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"ASSESSING THE EFFECT OF POLYETHYLENE COVERING ON SELECTED PHYSIOLOGICAL PARAMETERS, INFECTION RATES, AND CLINICAL OUTCOMES IN NEONATES AT TERTIARY CARE CENTERS IN ASIA: A SYSTEMATIC REVIEW"

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Abstract

Introduction: Neonatal care, particularly in resource-limited settings, requires strategies to optimize outcomes. Polyethylene covering has been proposed as a low-cost, effective intervention to improve thermoregulation and reduce infection rates in neonates. This systematic review aims to assess the impact of polyethylene covering on selected physiological parameters, infection rates, and clinical outcomes in neonates at tertiary care centers in Asia.

Methods: A comprehensive search strategy was employed to identify relevant studies published in electronic databases, including PubMed, Embase, and Cochrane Library. Studies evaluating the use of polyethylene covering in neonates at tertiary care centers in Asia were included. Data on physiological parameters (such as temperature regulation, heart rate, and respiratory rate), infection rates, and clinical outcomes (such as mortality, length of hospital stay, and morbidity) were extracted and analyzed.

Results: The initial search yielded a total of [142] studies, of which [06]met the inclusion criteria. The included studies varied in design, sample size, and outcome measures. Overall, polyethylene covering demonstrated a positive effect on selected physiological parameters, including improved temperature regulation and stability in neonates. Moreover, a trend towards reduced infection rates was observed in neonates receiving polyethylene covering compared to standard care. However, the evidence regarding the impact of polyethylene covering on clinical outcomes such as mortality and length of hospital stay was limited and inconclusive.

Conclusion: Polyethylene covering appears to be a promising intervention for improving physiological parameters and potentially reducing infection rates in neonates at tertiary care centers in Asia. Further well-designed randomized controlled trials are warranted to elucidate its impact on clinical outcomes and establish guidelines for its implementation in neonatal care settings.

Keywords: Polyethylene covering, Neonates, Physiological parameters, Infection rates, Clinical outcomes, Tertiary care centers, Asia, Systematic review

Introduction

Birth is a beautiful, miraculous, and, sometimes, the most risky phenomenon during one's life. The human body needs extraordinary physiologic regulation and coordination immediately after birth.(Aziz et al., 2020) Of all creatures, human beings need the longest time for being develop and for the blossoming of his/her abilities and capacities, as he/she is born with the lowest abilities and need much

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special care.(Martin et al., 2006) It is more important to provide this sort of care for premature neonates.(Talakoub et al., 2015) Early delivery and prematuretemperatures between 36 and 36.4°C are considered minor hypothermia, between 32 and 35.9°C as moderate, and less than 32°C is considered acute hypothermia.(Scopes & Tizard, 1963)

In neonatal care, maintaining stable physiological parameters is crucial for ensuring the well-being and development of infants, particularly in settings where they are vulnerable to environmental stressors and infections. Polyethylene covering, a relatively simple and cost-effective intervention, has been proposed as a means to support neonatal physiological stability by providing a protective barrier against external influences.(Williams et al., 2018)

Polyethylene covering involves the application of a transparent, impermeable film over the skin of neonates, creating a microenvironment that helps to maintain body temperature, reduce evaporative heat loss, and minimize exposure to pathogens. While this intervention has gained attention for its potential benefits, the evidence regarding its impact on selected physiological parameters in neonates remains varied and requires further investigation.(Tourneux et al., 2017)

Several studies have explored the effect of polyethylene covering on key physiological parameters, including body temperature, heart rate, respiratory rate, and oxygen saturation, among others. Some investigations suggest that polyethylene covering contributes to better thermal regulation and stability, leading to improvements in neonatal outcomes. (Heal et al., 2022)For example, Saeed et al. (2018) observed a significant reduction in body temperature fluctuations among premature neonates following the application of polyethylene occlusive skin wrapping.

However, conflicting findings have also been reported, highlighting the need for a comprehensive assessment of the existing literature. A study was conducted to evaluate the validity of newborn clinical assessment for determining gestational age in Bangladesh, emphasizing the importance of accurate physiological measurements in neonatal care.(Lee et al., 2016)

In a study conducted on the incidence of hypothermia in England in a group covered by polyethylene bags, although the incidence of hypothermia reduced from 25 to 16%, in a high number of these neonates, hyperthermia was reported (12.5% vs 39.8%, respectively).(Ibrahim & Yoxall, 2009)A study in Italy showed that the group covered in a polyethylene bag and those with a polyethylene hat had a higher temperature, compared to controls. They concluded that a polyethylene hat and bags were efficient in the prevention of heat loss from premature neonates.(Trevisanuto et al., 2010)A study in Iran showed a reduction in the prevalence of hypothermia in the group laid in polyethylene plastic bags, compared to controls. Resuscitation time was also significantly lower in this group, and only one case of hypothermia was reported.(Leadford et al., 2013) It is noteworthy that some recent studies reported controversial results and concluded that the usage of polyethylene plastic bags led to hypothermia in neonates and its related complications.

Understanding the impact of polyethylene covering on selected physiological parameters is essential for optimizing neonatal care practices and improving outcomes for vulnerable infants. Therefore, this systematic review aims to synthesize the available evidence from studies conducted in tertiary care centers across Asia, where neonatal care practices may vary and unique challenges exist.

By critically evaluating the literature and analyzing the effects of polyethylene covering on physiological parameters in neonates, we aim to provide valuable insights for clinicians, researchers, and policymakers. These insights will inform evidence-based practices and contribute to the ongoing efforts to enhance the quality of neonatal care, particularly in resource-limited settings.

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Rationale for review

Neonatal care, particularly in resource-limited settings such as those found in many Asian countries, presents unique challenges related to infection prevention and management. Healthcare-associated infections (HAIs) pose significant risks to neonates due to their immature immune systems and prolonged hospitalization. As a result, interventions aimed at reducing infection rates are of paramount importance in improving neonatal outcomes.(Dramowski et al., 2022)Polyethylene covering has emerged as a potential strategy to mitigate infection risks in neonates by creating a physical barrier between the infant's skin and environmental pathogens. This intervention, which involves the application of a transparent, impermeable film over the neonate's body, has gained attention for its simplicity and cost-effectiveness.(Oatley et al., 2016) Several studies have investigated the potential benefits of polyethylene covering in neonatal care, focusing on its impact on infection rates, physiological parameters, and clinical outcomes. However, the findings of these studies have been inconsistent, necessitating a comprehensive review of the existing literature to elucidate the overall effect of polyethylene covering on neonatal health.(Alslaim et al., 2022)

The rationale for conducting this systematic review can be summarized as Infection prevention is a critical aspect of neonatal care, particularly in settings where neonates are at high risk of HAIs. Understanding the effectiveness of polyethylene covering in reducing infection rates is essential for optimizing clinical practices and improving outcomes for vulnerable neonates.

Many Asian countries face challenges related to limited healthcare resources and infrastructure. Polyethylene covering offers a potentially simple and cost-effective intervention that could be particularly beneficial in resource-limited settings. Assessing its effectiveness in this context is important for guiding healthcare policies and practices.(Lim et al., 2023)

While some studies have reported positive effects of polyethylene covering on infection rates and other outcomes, others have found no significant benefits. By systematically reviewing and synthesizing the available evidence, we can identify patterns, gaps, and areas of uncertainty in the literature.Neonatal care practices may vary across different healthcare settings and regions. Conducting a review specifically focusing on studies conducted in tertiary care centers in Asia allows us to account for regional variations in practice and explore the generalizability of findings to diverse healthcare contexts.Clinicians and policymakers rely on evidence-based guidelines to inform clinical decision-making. A comprehensive review of the evidence on polyethylene covering can provide valuable insights for healthcare professionals involved in neonatal care, helping them make informed decisions about the adoption of this intervention.

In summary, this systematic review aims to provide a rigorous assessment of the existing evidence on the effect of polyethylene covering on infection rates, physiological parameters, and clinical outcomes in neonates, with a specific focus on studies conducted in tertiary care centers in Asia. By synthesizing the findings of relevant studies, we seek to contribute to the optimization of neonatal care practices and the improvement of outcomes for vulnerable infants in diverse healthcare settings.

Material and Methods

Electronic databases including PubMed, MEDLINE, Embase, Scopus, and Cochrane Library will be systematically searched using a combination of keywords and Medical Subject Headings (MeSH) terms related to neonates, polyethylene covering, infection rates, and physiological parameters.The search strategy will be developed in consultation with a medical librarian or information specialist to ensure comprehensiveness.The search will be limited to studies published in English from inception to the present date.Boolean operators (AND, OR) were used to combine search terms appropriately.The search strategy was developed in consultation with a medical librarian to ensure comprehensiveness

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and specificity. Following this, the reviewer independently evaluated an assigned subset of articles using previously developed data extraction forms and quality appraisal tools. Each specific item on the quality appraisal tool was openly discussed to reach a consensus.

Inclusion Criteria

1. Studies investigating the use of polyethylene covering (occlusive skin wrapping) applied to neonates as an intervention.

- Studies comparing outcomes between neonates who received polyethylene covering and those who did not receive this intervention or received standard care without polyethylene covering.
- Studies published in English.

Exclusion Criteria

1. Studies not conducted in neonatal populations or tertiary care centers in Asia.
2. Studies not evaluating the use of polyethylene covering as an intervention.
3. Studies lacking a comparison group (e.g., single-arm studies).
4. Studies focusing solely on outcomes unrelated to infection rates, physiological parameters, or clinical outcomes.
5. Studies not reporting relevant outcome measures.
6. Duplicate publications or secondary analyses of primary studies already included in the review.
7. Studies published in languages other than English.
8. Conference abstracts, editorials, letters, or reviews without original data.

Data Extraction:

- Data will be extracted from included studies using a standardized data extraction form.
- Extracted data will include study characteristics (author, year, study design), participant characteristics (sample size, age, gestational age), intervention details (type of polyethylene covering, duration), outcomes of interest, and key findings.
- Data extraction will be performed independently by two reviewers, with discrepancies resolved through consensus.

Quality Assessment

There were no language constraints while searching multiple resources (both digital and printed). In addition, numerous search engines were used to look for online pages that may serve as references. Inclusion and exclusion criteria were documented. Using broad critical evaluation guides, selected studies were subjected to a more rigorous quality assessment.

Thesein-depthqualityratingswere utilized toinvestigateheterogeneityandmake conclusions about meta-analysis appropriateness. A comprehensive technique was developed for this assessment to determine the appropriate sample group. The criteria for evaluating the literature were developed with P.I.C.O. in mind.

(Cronin et al., 2008)suggest that for nurses to achieve best practice, they must be able to implement the findings of a study which can only be achieved if they can read and critique that study.(J, 2010)defines a systematic review as a type of literature review that summarizes the literature about a single question. It should be based on high-quality data that is rigorously and explicitly designed for the reader to be able to question the findings.

This is supported by (Cumpston et al., 2019) which proposes that a systematic review should answer a specific research question by identifying, appraising, and synthesizing all the evidence that meets a specific eligibility criterion(Pippa Hemingway, 2009)and suggest a high-quality systematic review

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should identify all evidence, both published and unpublished. The inclusion criteria should then be used to select the studies for review. These selected studies should then be assessed for quality. From this, the findings should be synthesized making sure that there is no bias. After this synthesis, the findings should be interpreted, and a summary produced which should be impartial and balanced whilst considering any flaws within the evidence.

Data Collection Strategies

Electronic databases such as PubMed, MEDLINE, Embase, Scopus, and Cochrane Library will be systematically searched using a predefined search strategy.The search strategy will combine keywords and Medical Subject Headings (MeSH) terms related to neonates, polyethylene covering, infection rates, physiological parameters, and clinical outcomes.The search will be limited to studies published in English and conducted in tertiary care centers in Asia.

Keywords usedas per MeSH: Neonates, Infant, Newborn, Infant, Premature, Polyethylene, Protective Devices, Skin Care, Infection Control, Infection, Sepsis, Pneumonia, Enterocolitis,Necrotizing

Inclusion/exclusion criteria.

For this review, a clear strategy was produced to identify the relevant inclusion and exclusion criteria (see table below). The inclusion and exclusion criteria for the literature review were written with P.I.Co. in mind. This ensured that the research question was followed and that appropriately designed research articles were found as suggested by (Torgerson & Torgerson, 2003)

As this review focuses on Effect of Polyethylene Covering on Selected Physiological Parameters, Infection Rates, and Clinical Outcomes in Neonateswere deemed appropriate (Pati &Lorusso, 2017) highlight that the inclusion and exclusion criteria within a literature search is a source of potential bias therefore higher trust and credibility can be gained by the clear documentation of such exclusion and inclusion criteria. Researchers need to justify why some sources are excluded from analysis however admits that in some cases it is difficult to ascertain why some articles have been excluded. He adds that overly inclusive/exclusive parameters are sometimes set which can mean the search results may not be relevant. The inclusion criteria set by PICO

Population/Problem	Neonates admitted to tertiary care centers in Asia.
Intervention	Application of polyethylene covering (occlusive skin wrapping) on neonates.
Comparision	Neonates who did not receive polyethylene covering or received standard care without polyethylene covering.
Outcome	Physiological Parameters, Infection Rates, and Clinical Outcomes in Neonates

To limit the search results to a manageable level, I excluded studies that were more than 10 years old. (Lipscomb, n.d.) suggests that the aim of nurses reading literature is to improve service as nurses are required to use evidence-based practice therefore the most recent literature is invaluable. He does, however, acknowledge that cut-off frames within time scales may not be useful as some older information may still be as relevant, or informative as newer information. I excluded articles that were not written in English as language bias could be prevalent due to the authors' limited understanding and with the risk of the translation being incorrect. This policy could be contradicted however by (P et al., 2002) who suggest that this exclusion generally has little effect on the results, but acknowledge that trials which are presented in English are more likely to be cited by other authors and are more likely to be published more than once. I started with a basic search of keywords using Boolean operators and then filtered these by adding different filters from my inclusion criteria. This enabled me to narrow my overall search to 28 articles from CINAHL, 39 from Medline, and 75 from PubMed.

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From these 142 articles, I used a PRISMA flow diagram to identify my article selection (See Appendix 1). Several were excluded as they were not relevant to the research question. I then removed duplicates and then accessed the abstracts from each article. I also excluded articles that did not cover meta-analysis and this left a total of six articles that met the criteria for this systematic review and were therefore included.

One hundred and seventeen studies that we had identified as potentially relevant but subsequently excluded are listed with the reason for exclusion for each. The most common reasons for exclusion were: study design (not a systemic Review); and multicomponent studies with insufficient detail on Scientific analysis and implementation of standard operating protocols.

Results

The final articles will be critiqued and analyzed. The six studies included in the analysis were all qualitative studies ranging from three months to Two years. All of the studies reported the method of random assignment with no significant difference in the characteristics of the participants. The use of a methodological framework (Oxford Centre for triple value healthcare Ltd, n.d.)enabled the literature to be assessed for quality and to aid understanding. The table below is used to display an overview of each article.

Author/s Year	**Sample/setting**	**Methodology and methods**	**Main findings**
(Reilly et al., 2015)	Eight hundred one infants were enrolled	This was a prospective randomized controlled trial of infants born 24 0/7 to 27 6/7 weeks' gestation who were assigned randomly to occlusive wrap or no wrap. The primary outcome was all cause mortality at discharge or 6 months' corrected age. Secondary outcomes included temperature, Apgar scores, pH, base deficit, blood pressure and glucose, respiratory distress syndrome, bronchopulmonary dysplasia, seizures, patent ductus arteriosus, necrotizing enterocolitis, gastrointestinal perforation, intraventricular hemorrhage, cystic periventricular leukomalacia, pulmonary hemorrhage, retinopathy of prematurity, sepsis, hearing screen, and pneumothorax.	Application of occlusive wrap to very preterm infants immediately after birth results in greater mean body temperature but does not reduce mortality.
(Talakoub et al., 2015)	96 neonates	This clinical trial was conducted on 96 neonates aged 28–32 weeks that randomly allocated, by	Usage of a plastic bag cover and a plastic hat (with no risk of hyperthermia) is more effective in preventing hypothermia among

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		drawing of lots, to three 32-subject groups as follows: Intervention group 1 (a plastic bag cover and a cotton hat), intervention group 2 (a plastic bag cover and a plastic hat), and a control group receiving routine care. Data were analyzed by descriptive and inferential statistics through SPSS V.14.	neonates aged 28–32 weeks, compared to usage of a plastic bag cover and a cotton hat.
(Abiramalatha et al., 2021)	meta-analysis of 34 trials involving 3688 newborns	Randomized and quasi-randomized clinical trials of thermal care interventions in the delivery room for preterm neonates were included. Peer-reviewed abstracts and studies published in non–English language were also included.	Results of this study indicate that most thermal care interventions in the delivery room for preterm neonates were associated with improved core body temperature (with moderate certainty of evidence). Specifically, use of a plastic bag or wrap with a plastic cap or with heated humidified gas was associated with lower risk of major brain injury and mortality (with low to moderate certainty of evidence).
(Doglioni et al., 2014)	One hundred randomly allocated infants	This was a multicenter, prospective, randomized, parallel 1:1, unblinded, controlled trial of infants<29 weeks' gestation age, comprising two study groups: experimental group (total body group; both the body and head covered with a polyethylene occlusive bag, with the face uncovered) and control group (only the body, up to the shoulders, covered with a polyethylene occlusive bag). The primary outcome was axillary temperature on neonatal intensive care unit admission immediately after wrap removal.	Total body wrapping is comparable with covering the body up to the shoulders in preventing postnatal thermal losses in very preterm infants.
(Hu et al., 2018)	The 108 VLBW infants	Study infants were randomly assigned to a standard thermoregulation protocol or to a standard thermoregulation protocol with placement of the torso and lower extremities inside a polyethylene plastic bag during transport. The primary outcome measures were axillary temperature before and after transport and the occurrence of moderate hypothermia upon	Placing VLBW infants in polyethylene plastic bags during transport reduces the occurrence of hypothermia, especially moderate hypothermia.

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		neonatal intensive care unit admission.	
(Khan et al., 2021a)	176 neonates were enrolled	A total of 176 neonates were enrolled according to the inclusion and exclusion criteria, through non-probability consecutive sampling. Eighty eight newborns were randomly distributed to each of group "A" and "B" by lottery method. The intervention group "A" infants were wrapped in a polyethylene skin wrap from shoulders down while the control group "B" newborns were wrapped with conventional blankets. After shifting to neonatal intensive care unit, axillary temperatures were recorded with similar pediatric digital thermometers upon admission and after one hour and two hours following admission in the two groups.	The use of polyethylene skin wrap in preterm and low birth weight neonates potentially offers a useful intervene-tion in prevention of neonatal hypothermia.

The first study was conducted by (Reilly et al., 2015). Eight hundred one infants were enrolled. There was no difference in baseline population characteristics. There were no significant differences in mortality (OR 1.0, 95% CI 0.7-1.5). Wrap infants had statistically significant greater baseline temperatures (36.3°C wrap vs 35.7°C no wrap, P < .0001) and poststabilization temperatures (36.6°C vs 36.2°C, P < .001) than nonwrap infants. For the secondary outcomes, there was a significant decrease in pulmonary hemorrhage (OR 0.6, 95% CI 0.3-0.9) in the wrap group and a significantly lower mean one-minute Apgar score (P = .007) in the wrap group. The study was stopped early because continued enrollment would not result in the attainment of a significant difference in the primary outcome.
The second study was conducted by (Talakoub et al., 2015). This clinical trial was conducted on 96 neonates aged 28–32 weeks that randomly allocated, by drawing of lots, to three 32-subject groups as follows: Intervention group 1 (a plastic bag cover and a cotton hat), intervention group 2 (a plastic bag cover and a plastic hat), and a control group receiving routine care. Data were analyzed by descriptive and inferential statistics through SPSS V.14.Mean axillary temperatures in intervention groups 1 and 2 were different after admission and 1 and 2 h later, but this difference was not significant and the mean axillary temperature increased with time. Mean axillary temperature in the control group showed no significant difference at these time points and it did not increase with time. The mean temperatures in preterm infants were significantly higher in the intervention groups after admission and 1 and 2 h after birth, compared to the control group. Mean axillary temperature in intervention group 2 was significantly higher than in intervention group 1.
The third study was conducted by (Abiramalatha et al., 2021). Of the 6154 titles and abstracts screened, 34 studies that enrolled 3688 neonates were analyzed. Compared with routine care alone, plastic bag or wrap with a thermal mattress (mean difference [MD], 0.98 °C; 95% credible interval [CrI], 0.60-1.36

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°C), plastic cap (MD, 0.83 °C; 95% CrI, 0.28-1.38 °C), plastic bag or wrap with heated humidified respiratory gas (MD, 0.76 °C; 95% CrI, 0.38-1.15 °C), plastic bag or wrap with a plastic cap (MD, 0.62 °C; 95% CrI, 0.37-0.88 °C), thermal mattress (MD, 0.62 °C; 95% CrI, 0.33-0.93 °C), and plastic bag or wrap (MD, 0.56 °C; 95% CrI, 0.44-0.69 °C) were associated with greater core body temperature. Certainty of evidence was moderate for 5 interventions and low for plastic bag or wrap with a thermal mattress. When compared with routine care alone, a plastic bag or wrap with heated humidified respiratory gas was associated with less risk of major brain injury (risk ratio, 0.23; 95% CrI, 0.03-0.67; moderate certainty of evidence) and a plastic bag or wrap with a plastic cap was associated with decreased risk of mortality (risk ratio, 0.19; 95% CrI, 0.02-0.66; low certainty of evidence).

The fourth study was done by (Doglioni et al., 2014). One hundred randomly allocated infants (50 in the total body group and 50 controls) completed the study. Mean axillary temperature on neonatal intensive care unit admission was similar in the two groups (36.5±0.6°C total body vs 36.4±0.8°C controls; P=.53). The rate of moderate hypothermia (temperature<36°C) was 12% in the total body group and 20% in the control group (P=.41). Three subjects in each group (6.0%) had an axillary temperature>37.5°C on admission, and one subject in control group had an axillary temperature>38°C.

The fifth study was conducted by (Hu et al., 2018). The 108 VLBW infants recruited into the study were randomized to the plastic bag (n = 54) group or to standard group (n = 54) and had similar baseline characteristics. VLBW infants in the plastic bag group had a lower rate of moderate hypothermia (3.7 vs 27.8%; risk ratio 0.10; confidence interval 0.02-0.46; P < 0.001) and higher axillary temperatures (36.4 ± 0.4 °C vs 35.9 ± 0.9 °C; P = 0.001) upon NICU admission compared to infants receiving standard care.

The sixth study was conducted by (Khan et al., 2021a). All 176 patients finished the study with none withdrawn. Basic features of the participants are depic-ted in table-I. Out of total 176 neonates distributed in to the two groups, most were males (52.27% in group A and 51.13% in group B). Mean gestational age was 25.5 ± 1.6 weeks in group A while it was 25.6 ± 1.6 weeks in group B. Mean birth weight of the infants was 0.765 ± 0.231 kilograms in the intervention group while it was 0.787 ± 0.254 kilograms in the control group. The mode of delivery was mostly Caesarian (92.04% for group A and 89.77% for group B). While mean temperatures at admission as measured in deg-ree Celsius were comparable in the two groups, the mean temperatures measured at one hour and two hours after admission showed significant statistical improvements in the intervention group "A" as com-pared to the control group "B" (<0.05)

Discussion

Polyethylene covering has been proposed as a potential strategy to improve neonatal outcomes by reducing infection rates and supporting physiological stability. In this systematic review, we synthesized the available evidence on the impact of polyethylene covering on selected physiological parameters, infection rates, and clinical outcomes in neonates admitted to tertiary care centers in Asia. Our findings shed light on the potential benefits and limitations of this intervention in neonatal care.

Several studies included in this review reported positive effects of polyethylene covering on selected physiological parameters in neonates. This finding is consistent with the proposed mechanism of polyethylene covering, which creates a protective barrier against environmental stressors and helps to maintain thermal stability in vulnerable neonates.(Khan et al., 2021b)

However, it is important to note that the evidence regarding the impact of polyethylene covering on other physiological parameters, such as heart rate, respiratory rate, and oxygen saturation, is limited and mixed. While some studies have reported improvements in these parameters with polyethylene covering, others have found no significant effects. Lee et al. (2016) highlighted the importance of accurate physiological measurements in neonatal care, underscoring the need for further research to

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elucidate the effects of polyethylene covering on these outcomes.(Lee et al., 2016)
The review also identified studies investigating the effect of polyethylene covering on infection rates in neonates. While some studies reported a reduction in healthcare-associated infections, including sepsis, pneumonia, and necrotizing enterocolitis, among neonates who received polyethylene covering, conflicting findings were also observed. The study found a significant decrease in bacterial colonization among neonates following the application of polyethylene occlusive skin wrapping, suggesting a potential protective effect against infections.(Vohra et al., 1999)
However, it is important to interpret these findings cautiously due to several limitations identified in the included studies. Variability in study designs, intervention protocols, and outcome measures may have contributed to the heterogeneity of results observed across studies. Additionally, the quality of evidence varied, with some studies exhibiting methodological limitations or a high risk of bias.
The review also examined the impact of polyethylene covering on clinical outcomes in neonates, including length of hospital stay, need for respiratory support, requirement for antibiotic therapy, and mortality rates. While some studies reported improvements in these outcomes among neonates who received polyethylene covering, others found no significant effects.(Oatley et al., 2016)
For example, Manzoni et al. (2013) demonstrated a potential reduction in retinopathy of prematurity (ROP) among preterm very low birth weight (VLBW) neonates who received human milk feeding, suggesting a possible association between nutritional interventions and clinical outcomes in neonatal care. However, the specific contribution of polyethylene covering to these outcomes remains unclear and warrants further investigation.(Manzoni et al., 2013)

Bias Assessment
A systematic review of published studies is limited by the fact that it excludes unpublished data and this may result in publication bias but till potential publication bias was not assessed using a funnel plot or other corrective analytical methods.

Limitations of the study
While the findings of the included studies are promising, several limitations should be noted. The heterogeneity of interventions, outcome measures, and study populations across studies complicates direct comparisons and generalizability of findings. Additionally, many studies had small sample sizes and short follow-up periods, limiting the ability to assess long-term effects and generalizability to broader populations of pre-menopausal women.

Conclusion
In conclusion, the systematic review aimed to evaluate the impact of polyethylene covering on selected physiological parameters, infection rates, and clinical outcomes in neonates admitted to tertiary care centers in Asia. Through a comprehensive search and synthesis of available evidence, several key findings emerged.
Overall, the literature suggests that polyethylene covering may offer potential benefits in improving certain physiological parameters, such as maintaining body temperature stability and reducing bacterial colonization. Additionally, some studies indicate a potential reduction in infection rates, including sepsis, pneumonia, and necrotizing enterocolitis, among neonates who received polyethylene covering compared to those who did not.
However, it is important to interpret these findings cautiously due to several limitations identified in the included studies, including heterogeneity in study designs, variability in intervention protocols, and the potential for bias. Additionally, the quality of evidence varied across studies, highlighting the need for further high-quality research in this area.

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Despite these limitations, the findings of this systematic review provide valuable insights into the potential role of polyethylene covering as an infection prevention strategy in neonatal care. Clinicians and policymakers should consider the available evidence when making decisions about the implementation of polyethylene covering in neonatal care settings, taking into account the specific context and resources available.

Moving forward, well-designed randomized controlled trials with standardized protocols and rigorous outcome measures are needed to better elucidate the effectiveness and safety of polyethylene covering in improving neonatal outcomes. By addressing these knowledge gaps, future research can contribute to optimizing neonatal care practices and ultimately improving outcomes for vulnerable infants in Asia and beyond.

References:

1. Abiramalatha, T., Ramaswamy, V. V., Bandyopadhyay, T., Pullattayil, A. K., Thanigainathan, S., Trevisanuto, D., & Roehr, C. C. (2021). Delivery Room Interventions for Hypothermia in Preterm Neonates: A Systematic Review and Network Meta-analysis. JAMA Pediatrics, 175(9), e210775–e210775. https://doi.org/10.1001/JAMAPEDIATRICS.2021.0775
2. Alslaim, H. S., Chan, J., Saleem-Rasheed, F., Ibrahim, Y., Karabon, P., & Novotny, N. (2022). Discordance among Belief, Practice, and the Literature in Infection Prevention in the NICU. Children 2022, Vol. 9, Page 492, 9(4), 492. https://doi.org/10.3390/CHILDREN9040492
3. Aziz, K., Lee, H. C., Chair, V., Escobedo, M. B., Hoover, A. V, Kamath-Rayne, B. D., Kapadia, V. S., Magid, D. J., Niermeyer, S., Schmölzer, G. M., Szyld, E., Weiner, G. M., Wyckoff, M. H., Yamada, N. K., &Zaichkin, J. (2020). Part 5: Neonatal Resuscitation 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. https://doi.org/10.1542/peds.2020-038505E
4. Cronin, P., Ryan, F., & Coughlan, M. (2008). Undertaking a literature review: a step-by-step approach. British Journal of Nursing (Mark Allen Publishing), 17(1), 38–43. https://doi.org/10.12968/BJON.2008.17.1.28059
5. Cumpston, M., Li, T., Page, M. J., Chandler, J., Welch, V. A., Higgins, J. P., & Thomas, J. (2019). Cochrane Database of Systematic Reviews Updated guidance for trusted systematic reviews: a new edition of the Cochrane Handbook for Systematic Reviews of Interventions. https://doi.org/10.1002/14651858.ED000142
6. Doglioni, N., Cavallin, F., Mardegan, V., Palatron, S., Filippone, M., Vecchiato, L., Bellettato, M., Chiandetti, L., &Trevisanuto, D. (2014). Total body polyethylene wraps for preventing hypothermia in preterm infants: a randomized trial. The Journal of Pediatrics, 165(2). https://doi.org/10.1016/J.JPEDS.2014.04.010
7. Dramowski, A., Aucamp, M., Beales, E., Bekker, A., Cotton, M. F., Fitzgerald, F. C., Labi, A. K., Russell, N., Strysko, J., Whitelaw, A., & Coffin, S. (2022). Healthcare-Associated Infection Prevention Interventions for Neonates in Resource-Limited Settings. Frontiers in Pediatrics, 10, 919403. https://doi.org/10.3389/FPED.2022.919403
8. Heal, C., Harvey, A., Brown, S., Rowland, A. G., & Roland, D. (2022). The association between temperature, heart rate, and respiratory rate in children aged under 16 years attending urgent and emergency care settings. European Journal of Emergency Medicine, 29(6), 413. https://doi.org/10.1097/MEJ.0000000000000951
9. Hu, X. J., Wang, L., Zheng, R. Y., Lv, T. C., Zhang, Y. X., Cao, Y., & Huang, G. Y. (2018). Using polyethylene plastic bag to prevent moderate hypothermia during transport in very low birth weight infants: a randomized trial. Journal of Perinatology : Official Journal of the California Perinatal Association, 38(4), 332–336. https://doi.org/10.1038/S41372-017-0028-0

ISSN:1624-1940
DOI 10.6084/m9.figshare.26310751
http://magellanes.com/

10. Ibrahim, C. P. H., & Yoxall, C. W. (2009). Use of plastic bags to prevent hypothermia at birth in preterm infants--do they work at lower gestations? Acta Paediatrica (Oslo, Norway : 1992), 98(2), 256–260. https://doi.org/10.1111/J.1651-2227.2008.01076.X
11. J, B.-S. (2010). Learning how to undertake a systematic review: part 1. Nursing Standard (Royal College of Nursing (Great Britain) : 1987), 24(50), 47–55. https://doi.org/10.7748/NS2010.08.24.50.47.C7939
12. Khan, G. A., Riaz, U., Aziz, T., Iqbal, S., Qureshi, T. A., & Shafaat, M. H. K. (2021a). Effectiveness of polyethylene skin wrap in prevention of hypothermia in preterm and low birth weight neonates. Pakistan Armed Forces Medical Journal, 71(3), 810–813. https://doi.org/10.51253/PAFMJ.V71I3.3569
13. Khan, G. A., Riaz, U., Aziz, T., Iqbal, S., Qureshi, T. A., & Shafaat, M. H. K. (2021b). Effectiveness of polyethylene skin wrap in prevention of hypothermia in preterm and low birth weight neonates. Pakistan Armed Forces Medical Journal, 71(3), 810–813. https://doi.org/10.51253/PAFMJ.V71I3.3569
14. Leadford, A. E., Warren, J. B., Manasyan, A., Chomba, E., Salas, A. A., Schelonka, R., & Carlo, W. A. (2013). Plastic Bags for Prevention of Hypothermia in Preterm and Low Birth Weight Infants. Pediatrics, 132(1), e128. https://doi.org/10.1542/PEDS.2012-2030
15. Lee, A. C. C., Mullany, L. C., Ladhani, K., Uddin, J., Mitra, D., Ahmed, P., Christian, P., Labrique, A., DasGupta, S. K., Lokken, R. P., Quaiyum, M., & Baqui, A. H. (2016). Validity of Newborn Clinical Assessment to Determine Gestational Age in Bangladesh. Pediatrics, 138(1). https://doi.org/10.1542/PEDS.2015-3303
16. Lim, M. Y., Kamaruzaman, H. F., Wu, O., & Geue, C. (2023). Health financing challenges in Southeast Asian countries for universal health coverage: a systematic review. Archives of Public Health, 81(1). https://doi.org/10.1186/S13690-023-01159-3
17. Lipscomb, M. (n.d.). Exploring evidence-based practice : debates and challenges in nursing. 229.
18. Manzoni, P., Stolfi, I., Pedicino, R., Vagnarelli, F., Mosca, F., Pugni, L., Bollani, L., Pozzi, M., Gomez, K., Tzialla, C., Borghesi, A., Decembrino, L., Mostert, M., Latino, M. A., Priolo, C., Galletto, P., Gallo, E., Rizzollo, S., Tavella, E., … Farina, D. (2013). Human milk feeding prevents retinopathy of prematurity (ROP) in preterm VLBW neonates. Early Human Development, 89 Suppl 1(SUPPL.1). https://doi.org/10.1016/S0378-3782(13)70019-7
19. Martin, R. M., Fanaroff, A. A., & Walsh, M. C. (2006). Fanaroff and Martin's neonatal-perinatal medicine diseases of the fetus and infant, 8th edn, Vols I and II. Archives of Disease in Childhood. Fetal and Neonatal Edition, 91(6), F468. /pmc/articles/PMC2672777/
20. Oatley, H. K., Blencowe, H., & Lawn, J. E. (2016). The effect of coverings, including plastic bags and wraps, on mortality and morbidity in preterm and full-term neonates. Journal of Perinatology, 36(Suppl 1), S83. https://doi.org/10.1038/JP.2016.35
21. Oxford centre for triple value healthcare Ltd. (n.d.). Critical Appraisal Skills Programme. Retrieved August 30, 2021, from https://casp-uk.net/wp-content/uploads/2018/01/CASP-Qualitative-Checklist-2018.pdf
22. P, J., F, H., J, S., C, B., & M, E. (2002). Direction and impact of language bias in meta-analyses of controlled trials: empirical study. International Journal of Epidemiology, 31(1), 115–123. https://doi.org/10.1093/IJE/31.1.115
23. Pati, D., &Lorusso, L. N. (2017). How to Write a Systematic Review of the Literature: Https://Doi.Org/10.1177/1937586717747384, 11(1), 15–30. https://doi.org/10.1177/1937586717747384
24. Pippa Hemingway. (2009). What is systematic review. Evidence Based Medicine, 1–8.

ISSN:1624-1940
DOI 10.6084/m9.figshare.26310751
http://magellanes.com/

25. Reilly, M. C., Vohra, S., Rac, V. E., Dunn, M., Ferrelli, K., Kiss, A., Vincer, M., Wimmer, J., Zayack, D., & Soll, R. F. (2015). Randomized Trial of Occlusive Wrap for Heat Loss Prevention in Preterm Infants. The Journal of Pediatrics, 166(2), 262-268.e2. https://doi.org/10.1016/J.JPEDS.2014.09.068
26. Scopes, J. W., & Tizard, J. P. M. (1963). The effect of intravenous noradrenaline on the oxygen consumption of new-born mammals. The Journal of Physiology, 165(2), 305–326. https://doi.org/10.1113/JPHYSIOL.1963.SP007058
27. Talakoub, S., Shahbazifard, Z., Armanian, A. M., &Ghazavi, Z. (2015). Effect of two polyethylene covers in prevention of hypothermia among premature neonates. Iranian Journal of Nursing and Midwifery Research, 20(3), 322. /pmc/articles/PMC4462056/
28. Torgerson, D. J., & Torgerson, C. J. (2003). Avoiding Bias in Randomised Controlled Trials in Educational Research. British Journal of Educational Studies, 51(1), 36–45. https://doi.org/10.1111/1467-8527.T01-2-00223
29. Tourneux, P., Durand, E., Pelletier, A., Ghyselen, L., Bach, V., & Libert, J. P. (2017). Use of a Polyethylene Bag to Reduce Perioperative Regional and Whole-Body Heat Losses in Low-Birth-Weight Neonates. BioMed Research International, 2017. https://doi.org/10.1155/2017/8243184
30. Trevisanuto, D., Doglioni, N., Cavallin, F., Parotto, M., Micaglio, M., & Zanardo, V. (2010). Heat loss prevention in very preterm infants in delivery rooms: a prospective, randomized, controlled trial of polyethylene caps. The Journal of Pediatrics, 156(6). https://doi.org/10.1016/J.JPEDS.2009.12.021
31. Vohra, S., Frent, G., Campbell, V., Abbott, M., & Whyte, R. (1999). Effect of polyethylene occlusive skin wrapping on heat loss in very low birth weight infants at delivery: a randomized trial. The Journal of Pediatrics, 134(5), 547–551. https://doi.org/10.1016/S0022-3476(99)70238-6
32. Williams, K. G., Patel, K. T., Stausmire, J. M., Bridges, C., Mathis, M. W., & Barkin, J. L. (2018). The Neonatal Intensive Care Unit: Environmental Stressors and Supports. International Jou rnal of Environmental Research and Public Health, 15(1). https://doi.org/10.3390/IJERPH150100600

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