharoh et al., 2022; WHO, 2023).

Early Initiation of Breastfeeding (IMD) is an evidence-based intervention involving immediate skin-to-skin contact between the mother and newborn within the first hour after birth. This contact facilitates temperature regulation, stabilizes neonatal physiology, strengthens maternal-neonatal bonding, and promotes successful breastfeeding. The mother's chest acts as a natural thermal source, adjusting to the newborn's body temperature to prevent hypothermia (Lestari et al., 2022; Yuliana et al., 2022).

IMD has been shown to reduce neonatal mortality by 22% when initiated within the first hour and by 16% if done within the first 24 hours. However, many newborns miss this opportunity due to the common practice of postnatal separation. This separation hinders bonding, increases hypothermia risk, and undermines neonatal survival. More studies are needed to evaluate the effectiveness and implementation barriers of IMD in diverse clinical settings (Syswianti et al., 2022).

Nurses play a pivotal role in the success of IMD as part of neonatal hypothermia prevention. Their responsibilities include educating mothers, assisting with correct breastfeeding techniques, and monitoring the newborn’s temperature. By identifying risk factors and ensuring uninterrupted skin-to-skin contact, nurses can significantly reduce hypothermia risk and improve neonatal outcomes (Gultom, 2021).

This literature review aims to evaluate the effectiveness of Early Initiation of Breastfeeding (IMD) in preventing neonatal hypothermia and to provide evidence-based recommendations for integrating IMD into routine neonatal care. Optimizing IMD implementation is expected to enhance neonatal health outcomes and reduce hypothermia-related complications.

MATERIALS AND METHOD

This study used a literature review design to evaluate the effectiveness of IMD in preventing neonatal hypothermia. The literature search was conducted through Elsevier, Google Scholar, ResearchGate, PubMed, and Wiley Online Library, using keywords appropriate to the research topic. Articles were selected using the PICO (Population, Intervention, Comparison, Outcome) approach, with a neonatal population, IMD intervention, no comparison group, and neonatal hypothermia prevention outcome according to table 1 (Dahlan, 2021; Polit & Beck, 2018).

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population	Neonatal who received IMD	Neonatal with congenital abnormalities
Intervention	IMD in vaginal birth neonates	IMD in neonatal delivered by sectio caesarea
Outcomes	IMD is effective in preventing hypothermia	IMD in neonates with congenital diseases
Design	Quasi-experimental (pre-post test)	Quasi-experimental with comparison group
Year	2019 - 2023	Before 2019

Criteria	Inclusion	Exclusion
Language	UK and Indonesia	Besides English and Indonesian

The review process was conducted by three independent researchers with backgrounds in neonatal nursing and health. Each article found in the initial search was evaluated based on the title and abstract to ensure appropriateness to the research topic. Articles that passed the initial stage were then thoroughly examined based on full content to assess the research methodology, data quality, main results, and relevance to the research objectives. If there were differences of opinion between the two researchers, discussions were held to reach an agreement or a third reviewer with experience in systematic research was sought.

Data were analysed using the narrative synthesis method, grouping the results based on study design, sample size, temperature measurement method, and p-value (<0.05). Evaluation of the strength of evidence was conducted using the Evidence-Based Practice (EBP) approach. The results of the studies were compared to see similar patterns of findings as well as differences in the effectiveness of IMD on neonatal hypothermia, then arranged in a table for easy interpretation.

Reporting review results using the Preferred Reporting Items for Systematic Reviews and Meta-Analyse (PRISMA) as follows:

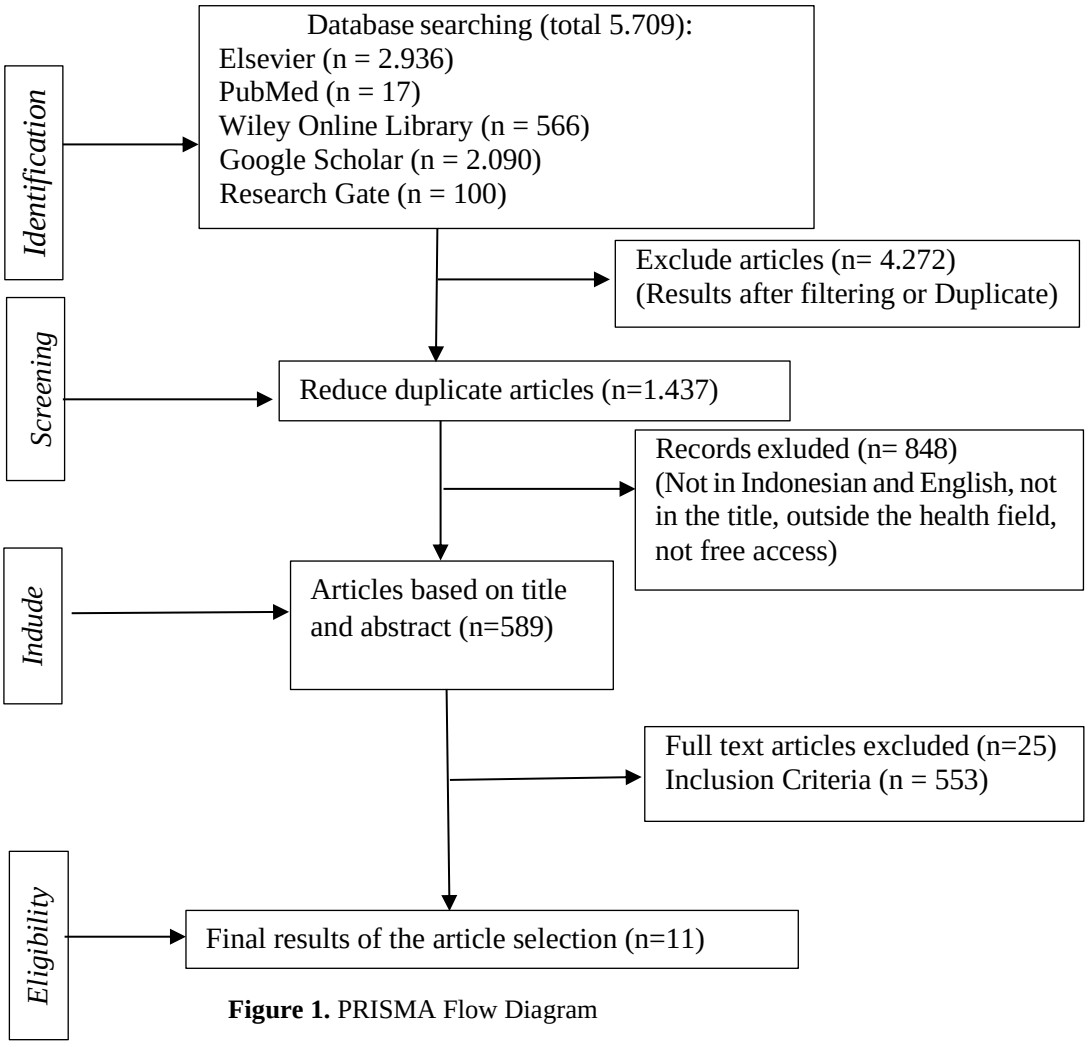

Figure 1. PRISMA Flow Diagram

RESULTS

Based on the results of the journal search with the keywords of early breastfeeding initiation (IMD), hypothermia, and neonatal, 11 journals were found that met the selection criteria, consisting of 10 national journals and 1 international journal. The selected articles were analysed by reading the abstracts and journal content thoroughly to get the essence of the research. All journals obtained were compiled in a Library summary table, which included information about the author, year of publication, research title, research methods, research results, and evidence-based practice (EBP) level.

The results of the analysis show that the most widely used research method is quasi-experimental with a pre-post-test one group approach, namely by measuring the baby's body temperature before and after the IMD intervention. Infant body temperature data was collected through observation sheets and measurements using a digital axillary thermometer. The average results showed an increase in infant body temperature after IMD, which means IMD is effective in preventing hypothermia in neonatal. Based on the analysis of 11 journals reviewed, it was found that IMD significantly increases newborn body temperature and prevents neonatal hypothermia. All studies showed that the baby's body temperature increased after IMD, with a p-value = $<0.001 < \alpha = 0.05$, indicating a significant effect of IMD on increasing newborn body temperature.

Table 3.1. Summary of Literature

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
1	Fenny Fernando, Melia Pebrina, Dewi Fransisca, Siti Aisyah Nur (Indonesia)	13(1) 2023	Effectiveness of Early Breastfeeding Initiation on Infant Body Temperature Normal Newborn	**Design:** Quasi-experimental with *pre test-post test one group* approach. **Sample:** 12 respondents (*purposive sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** *Wilcoxon*	The results showed that the majority of newborns (75%) experienced hypothermia before the initiation of early breastfeeding and after the initiation of early breastfeeding the majority of normal baby temperatures were 83.3%. The results of the *Wilcoxon* statistical test obtained a p-value of 0.003. IMD is effective in reducing hypothermia in newborns.	*Google Scholar*	III
2	Izra Yunura, Pagdya Haninda NR, Lisa Ernita (Indonesia)	7(1) 2023	Effect of Early Breastfeeding Initiation (IMD) on Body Temperature Newborns at PMB Hj. Hendriwati, S.ST 2022	**Design:** Quasi-experimental with *pre test-post test one group* approach. **Sample:** 10 respondents (*accidental sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, observation sheet temperature, digital axillary thermometer **Analysis:** Paired T-test	The body temperature of newborns before IMD at PMB Hj Hendriwati, S.ST had an average value of 35.880. The body temperature of newborns after IMD at PMB Hj Hendriwati, S.ST got an average value of 36.620. There is an influence between early breastfeeding initiation and newborn body temperature at PMB Hj Hendriwati, S.ST.	*Google Scholar*	III

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
3	Desy Syswianti, Dina Mardiana, and Tri Wahyuni (Indonesia)	2022	*The Influence of Breastfeeding Initiation on Newborn Body Temperature*	**Design:** Quasi-experimental with *pre test-post test one group* approach. **Sample:** 16 respondents (*accidental sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** *Paired T-test*	*Based on the results of the research, we can conclude that there were 16 respondents (27.6%) who experienced hypothermia before being given Early Breastfeeding Initiation (IMD). furthermore, there were no respondents (0.0%) who experienced hypothermia after being given IMD. Early Breastfeeding Initiation (IMD) had a significant effect on newborns' temperature. The average newborns' temperature increased by 0.467240 C after an Early Breastfeeding Initiation (IMD) was conducted.*	*Google Scholar*	III
4.	Yuliana, Jasmawati, Rivan Firdaus (Indonesia)	1(8) 2022	Effect of Early Breastfeeding Initiation on Changes in Newborn Body Temperature at RSUD.I.A Moeis	**Design:** Quasi-experimental with *pre test- post test one group* approach. **Sample:** 17 respondents (*purposive sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** *T-test (Paired T-test)*	*The paired samples t-test statistical* test obtained a value of t = -11.6 and p = 0.001 (p < 0.05) means that there is a significant effect of IMD implementation on increasing the body temperature of newborns. From the results of the study it can be concluded that there is a difference in body temperature of newborns who	*Google Scholar*	III

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
			Samarinda in 2022		successfully perform IMD and those who do not successfully perform IMD.		
5	Siti Sarti, Eka Meiri Kurniyati, Bety Irawati (Indonesia)	6(1) 2021	Effect of Early Breastfeeding Initiation on Newborn Body Temperature Changes	**Design:** Quasi-experimental with *pre test post test one group* approach. **Sample:** 40 respondents (*purposive sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** T-test (Paired T-test)	The mean before early breastfeeding initiation was 0.42 and after early breastfeeding initiation was 0.15. The results of data analysis using paired sample test obtained sign 0.001 so that there is an effect of Early Breastfeeding Initiation (IMD) on temperature changes. body in newborns (p value <0.05). IMD has been shown to reduce neonatal mortality. Infants who are given the opportunity to breastfeed within the first hour and allow skin-to-skin contact between the infant and the mother, can reduce the first day mortality by 22%.	*Google Scholar*	III
6	Lusiana Gultom (Indonesia)	16(1) 2021	The Relationship Between Early Breastfeeding Initiation With	**Design:** Quasi-experimental with *pre test- post test* aone *group* approach. **Sample:** 30 respondents (*total sampling*) **Variables:** Independent variable The independent variable is IMD, the dependent variable is	1. Of the 30 respondents, the mean newborn body temperature before early breastfeeding initiation was 36.60C with a standard *deviation of* 0.11958 and a	*Google Scholar*	III

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
			Increased Newborn Body Temperature At Home Clinic Healthy Cinta Mama Tebing Tinggi City 2017	neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** *T-test (Paired T-test)*	standard *error of the mean of* 0.02183. 2. Of the 30 respondents, the mean newborn body temperature after early breastfeeding initiation was 37.20C with a standard *deviation of* 0.29206 and a standard *error of the mean of* 0.05332. 3. There is a significant relationship between early initiation of breastfeeding and the increase in newborn body temperature, where $\rho = 0.000 < 0.05$ ($p < \alpha$) and the value of t-count (9.719) > t-table (0.266). 4. The conclusion of this study is the effectiveness of the results of early breastfeeding initiation on the transfiguration of newborns, so it is hoped that nurses or midwives who perform birth assistance to provide early breastfeeding initiation for newborns aimed at warding off hypothermia.		

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
7.	Nancy Olii, Tumarthony Hiola (Indonesia)	7(2), 2020	Effect of Early Breastfeeding Initiation on Changes in Newborn Body Temperature	**Design:** *Quasi experiment pre and post-test one group design.* **Sample:** 30 respondents (*purposive sampling* **Variables:** Independent variable is IMD, dependent variable is body temperature **Instruments**: IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** *Independent T-Test.*	The results showed that babies who were initiated early breastfeeding before and after all newborns experienced significant changes in body temperature with a p value of $0.001 < \alpha = 0.005$, thus H0 was rejected, meaning that there was an effect of early breastfeeding initiation on changes in body temperature of newborns in the working area of the Dungaliyo Health Centre, Gorontalo Regency.	*Google Scholar*	III
8.	Indah Dewi Sari (Indonesia)	9(1) 2020	Effectiveness of Early Breastfeeding Initiation on Temperature Change Newborn Body	**Design:** Quasi-experimental with *pre test- post test* approach. **Sample:** 20 respondents (*accidental sampling*) **Variables:** Independent variable is IMD, dependent variable is neonatal body temperature. **Instruments:** IMD observation sheet, temperature observation sheet, axillary thermometer digital **Analysis:** *Wilcoxon*	The results showed that almost 90% of newborns before the initiation of early breastfeeding had a decreased body temperature and after the initiation of early breastfeeding only 10% had a low body temperature. From the results of statistical testing obtained results with Z = - 4.243 and p *value* = 0.000. The conclusion of this study is that there is an effective effect of early breastfeeding initiation on changes in body temperature of	*Resear ch Gate*	III

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
					newborns. It is expected that midwives who perform delivery assistance should provide early breastfeeding initiation actions to every newborn to prevent hypothermia.		
9.	Sawitry, Puput Kurnia Sari, Putri Kusuma-wardhani (Indonesia)	6(2) 2019	Implementation of early breastfeeding initiation (IMD) to increase newborn body temperature	**Design:** Quasi-experimental with *cross sectional* approach, **Sample:** 30 respondents (*accidental sampling*) **Variables:** Independent variable The independent variable is IMD, the dependent variable is neonatal body temperature **Instruments:** IMD and temperature observation sheet, digital axillary thermometer **Analysis:** *Chi Square*	The statistical test results obtained *p-value* = 0.000 (probability value (p) < α (0.05), Ha is accepted so it can be concluded that there is a relationship between the implementation of Early Breastfeeding Initiation (IMD) with newborn body temperature in the Working Area of Halmahera Health Centre, Semarang City.	*Google Scholar*	III
10.	Deti Lestari, Tatu Septiani Nurhikmah Melsa Sagita Imaniar (Indonesia)	6(1) 2019	Management of early initiation of breastfeeding to maintain newborn body temperature	**Design:** Quasi-experimental with *pre test- post test* approach. **Sample:** 5 respondents (*total sampling*) **Variables:** Independent variable which is IMD, dependent variable which is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer	The result of an increase in body temperature by (0.5°C) with an average temperature before IMD of 36.8°C and after IMD of 37.3°C. So there is an effect of early breastfeeding initiation management to maintain body temperature in newborns at Karanganyar Health Centre,	*Google Scholar*	III

No.	*Author* (Country)	Vol, (No) Year	Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Research Results	*Database*	EBP Level
					Tasikmalaya City, which is maintaining body temperature in newborns.		
11.	Psiari Kusuma Wardani, Indah Comalasari Linda Puspita (Indonesia)	1(1) 2019	The Effect of Early Breastfeeding Initiation (IMD) on Body Temperature Changes in the Newborn	**Design:** Quasi-experimental with *pre test- post test* approach. **Sample:** 40 respondents (*accidental sampling*) **Variables:** Independent variable is IMD, dependent variable is neonatal body temperature **Instruments:** IMD observation sheet, temperature observation sheet, digital axillary thermometer **Analysis:** T-test (Paired T-test)	The mean before the initiation of early breastfeeding was 0.42 and after the initiation of early breastfeeding was 0.15. The results of data analysis using *paired sample test* obtained significance 0.001 (p value <0, 05) so that it can be concluded that there is an effect of Early Breastfeeding Initiation (IMD) on changes in body temperature in newborns at BPM Mastuti, Amd.Keb, Pardasuka District Pringsewu Regency in 2017.	*Google Scholar*	III

DISCUSSION

This study analysed the effectiveness of Early Initiation of Breastfeeding (IMD) as a preventive measure against neonatal hypothermia by reviewing 11 relevant journals. The findings consistently showed that IMD significantly increased neonatal body temperature and prevented hypothermia (Fernando et al., 2023). For example, one quasi-experimental study used a pre-test and post-test one-group design to measure infant body temperature before and after IMD using a digital axillary thermometer (Yunura1 et al., 2023).

The results indicated that among 250 neonates who received IMD, there was an average increase in body temperature of 0.55°C (Syswianti et al., 2022). This suggests that IMD is effective in maintaining thermoregulation, reducing the risk of hypothermia, and stabilizing neonatal physiology. Beyond temperature regulation, IMD also offers additional benefits such as enhanced maternal milk production, improved immune response in infants, stronger maternal-infant bonding, and the maturation of the infant's gastrointestinal system. These effects are primarily driven by skin-to-skin contact, which enables direct heat transfer from the mother to the newborn (Huang et al., 2022).

IMD also stimulates the release of oxytocin in the mother, which not only increases breast temperature but also enhances milk ejection. The newborn's body temperature rises through direct heat conduction during skin-to-skin contact. To maximize these benefits, IMD should be initiated immediately after birth and maintained for at least 60 minutes without interruption. This practice contributes not only to the prevention of hypothermia but also to supporting the newborn's early development and long-term health (Muthoharoh et al., 2022; Sivanandan & Sankar, 2023; Wilde, 2021).

This study has several strengths, including a systematic review approach, consistency in findings across studies, and high clinical relevance. IMD is demonstrated to be a simple yet highly effective intervention for maintaining neonatal body temperature and strengthening maternal-infant bonding (Fernando et al., 2023). However, this review is limited by the relatively small sample sizes in some studies, limited diversity in research designs, and the predominance of non-international journals. Additionally, differences in temperature measurement techniques among studies may have influenced the consistency and validity of the reported outcomes (Huang et al., 2022; Maria José Castro Babbini et al., 2024; Yunura1 et al., 2023).

CONCLUSION

IMD is proven to be effective in increasing the newborn's body temperature and preventing hypothermia. IMD also has the added benefit of improving bonding between mother and baby, increasing breast milk production, and strengthening the baby's immune system. Future research is recommended to conduct a literature review using a design with a control group, involving more samples to increase generalisability, reviewing more international journals, and standardising temperature measurement methods.

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