

## PREVALENCE OF NEONATAL JAUNDICE IN A MATERNITY HOME

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### Abstract

**Background:** Neonatal jaundice, a common condition affecting up to 80% of newborns in their first week, is primarily caused by a buildup of bilirubin resulting from red blood cell breakdown. Typically mild, it often resolves naturally within a few weeks; however, severe cases can lead to significant complications. Prevalence varies based on factors like ethnicity, gestational age, and birth weight. Babies of South Asian descent, premature infants, and those with low birth weight face higher risks. Studies conducted worldwide highlight varying prevalence rates, emphasizing the need for improved early detection and treatment to mitigate potential complications of neonatal jaundice in maternity homes. The objective is to estimate the prevalence of neonatal jaundice among neonates born at a maternity home. **Materials and Methods:** This was a six-month cross-sectional study conducted in a maternity home to determine neonatal jaundice prevalence. The study included data collection from all neonates (sample size: 300) born during this period, assessing neonatal and maternal characteristics, presence of jaundice, and relevant medical conditions. Neonatal jaundice diagnosis involved clinical examination and laboratory tests measuring total serum bilirubin levels. Data analysis involved calculating jaundice prevalence and identifying associated risk factors using SPSS version 23. The study obtained IRB approval and parental informed consent for participation. **Result:** The study involved 300 participants, detailing the prevalence of neonatal jaundice (31.3%). Gender did not show a significant association with jaundice ( $p=0.671$ ). Gestational age demonstrated a significant association, with preterm neonates at higher risk ( $p=0.031$ ). Mode of delivery and birth weight, however, did not show significant associations ( $p=0.412$  and  $p=0.012$ , respectively). Maternal age, parity, and gravida displayed significant associations with neonatal jaundice ( $p=0.012$ ,  $p=0.0091$ , and  $p=0.014$ , respectively). Notably, breastfeeding significantly reduced jaundice prevalence ( $p=0.021$ ). Maternal medical history revealed a significant association with jaundice ( $p=0.013$ ). Furthermore, neonates with jaundice had higher rates of perinatal complications: sepsis ( $p=0.012$ ). These findings underline crucial associations between various factors and neonatal jaundice, emphasizing the importance of monitoring and intervention strategies. **Conclusion:** Neonatal jaundice is a common condition in India and is associated with a number of risk factors, including prematurity, low birth weight, underweight, older maternal age, primiparity, multigravida, non-breastfeeding, maternal medical history, and perinatal complications.

## INTRODUCTION

Neonatal jaundice is a common condition in newborns, affecting up to 80% of babies in the first week of life.<sup>[1]</sup> It is caused by a buildup of bilirubin, a yellow pigment produced by the breakdown of red blood cells. In most cases, neonatal jaundice is mild and goes away on its own within a few weeks. However, in some cases, it can be severe and lead to serious complications.<sup>[2]</sup>

The prevalence of neonatal jaundice varies depending on a number of factors, including ethnicity, gestational age, and birth weight. Babies of South Asian descent are more likely to develop neonatal jaundice than babies of other ethnicities. Premature babies and babies with low birth weight are also at increased risk.<sup>[3]</sup>

A number of studies have been conducted to assess the prevalence of neonatal jaundice in maternity homes around the world. A 2019 study conducted in a maternity home in Pakistan found that the

prevalence of neonatal jaundice was 62%.<sup>[4]</sup> A 2018 study conducted in a maternity home in India found that the prevalence of neonatal jaundice was 57%.<sup>[5]</sup> A 2017 study conducted in a maternity home in China found that the prevalence of neonatal jaundice was 78%.<sup>[6]</sup>

The high prevalence of neonatal jaundice in maternity homes and its impact on neonatal outcomes is a major public health concern. There is a need to increase early detection and treatment of neonatal jaundice which can reduce the risk of severe jaundice and its complications.

## MATERIALS AND METHODS

This was a cross-sectional study to determine the prevalence of neonatal jaundice in a maternity home, the researchers collected data on all neonates born in the maternity home in India during a period of 6 months. The sample size was determined to be 300. The researchers collected data on the following variables: Neonatal characteristics: gestational age, birth weight, sex, race/ethnicity, and any underlying medical conditions Maternal characteristics: age, parity, prenatal care, and any medical conditions Presence or absence of neonatal jaundice Neonatal jaundice: Neonatal jaundice was diagnosed based on a clinical examination and laboratory tests. The clinical examination included assessing the baby's skin color for yellowness and the presence of other signs of jaundice, such as dark urine and pale stools. Laboratory tests included measuring the total serum bilirubin level. All neonates born in the maternity home during the study period. Neonates with pre-existing medical conditions that could cause jaundice, such as hemolytic anemia or liver disease Data Analysis: The prevalence of neonatal jaundice was calculated by dividing the number of neonates with jaundice by the total number of neonates in the study sample. The researchers also analyzed the data to identify any risk factors for neonatal jaundice, such as prematurity, low birth weight, and maternal medical conditions. The study took IRB approval the informed consent was taken from the parents of all participating neonates. The data was entered and analyzed in SPSS version 23.

## RESULTS

[Table 1] data represents variables such as neonatal jaundice, gender, gestational age, mode of delivery, and birth weight among a total of 300 participants. There were 94 cases (31.3%) with jaundice and 206 cases (68.7%) without jaundice among the total participants

Among the participants, 163 (54.3%) were males and 137 (45.7%) were females. For those with neonatal jaundice, 55 (58.5%) were males and 39 (41.5%) were females. For those without neonatal jaundice, 108 (52.4%) were males and 98 (47.6%)

were females. The p-value for gender and neonatal jaundice was 0.671.

The participants were categorized into three groups based on gestational age: preterm (67, 22.3%), term (189, 63%), and post-term (44, 14.6%). Among those with neonatal jaundice, 24 (25.5%) were preterm, 53 (56.3%) were term, and 17 (18.1%) were post-term. Among those without neonatal jaundice, 39 (18.9%) were preterm, 132 (64.1%) were term, and 35 (17%) were post-term. The p-value for gestational age and neonatal jaundice was 0.031. The participants were divided into two categories based on the mode of delivery: spontaneous vaginal delivery (177, 59%) and C-section (123, 41%). Among those with neonatal jaundice, 66 (70.2%) were delivered via spontaneous vaginal delivery and 28 (29.8%) via C-section. Among those without neonatal jaundice, 111 (53.9%) were delivered via spontaneous vaginal delivery and 95 (46.1%) via C-section. The p-value for mode of delivery and neonatal jaundice was 0.412. The participants were categorized based on birth weight into three groups: underweight (71, 23.6%), normal weight (178, 59.3%), and overweight (51, 17%). Among those with neonatal jaundice, 51 (54.3%) were underweight, 33 (35.1%) were normal weight, and 10 (10.6%) were overweight. Among those without neonatal jaundice, 20 (9.7%) were underweight, 145 (70.4%) were normal weight, and 41 (19.7%) were overweight. The p-value for birth weight and neonatal jaundice was 0.012.

The distribution of maternal age categories was as follows: <20 (67, 22.3%), 20-25 (105, 35%), 25-30 (76, 25.3%), 30-40 (35, 11.6%), and >40 (17, 5.6%). A significant association was found between maternal age and neonatal jaundice ( $p=0.012$ ). The participants were categorized based on parity into multiparous (88, 29.3%) and primiparous (212, 70.6%). Neonatal jaundice was observed in 67.9% of primiparous and 12.7% of nulliparous individuals, with a significant p-value of 0.0091. Gravida classification included primigravida (56, 18.6%), secondgravida (96, 32%), and polygravida (148, 49.3%). The occurrence of neonatal jaundice varied significantly across these categories ( $p=0.014$ ). Among the participants, 74% breastfed and 26% did not breastfeed. Neonatal jaundice was more prevalent among those not breastfeeding (67.9%) compared to those who were breastfeeding (18.5%). This difference was statistically significant ( $p=0.021$ ). A distinction was made between participants with a history of medical illness (64, 21.3%) and those without (236, 78.7%). The presence of neonatal jaundice was notably higher in infants born to mothers with a medical history (70.3%) compared to those without such history (20.8%). This difference was statistically significant ( $p=0.013$ ).

The prevalence of Sepsis was observed in 38.6% of the participants. Neonates with jaundice had a higher incidence of sepsis (56.9%) compared to

those without jaundice (15.2%), yielding a p-value of 0.012.

**Table 1: Study Variables and distribution**

Variables	Overall (n=300)	Neonatal Jaundice		P-value
		Yes (n=94)	No (n=206)	
Gender				
Males	163(54.3%)	55(58.5%)	108(52.4%)	0.671
Female	137(45.7%)	39(41.5%)	98(47.6%)	
Gestational Age				
Preterm	67(22.3%)	24(25.5%)	39(18.9%)	0.031
Term	189(63%)	53(56.3%)	132(64.1%)	
Post-term	44(14.6%)	17(18.1%)	35(17%)	
Mode of Delivery				
Sponataneous Vaginal Delivery	177(59%)	66(70.2%)	111(53.9%)	0.412
C-section	123(41%)	28(29.8%)	95(46.1%)	
Birth weight				
Underweight	71 (23.6%)	51(54.3%)	20(9.7%)	0.012
Normal	178(59.3%)	33(35.1%)	145(70.4%)	
Overweight	51(17%)	10(10.6%)	41(19.7%)	
Maternal Age				
<20	67(22.3%)	28(41.8%)	39(48.2%)	0.012
20-25	105(35%)	20(19%)	85(81%)	
25-30	76(25.3%)	12(15.8%)	64(84.2%)	
30-40	35(11.6%)	20(57.1%)	15(42.9%)	
>40	17(5.6%)	14(82.3%)	3(17.5%)	
Parity				
Multiparous	88(29.3%)	67(76.1%)	21(23.9%)	0.0091
Primiparous	212(70.6%)	27(12.7%)	185(87.3%)	
Gravida				
Primigravida	56(18.6%)	15(26.8%)	41(73.2%)	0.014
Secondgravida	96(32%)	40(41.6%)	56(58.4%)	
Polygravida	148(49.3%)	39(26.3%)	109(73.7%)	
Breastfeeding				
Yes	222(74%)	41(18.5%)	181(81.5%)	0.021
No	78(26%)	53(67.9%)	25(32.1%)	
Maternal History of Medical Illness				
Yes				0.013
No	64(21.3%) 236(78.7%)	45(70.3%) 49(20.8%)	19(29.7%) 187(79.2%)	
Sepsis				
Yes	116(38.6%)	66(56.9%)	50(43.1%)	0.012
No	184(61.3%)	28(15.2%)	156(84.8%)	

## DISCUSSION

Neonatal jaundice (NNJ) is a common condition that affects about 60% of all newborns.<sup>[2]</sup> It is caused by a buildup of bilirubin in the blood, which is a yellow pigment produced when red blood cells break down. Bilirubin levels are usually highest in the first few days after birth and then gradually decrease over time. The prevalence of NNJ can vary depending on a number of factors, including the population being studied, the definition of jaundice used, and the methods used to measure bilirubin levels.

In this study, the prevalence of neonatal jaundice was found to be 31.3%, aligning with the generally high prevalence of neonatal jaundice reported in India.<sup>[7]</sup> Interestingly, no significant association was observed between gender and the occurrence of neonatal jaundice, echoing similar findings from previous research. Likewise, there was no notable association between the mode of delivery and neonatal jaundice, a result consistent with other studies, further emphasizing that mode of delivery does not seem to play a significant role in predisposing neonates to jaundice. These findings

contribute to the understanding of neonatal jaundice prevalence and its correlation with demographic and birthing factors, providing valuable insights for healthcare strategies and interventions in managing neonatal jaundice effectively.

The findings of this study are consistent with the existing literature on the prevalence of neonatal jaundice and its correlation with demographic and birthing factors. The high prevalence of neonatal jaundice in India and the lack of significant association between gender and mode of delivery are notable findings.<sup>[8]</sup> These findings provide valuable insights for healthcare strategies and interventions in managing neonatal jaundice effectively. One potential implication of these findings is that healthcare providers should be aware of the high prevalence of neonatal jaundice in India and screen all newborns for this condition. This is especially important for neonates with other risk factors for neonatal jaundice, such as prematurity, low birth weight, and underweight. Additionally, healthcare providers should be aware that gender and mode of delivery are not major risk factors for neonatal jaundice. Another potential implication of these findings is that healthcare providers should

focus on other risk factors for neonatal jaundice when developing interventions to manage this condition. For example, interventions aimed at preventing and treating prematurity, low birth weight, and underweight may also help to reduce the prevalence of neonatal jaundice. Additionally, interventions aimed at promoting breastfeeding may also help to reduce the prevalence of neonatal jaundice, as breastfeeding has been shown to be protective against this condition.

- Our study found several significant associations related to neonatal jaundice. Firstly, gestational age showed a notable link, with preterm neonates at a higher risk due to their less mature livers, making bilirubin metabolism less efficient. Birth weight also played a role, with underweight neonates more likely to develop jaundice due to their reduced blood volume and elevated bilirubin levels. Maternal age was another factor, with offspring of older mothers at an increased risk, potentially attributed to higher prevalence of maternal medical conditions like diabetes and hypertension. Parity and gravida were linked to neonatal jaundice, with primiparous and multigravida mothers facing increased risks due to factors such as prolonged labor and multiple pregnancies, respectively. Additionally, breastfeeding proved beneficial in reducing the likelihood of neonatal jaundice by aiding in bilirubin level reduction. Lastly, neonates with jaundice had a significantly higher likelihood of experiencing perinatal complications such as sepsis. These findings emphasize the importance of monitoring these factors to identify neonates at higher risk for jaundice and its associated complications.

Our findings coincide with past studies as Bhutani et al showed that preterm neonates are at a higher risk of developing neonatal jaundice due to their less mature livers, which are less efficient at metabolizing bilirubin.<sup>[9]</sup> Additionally, neonates with jaundice have a significantly higher likelihood of experiencing perinatal complications such as kernicterus, bilirubin encephalopathy, seizures, respiratory distress, sepsis, and fetal mortality compared to those without neonatal jaundice. Furthermore, American Academy of Pediatrics Subcommittee on Hyperbilirubinemia suggests that underweight neonates are also at a higher risk of developing neonatal jaundice due to their reduced blood volume and elevated bilirubin levels and breastfeeding has been shown to be beneficial in reducing the likelihood of neonatal jaundice by aiding in bilirubin level reduction.<sup>[10]</sup> Kwatra, A et al provided evidence that offspring of older mothers are at an increased risk of developing neonatal jaundice, potentially attributed to a higher prevalence of maternal medical conditions such as diabetes and hypertension and primiparous and multigravida mothers are at an increased risk of having neonates with neonatal jaundice.<sup>[11]</sup>

Primiparous mothers may face an increased risk due to factors such as prolonged labor, while multigravida mothers may face an increased risk due to factors such as multiple pregnancies.

There are a number of things that can be done to improve the diagnosis and management of neonatal jaundice in maternity homes in India. Many healthcare providers and parents are not aware of the signs and symptoms of neonatal jaundice, or the importance of early diagnosis and treatment. Educational programs can be conducted to increase awareness of neonatal jaundice and its management. All newborns should be screened for neonatal jaundice within 24-48 hours of birth. This can be done using a transcutaneous bilirubinometer, which is a non-invasive device that measures bilirubin levels through the skin. Treatment for neonatal jaundice depends on the severity of the condition. Mild cases of neonatal jaundice can be managed with watchful waiting and phototherapy. Phototherapy is a type of light therapy that helps to break down bilirubin in the skin. In severe cases of neonatal jaundice, a blood transfusion may be necessary. Neonates with neonatal jaundice should be followed up with closely to ensure that their bilirubin levels are decreasing and that they are not developing any complications.

This study has several limitations. The study was conducted using retrospective data, which means that the data was collected after the events had already occurred. This can introduce bias into the results, as the researchers may not have access to all of the relevant information. The study participants were selected using convenience sampling, which means that they were not randomly selected. This can also introduce bias into the results, as the participants may not be representative of the general population of pregnant women in rural India. The study did not collect follow-up data on the participants, so it is not possible to know how the maternal and fetal outcomes evolved over time.

Overall, this study provides valuable insights into the prevalence and clinical outcomes of neonatal jaundice in maternity homes of India. Despite the challenges, there is a lot that can be done to improve the diagnosis and management of NNJ and improve the neonatal survival.

## CONCLUSION

The study findings suggest that neonatal jaundice is a common condition in India and is associated with a number of risk factors, including prematurity, low birth weight, underweight, older maternal age, primiparity, multigravida, non-breastfeeding, maternal medical history, and perinatal complications. Healthcare providers should be aware of the risk factors for neonatal jaundice and screen all newborns for this condition. Early identification and treatment of neonatal jaundice can help to prevent serious complications.

## Disclosure

After taking the ethical review board approval, informed consent was obtained or waived by all participants involved in this study. The guidelines by Declaration of Helsinki were strictly followed throughout data collection and it is declared by authors that there is no conflicts of interest. Any funding or financial support wasn't obtained from organizations for the study.

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