

# Impact of Delivery Room Gastric Lavage on Exclusive Breastfeeding: A Systematic Review and Meta-Analysis

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## ABSTRACT

**Background:** This systematic review is mainly based on analyzing the impact of Delivery Room Gastric Lavage on Exclusive Breastfeeding. Delivery room gastric lavage is a gastric suctioning process that includes the removal of deleterious contents from the stomach of newborns after their birth. No specific meta-analysis was done in this specific field of study, and therefore the present research was based on a secondary research design to find out the advantages and disadvantages of using gastric lavage in exclusive breastfeeding. **Methods:** A systematic review was undertaken by searching different randomized controlled trials (RCTs) on the impact of gastric lavage in breastfeeding newborns. The databases include RCTs published in open-access PubMed and Google Scholar from 2019 to 2023. The search terms were gastric lavage AND Breastfeeding OR breastfeeding; Breastfeeding rates; Time of breastfeeding; tolerance or intolerance of breastfeeding. The primary outcome was the utilization of gastric lavage in exclusive breastfeeding, which was found to have both potential advantages and disadvantages. The data were pooled and analyzed in RevMan. **Data Sources and Selection Criteria:** Open-access PubMed and Google Scholar were searched for randomized controlled trials using search terms: Gastric lavage AND Breastfeeding OR breastfeeding; breastfeeding rates; Time of breastfeeding; tolerance or intolerance of breastfeeding from 2019 to 2023. The data were pooled and analyzed in RevMan. **Results:** Four RCTs with low risks of bias were included. The pooled estimate (RevMan) showed a statistically significant outcome for breastfeeding intolerance ( $p < 0.00001$ ). The breastfeeding rate was reported to be statistically insignificant ( $p < 0.91$ ). There was no other adverse effect. **Conclusion:** This discrepancy in the findings indicates the requirement for further investigation and the inclusion of a larger sample size to develop the validity and reliability of the advantages of gastric lavage in improving breastfeeding outcomes.

**Keywords:** Breastfeeding; Delivery Rooms; Exclusive; Gastric Lavage

## INTRODUCTION

Delivery room gastric lavage is a routine gastric suctioning process that includes the removal of the contents from the stomachs of newborns after their birth. One such intervention has been found to be a major routine gastric lavage procedure, which was historically performed in the delivery rooms. This has been observed to involve the insertion of tubes via the newborn's mouth or nose inside the stomach in order to remove meconium and various other stomach contents (Chaudhary *et al.*, 2023). This was a specific and common practice in the past, and its use has decreased in recent years because of evolving evidence-based practice and medical guidelines. Gastric lavage can also cause a delay in the initiation of breastfeeding since the procedure takes time and can require interventions and additional monitoring (Guo *et al.*, 2022). The early hours post-birth have been observed to be crucial for the establishment of a strong bond between the newborn and mother. The process was observed to be beneficial for the reduction of the risk associated with meconium aspiration

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syndrome. This is a condition in which the airways of newborns get blocked by meconium, which leads to the occurrence of respiratory distress. Any specific procedure that interrupts a specific process, including gastric lavage, can hinder the establishment of a close and nurturing relationship. This specific bonding is also essential for successful breastfeeding, and it promotes skin-to-skin contact as well as the release of hormones that support lactation (Wang *et al.*, 2021). In the delivery room, gastric lavage feeding leads to a reduction in respiratory disease and intolerance among the neonates. According to the research study, meconium-stained amniotic fluid specifically occurs when the baby has been observed to pass stool before the birth process (Bulbul *et al.*, 2020). This study was performed using an RCT, or randomized controlled trial, design. The study results have shown that routine gastric lavage has a specific and negative impact on exclusive breastfeeding rates, which were mainly lower in the intervention group when compared to the control group. The overall negative impact persisted at the follow-up visit. Lowered exclusive breastfeeding rates inside the intervention group can be stated to be associated with several factors. Thus, it can be stated that healthcare providers must always prioritize evidence-based practices that promote early as well as uninterrupted breastfeeding for the optimization of breastfeeding outcomes.

A research study on the overall impact of delivery room gastric lavage on exclusive breastfeeding rates among neonates is significant for several reasons. One of the most significant reasons is evidence-based practice, optimization of breastfeeding outcomes, potential harm identification, improved care of newborns, cost-effectiveness, and enhanced other infant bonding. The conduct of research in this specific area helps in the establishment of evidence-based guidelines as well as practices for healthcare providers (Guo *et al.*, 2022). The findings of the research can also inform several healthcare policies as well as guidelines that ensure that interventions are based on scientific evidence. Exclusive breastfeeding has been observed to be related to numerous health benefits for both mothers and infants. After the identification of interventions, it can hinder exclusive breastfeeding, and therefore healthcare professionals can find approaches for supporting the successful initiation and duration of breastfeeding (Theurich, McCool-Myers, & Koletzko, 2021). The conduct of research on routine gastric lavage as well as exclusive breastfeeding rates can provide specific insights into the cost-effectiveness of the process. Routine stomach lavage was formerly a widespread practice, but its efficacy and possible drawbacks have come under scrutiny. Studies looking at how gastric lavage affects rates of exclusive breastfeeding can help identify any possible risks connected to the operation. When deciding whether to keep using current procedures or change them, having this knowledge is crucial. Meconium-stained amniotic fluid is frequently linked to respiratory concerns, so it's important to treat these babies properly. Researchers can advance knowledge of the best newborn care practices by examining how gastric lavage affects the percentage of women who exclusively breastfeed in this particular cohort (Wang *et al.*, 2021).

This study can help healthcare professionals strike a balance between the necessity of respiratory assistance and the value of encouraging successful breastfeeding. The cost-effectiveness of the therapy can also be determined by doing research on the prevalence of exclusive breastfeeding and routine gastric lavage. It may be necessary to re-evaluate the need for routine gastric lavage if the results of the research indicate that it has possible adverse effects on exclusive breastfeeding or does not significantly enhance outcomes. Resource allocation for healthcare may be made more effective and efficient with the help of this review. The bonding process may be affected by any interventions or operations carried out during this time. It is now possible to better understand how treatments may affect the mother-infant skin connection, and research on the effects of gastric lavage on rates of exclusive breastfeeding has provided information regarding the same. Practices that support effective breastfeeding and encourage early bonding can be informed by this knowledge.

The aim of this research study was to analyze the effect of gastric lavage on the process of exclusive breastfeeding and skin contact. The objectives of this research study are: a) to find out the advantages of using gastric lavage for exclusive breastfeeding; and b) to find out the disadvantages of using gastric lavage for exclusive breastfeeding.

## **METHODOLOGY**

The Google Scholar and PubMed were used for performing the systematic review, followed by PRISMA for transparent reporting of the systematic review, and meta-analysis guidelines were used for the systematic

review. Ethics approval was not taken.

### **Eligibility Criteria**

Study types: RCTs have been considered. Other study designs like case control, reviews, commentaries, and case reports were excluded. These were read to extract other relevant studies if they were present.

### **Study Exclusion and Inclusion Criteria**

Papers are written and published in English. The papers are published between 2019 and 2023 (a 5-year time period). Papers are written in some other language apart from English. The papers were published before 2019.

### **Participants and Type of Intervention**

The participants were newborns. Gastric lavage is the type of intervention.

### **Search Strategy**

The researcher first looked for published studies in June 2023 by searching Google Scholar and PubMed, then conducted the same searches again in July 2023 to make sure the researcher did not miss anything. The keywords were placed in PubMed and Google Scholar. These two specific databases were mainly utilized by the research study collection, which is open access in nature. Gastric lavage AND Breastfeeding OR Breastfeed, breastfeed rates, Time of Breastfeed, tolerance or intolerance of breastfeed were the keywords used. The selected research design was ranked at the highest point of the hierarchy of the evidence triangle (Bulbul *et al.*, 2020). However, it can be stated that the specific research study's focus was to perform the meta-analysis. The current research study has been performed using a secondary quantitative research design. Meta-analysis is advantageous since there are various studies on the specific topic. It can be stated that both systematic reviews and meta-analyses are highly evidence-based in nature, which helps in the overall improvement of clinical practice, policy decisions, and future research. Moreover, it can be stated that both SLR and meta-analysis are themselves significant research designs for researching future research directions and informing clinical practice. Articles that might not have been cited in the usual medical databases were sought out by searching Google Scholar and PubMed. Additional papers that met the criteria were located by searching the reference lists of the included studies and reviews.

The search question that was used has been given in a PICO format (Population Intervention Comparator Outcome)-

P– Babies

I– Gastric lavage

C– Non gastric lavage

O– Breastfeeding rate and Breastfeeding intolerance

### **Study Selection**

The studies were selected based on information regarding the specific keywords associated with the research topic. Studies concerning gastric lavage and breastfeeding in hospital sectors were selected for this research. The research design of these selected papers was observed to be primary (Randomized Controlled trials, or RCTs). Since secondary quantitative research design was followed here, RCT was the best primary quantitative design that could have been selected for the current research.

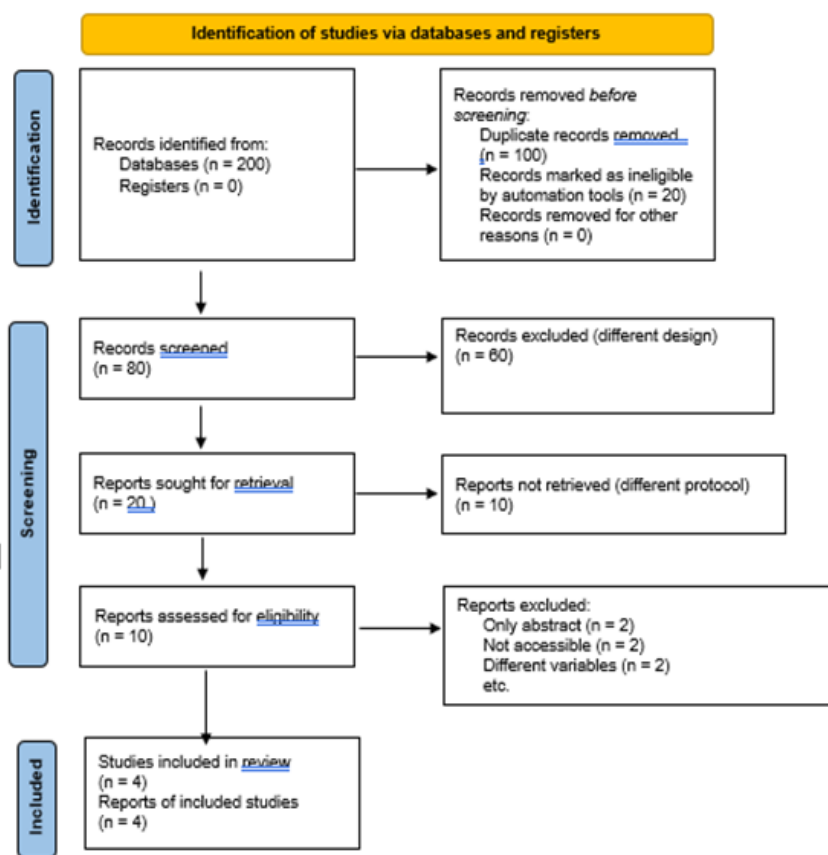
### **Data Extraction**

Data for this research was collected from PubMed and Google Scholar only. Quantitative data was specifically collected from the studies associated with the primary research design. These data types were mainly collected from the research findings, which were mainly selected for the paper. The overall collected

data was specifically imported into the RevMan tool, and then the analysis was performed (Chaudhary et al., 2023). RevMan 5.3 is the latest version of the offline software for performing data analysis. There are several values of statistical data that were collected: mean and SD (standard deviation). The studies were also analyzed for the control group, where gastric lavage was not used. The author has successfully extracted all the required information related to the study characteristics. Data quality was analyzed using the Critical Appraisal Skills Program (CASP) tool for RCT. The overall quality of the collected research studies was then recorded in another data table.

### Data Synthesis

Statistical analysis was specifically performed by using the RevMan tool for the analysis of quantitative data. In order to analyze the effect of gastric lavage on exclusive breastfeeding, data analysis was performed in the RevMan tool, and the Forest plot was generated. A random effects model was used, and RevMan's data analysis was used to measure the effect size for the meta-analysis (Singh et al., 2021). The calculation of the weighted mean difference, or WMD, or even the standardized mean difference, or SMD, between the control and intervention groups provided the main measures of outcome. Subgroup studies were not required here since only one intervention (gastric lavage) was used.



Source (PRISMA)

Figure 1: PRISMA flowchart

### RESULTS

Four specific papers were screened out of 200, and then they were selected from the total number of papers obtained from the first search process. Then, both qualitative and quantitative data were collected from the research studies and recorded in the table talking about study characteristics in the following chapter. However, it can be stated that the overall quality of the collected papers was specifically assessed. The FOREST plot was

drawn after specific statistical analysis was performed using the RevMan tool. The summary of the study findings was then recorded in the data extraction table.

### Study Characteristics

**Table 1: Study Characteristics Table**

Author Names/Studies	Study Design	Participants	Interventions	Control	Outcome measure	Follow-up	Results
Halder, S. K., Ahmed, G. U., Popy, D., Rahaman, M. M., & Chowdhury, M. A. (2020). Impact of Breast Milk Gastric Lavage on Morbidity and Mortality in Preterm Neonates. <i>The Planet</i> , 4(01), 11 - 11.	Randomized controlled trial.	82 babies	Gastric lavage	No gastric lavage	Tolerance of enteral feeding, Full enteral feeding, Hospital stays	Yes	Commence breastfeeding and establish exclusive breastfeeding, the percentage of exclusive breastfeeding at discharge, the length of time for the first skin-to-skin contact, the rates of respiratory distress, the technique, and the rate of feeding intolerance.
Chaudhary, R. K., Chaurasia, S., Singh, P., Priyadarshi, M., Bhat, N. K., Chaturvedi, J., & Basu, S. (2023). Impact of Delivery Room Gastric Lavage on Exclusive Breastfeeding Rates Among Neonates Born Through Meconium-Stained Amniotic Fluid: A Randomized Controlled Trial. <i>Indian Pediatrics</i> , S097475591600515 - S097475591600515.	Randomized controlled trial	112 babies	Gastric lavage	No gastric lavage	Rate of exclusive breast feeding, initiation of breast feeding, tolerance to breast feeding, complications of gastric lavage	Yes	Gastric lavage did not support the development of exclusive breastfeeding, postponed the start of skin-to-skin contact in the delivery room, and shorten the length of breastfeeding overall. Additionally, the gastric lavage technique was linked to pain in newborns.

Gidaganti, S., Faridi, M. M. A., Narang, M., & Batra, P. (2018). Effect of Gastric Lavage on Meconium Aspiration Syndrome and Feed Intolerance in Vigorous Infants Born with Meconium Stained Amniotic Fluid —A Randomized Control Trial. <i>Indian Pediatrics</i> , 55, 206 - 210.	Randomized controlled trial	700 babies	Gastric lavage	No gastric lavage	Feeding intolerance, procedure related complications and meconium aspiration syndrome	Yes	Strong children delivered through meconium-stained amniotic fluid do not appear to be less susceptible to meconium aspiration syndrome or feed intolerance when gastric lavage is performed in the delivery room.
Yadav, S. K., Venkatnarayan, K., Adhikari, K. M., Sinha, R., & Mathai, S. S. (2018). Gastric lavage in babies born through meconium stained amniotic fluid in prevention of early feed intolerance: A randomized controlled trial. <i>Journal of Neonatal-Perinatal Medicine</i> , 11(4), 393-397.	Randomized controlled trial	224 babies	Gastric lavage	No gastric lavage	Feeding intolerance, Meconium aspiration syndrome, time of feeding initiation.	Yes	GL does not lessen feed intolerance in newborns with MSAF.

**Description of the intervention utilised in the included studies**

The use of the gastric lavage technique has been observed to be the intervention utilized in the included studies. The utilized intervention is observed to be associated with exclusive breastfeeding. This is only one intervention that has been utilized in the research study.

**Table 2: Meta-Analysis Table (Breastfeeding Tolerance/Intolerance)**

Meta-analysis ID	Authors	Experimental Group – Participant number	Experimental Group – Standard deviation	Experimental group Mean	Control group participant number	Control group Standard Deviation	Control Mean
1	Halder <i>et al.</i> , (2020)	40	1.38	4.68	42	1.43	6.36
2	Chaudhary <i>et al.</i> , (2023)	55	1.8	1	55	5.4	3
3	Gidaganti <i>et al.</i> , (2018)	267	10.5	37	269	15.1	53
4	Yadav <i>et al.</i> , (2018)	107	4.6	5	117	9.2	11

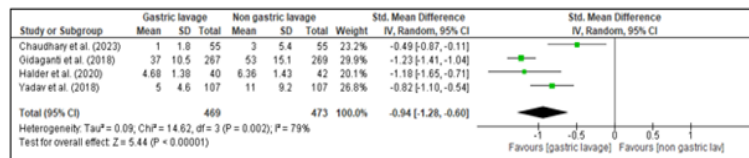


**Table 3: Breast Feeding Rates**

Meta - analysis ID	Authors	Experimental Group – Participant number	Experimental Group – Standard deviation	Experimental group Mean	Control group participant number	Control group Standard Deviation	Control Mean
1	Chaudhary <i>et al.</i> , (2023)	55	89.1	49	55	87.3	48
2	Yadav <i>et al.</i> , (2018)	107	5.73	30.6	117	10.3	30.8

**Effect of gastric lavage on breastfeeding rate and breastfeeding intolerance**

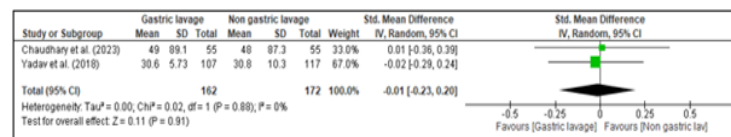
**a. Forest plot for breastfeeding intolerance**



Source: (RevMan 5.3)

Figure 2: The effect of gastric lavage on breastfeeding intolerance has been observed in the above research papers. As observed from the results section, it can be said that the results favor gastric lavage for breastfeeding intolerance reduction. Also, the reduction has been observed to be significantly high for gastric lavage as the points shift far left from the normal line of the Plot. Therefore, it can be concluded that gastric lavage was effective in reducing breastfeeding intolerance.

**b. Forest plot for breastfeeding rate**



Source: (RevMan 5.3)

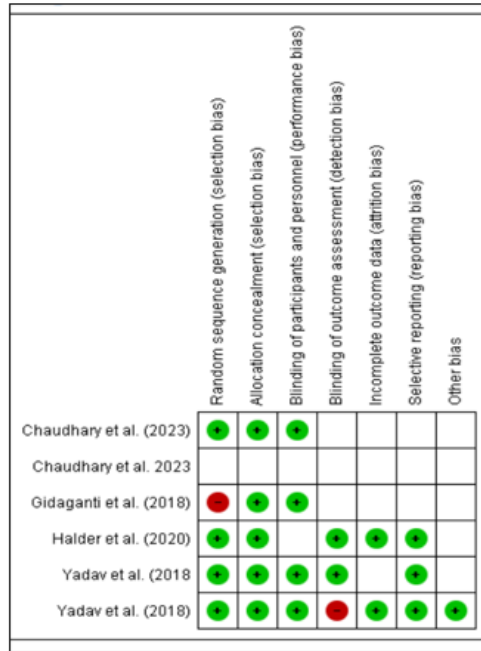
Figure 3 The effect of gastric lavage on the exclusive breastfeeding rate has been observed to have a positive effect on increasing the rate. However, in one observation, it was observed that the breastfeeding rate was favored by the non-gastric lavage group. However, the breastfeeding rate was higher for the experimental group (gastric lavage group), as observed from the above Forest plot.

Therefore, it can be concluded that gastric lavage increases breastfeeding rates in the participant group.

Study ID	Did the trial focus on a clear issue?	Was the assignment of interventions randomized?	Were all the participants accounted for conclusion?	Were all participants blinded to the treatment?	Were the groups similar at the start of the trial?	Were the groups treated equally?	How precise was the treatment effect?	Were all clinically important outcomes considered?	Are the benefits worth harms and costs?
Halder <i>et al.</i> , (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chaudhary <i>et al.</i> , (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gidaganti <i>et al.</i> , (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yadav <i>et al.</i> , (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

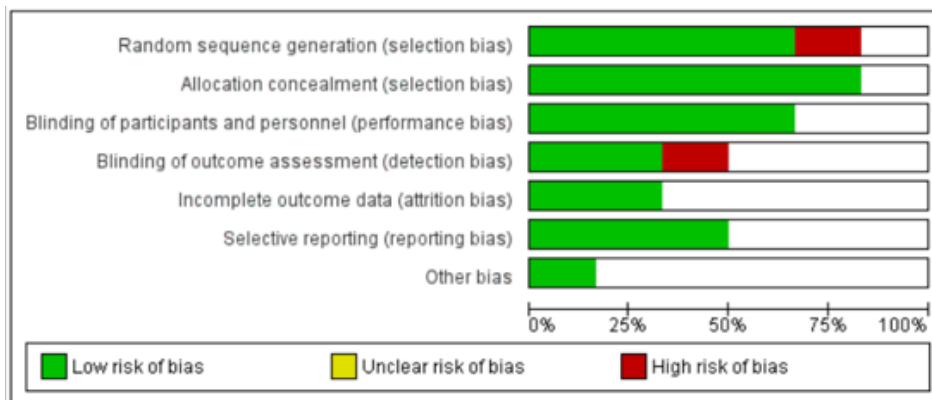
### 3.5. Risk of bias assessment

#### Risk of bias summary



Source: (Revman 5.3)

Figure 4: Risk of Bias Table Has Been Shown Here. Most of the Studies Had Low Risk of Bias and Therefore Were Considered for The Current Research Study



Source: (Revman 5.3)

Figure 5: The Risk of Bias Graph Has Been Represented in The Above Figure. As Observed, Very Less Bias or Low Risk of Bias Was Associated with The Collected Pieces of Evidence

## DISCUSSION

The key objective of this paper is to identify both the advantages and disadvantages of using gastric lavage in exclusive breastfeeding. A study was performed by Deshmukh *et al.* (2015) to investigate the impact of gastric lavage on feeding in neonates born through meconium-stained liquor. The study investigated both the advantages and disadvantages of using gastric lavage during exclusive breastfeeding through a systematic review approach. In the findings of the study, it was identified that a routine gastric lavage immediately after birth has a significant ability to improve feed tolerance, specifically in neonates born through meconium-stained liquor. Despite the evidence on the advantage of routine gastric lavage in improving feed tolerance among neonates, a significant



limitation in the evidence is the probable small-study bias and a high risk of bias in the number of studies included in the systematic review. In this systematic review, the author has investigated the impact of breast milk gastric lavage on morbidity and mortality in preterm neonates, where early exposure to even a small quantity of breast milk in neonates with sick preterm babies was found to decrease the days significantly, to tolerate external feeds as well as the risk of sepsis and length of hospital stay. In the study performed by Halder *et al.* (2020), the comparison was made between BML (breast milk lavage), or the intervention group, and NPO (nil per orally), or the control group. A total of three dependent variables were assessed in the study, and a statistical association was drawn between the dependent variables and the independent variables. The authors of the study have also considered some other variables, for example, the occurrence of septicaemia, jaundice, electrolyte imbalance, and NEC (Necrotizing enterocolitis) among participants in both the BML and NPO groups. There are the findings of the study: it was shown that the intervention with breast milk gastric lavage was identified to be linked with a significantly lower proportion of septicaemia ( $p < 0.05$ ). The prevalence of jaundice among neonates in the BML group was also identified as being comparatively lower than that of the control group of participants. No such differences in the prevalence of complications like electrolyte imbalance and NEC were identified among the participants of the BML group and the control group of participants. In terms of the advantage, it can also be stated that the successful tolerance of enteral feeding among the participants of the BML group was comparatively lower than that of the control group of participants. The number of days needed for successful tolerance of enteral feeding among the BML group of participants was 4.68 days, and in the case of the participants in the NPO group, it was 6.36 days. Days required for successful achievement of full enteral feeding were also comparatively lesser among the participants of the BML group than among the participants of the NPO group. Among participants in the BML group, 9.53 days were required to achieve full enteral feeding, and in the case of the participants in the NPO group, a total of 13.22 days were required to achieve full enteral feeding. Similar findings were observed in the study performed by Deshmukh *et al.* (2015), where routine gastric lavage was found to improve feed tolerance as well as reduce the prevalence of feed intolerance in comparison with the control group of participants. No such adverse effects as the occurrence of septicaemia, jaundice, or electrolyte imbalance were identified among the participants who had undergone gastric lavage. Despite the advantages of the gastric lavage intervention, some disadvantages were also identified in this systematic review.

According to the randomised controlled trials performed by Chaudhary *et al.* (2023), gastric lavage was found to have an inability to develop exclusive breastfeeding. Apart from that, the overall process of gastric lavage was also found to have a significant association with the discomfort of neonates. In terms of the exclusive breastfeeding rate, there was a positive correlation found between gastric lavage and breastfeeding rate in the study performed by Chaudhury *et al.* (2023). The procedure of gastric lavage also resulted in a substantial delay in the initiation and the collective duration of skin-to-skin contact. Delay in skin-to-skin contact is further considered to deprive neonates of its advantages, including the scope of early breastfeeding. Therefore, this disadvantage of gastric lavage further increases the conflict with its scope of implementation to assure the health status of neonates. A study performed by Gidaganti *et al.* (2018) was included in this systematic review. The findings of the study suggested no potential benefit of gastric lavage in either reducing meconium aspiration syndrome or feeding intolerance in vigorous infants born through meconium-stained amniotic fluid. Among the total participants allocated to the intervention (lavage group) and control (no lavage group), 5 participants in the lavage group and a total of 8 participants in the no lavage group were found to develop meconium aspiration syndrome. On the other hand, the prevalence of feed intolerance was also identified in 37 participants in the lavage group. The reduction in feed intolerance was also not significant among participants in the study performed by Yadav *et al.* (2018). In this study, a negative correlation was also identified between breastfeeding rate and gastric lavage. The findings of the study also did not demonstrate any adverse events secondary to gastric lavage. Therefore, considering the synchrony between the findings of the studies performed by Gidaganti *et al.* (2018) and Chaudhary *et al.* (2023), the advantage of gastric lavage is not reliable and validated. Despite the homogenous methodological aspects considered by different researchers in the four different studies included in the systematic review, a significant difference was found in the overall findings of the study in terms of the variables. Considering the limitations of this systematic review, it requires further investigation through the involvement of a broad number of participants to conclude whether gastric lavage is beneficial to reduce the prevalence of feed intolerance, morbidity, and mortality of neonates.

## CONCLUSION

In summary, the utilization of gastric lavage in exclusive breastfeeding is found to have both potential advantages and disadvantages, as investigated in the studies included in the systematic review. As per the suggestions of the findings of the studies, it can be stated that routine gastric lavage immediately after birth can significantly improve feed tolerance, specifically among neonates born through meconium-stained liquor. It was identified that early exposure to even a very small quantity of breast milk via gastric lavage in sick preterm neonates reduced the time required specifically to tolerate enteral feeds and decreased the risk of sepsis as well as the duration of hospital stay. Studies in this systematic review also demonstrated some major limitations and disadvantages linked to gastric lavage. The systematic review has also identified potential small-study biases and a high risk of bias in the studies that are included in the paper, which may further affect the validity and reliability of the overall findings. Moreover, the process of gastric lavage was identified as uncomfortable for new-borns and also resulted in a significant delay in initiating skin-to-skin contact, which can further deprive new-borns of the advantages of early breastfeeding. Some conflicting findings were identified in terms of the impact of gastric lavage on the rates of exclusive breastfeeding. While one study demonstrated a positive correlation between gastric lavage and the rate of breastfeeding, another study identified a negative correlation between the mentioned variables. This discrepancy in the findings indicates the requirement for further investigation and the inclusion of a larger sample size to develop the validity and reliability of the advantages of gastric lavage in improving breastfeeding outcomes. Some studies in the systematic review suggested a significant impact of gastric lavage on the reduction of feed intolerance, whereas some other studies did not address significant alterations in the feed tolerance of the participants. Therefore, the finding of the systematic review specifically on the impact of gastric lavage on feed intolerance is not conclusive, and therefore, further primary research designs can be developed to investigate the identified gap more specifically. Therefore, as a whole, it can be stated that to conclude definitively on the advantages of gastric lavage in decreasing feed intolerance, mortality, and morbidity among neonates, further research studies are considered essential. Future research studies should address the limitations identified in this systematic review and include a large size of the target population or samples to improve the reliability and generalizability of the findings. Moreover, it is also found necessary to consider the discomfort experienced by neonates during the process and the impact on the initiation of early breastfeeding and skin-to-skin contact. Ultimately, healthcare professionals must weigh the potential advantages and disadvantages of gastric lavage in exclusive breastfeeding on a case-by-case basis, taking into account the personalized needs and circumstances of newborns.

## Conflict of Interest

The authors declare that they have no competing interests.

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