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THE PREVALENCE OF FEEDING INTOLERANCE IN PRETERM NEONATES ATTENDING A TERTIARY CARE HOSPITAL, BANGLADESH

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ABSTRACT

Background: Feeding intolerance is common in premature newborns and is strongly linked to morbidity and mortality. All pediatricians will eventually have to deal with this formidable obstacle. When clinical symptoms such as vomiting, diarrhea, or abdominal pain arise as a result of ingestion or digestion of milk, this is known as feeding intolerance. **Objective:** To evaluate the prevalence of feeding intolerance in preterm neonates in neonatal intensive care units. **Method:** This prospective study was carried out on 40 preterm neonates admitted to Neonatal Intensive Care Unit of Khulna City Medical College and Hospital, Khulna from 1st January 2022 to 31st December 2022. Inclusion criteria of the study were admitted preterm infants of both genders from day 0 to day 28 of life and with gestational age (GA) from 28 to 36 weeks (estimated by 1st day of maternal last menstrual period). Diagnosis of feeding intolerance considered by the presence of one or more signs that leading to interruption of the enteral feeding regime of the preterm as increased gastric residuals (>50%) of the previous feeding, greenish residual, hemorrhagic residual, emesis, abdominal distention (increase in abdominal girth by 2 cm or more in between feedings), bloody stool, diarrhea, visible bowel loops and apnea. **Results:** During the study 10% had feeding intolerance. Mean gestational age was found 32.2±2.3 weeks with range from 28 to 36 weeks. The mean birth weight was found 1866.5±529.9 gram with range from 950 to 2800 gram. The mean time of feeding intolerance diagnosis was found 6.1±4.2 days with range from 2 to 15 days. 70% patients had feeding intolerance who was born in 28-32 weeks and 30% was in 33-35 weeks of gestation. Majority (52.5%) patients had vomiting, 37.5% had abdominal distension, 20% had gastric residual, 15% had apnea, 12.5% had greenish residual and 12.5% had hemorrhagic residual. 45% patients was found with respiratory distress followed by 37.5% with respiratory distress syndrome, 10% with necrotizing enterocolitis, 5% with transient tachypnea of the newborn and 5% with hypoxic ischemic encephalopathy. **Conclusion:** The feeding of preterm neonates is one of the main challenges facing the neonatologist. Feeding intolerance can be defined by difficulty in ingestion or digestion of the milk that causes a disruption in the enteral feeding plan due to the manifestation of clinical symptoms. In our study through cases of feeding indolence has limited but frequency of symptoms and morbidities were higher.

KEYWORDS: feeding intolerance, preterm neonates. neonatal intensive care units.

INTRODUCTION

Preterm infants have higher nutrient requirements than term infants because they have missed some or all of the third trimester of pregnancy which is a period of nutrient accretion and rapid growth. The fetus multiplies in weight five times from 24 weeks gestation to term (a period <4 months); in comparison term infants double their birth weight by 4–5 months.[1] The American Academy of Pediatrics policy statement in 2012 on breastfeeding and the use of human milk recommend human milk for term, preterm, and other high-risk infants either by direct breastfeeding and/or by expressed breast milk.[2] Preterm infants, who have feeding intolerance, get difficulty with the ingestion or digestion of formula or breast diarrhea, or bloody stool. Apnea, bradycardia, and temperature instability are also included as symptoms of feeding intolerance.[3] Feeding intolerance (FI) is often associated with nacrotizing enterocolitis, a leading cause of morbidity and mortality in preterm infant.[4] Preterm infants who frequently suffer from feeding intolerance and subsequently exposed to parenteral nutrition for prolonged time.[5] Factors that contribute to feeding intolerance include poor coordination of sucking and swallowing, incompetent lower esophageal sphincter, small gastric capacity, delayed gastric emptying time and intestinal hypo motility.[6] An abnormal bacterial colonization may be a coexisting factor in feeding intolerance in newborn mainly due to dysfunction of the intestinal barrier, the immune responses, and sensory motor functions of the

gut. Abnormal intestinal colonization, poor balance between microbiota, immune response and tolerance mechanisms may result in feeding intolerance in early postnatal life and in gastrointestinal disease in childhood.[7]

OBJECTIVE

To determine the frequency of feeding intolerance in hospitalized preterm neonates.

METHODS

This prospective study was carried out on 40 preterm neonates admitted to Neonatal Intensive Care Unit of Khulna City Medical College and Hospital, Khulna from 1st January 2022 to 31st December 2022. Inclusion criteria of the study were admitted preterm infants of both genders from day 0 to day 28 of life and with gestational age (GA) from 28 to 36 weeks (estimated by 1st day of maternal last menstrual period). Diagnosis of feeding intolerance considered by the presence of one or more signs that leading to interruption of the enteral feeding regime of the preterm as increased gastric residuals (>50%) of the previous feeding, greenish residual, hemorrhagic residual, emesis, abdominal distention (increase in abdominal girth by 2 cm or more in between feedings), bloody stool, diarrhea, visible bowel loops and apnea. Exclusion criteria was neonates suffering from intestinal congenital anomalies, neonates with fulminating sepsis from onset, also neonates with milk allergy. All the studied neonates were subjected to full history taking and full clinical examination. Statistical analysis. The collected data were organized, tabulated, and statistically analyzed by using Statistical Package for Social Science (SPSS) version 16.

RESULTS

Figure-1 shows prevalence of feeding intolerance in preterm where 10% had feeding intolerance.

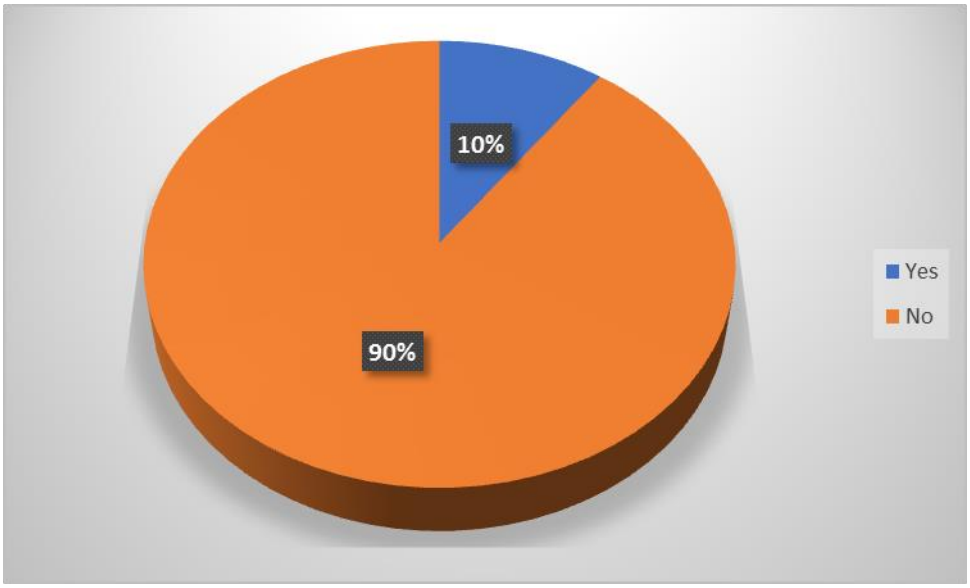

Figure-1: Prevalence of feeding intolerance in preterm.

Table-1 shows demographic status of the patients where Mean gestational age was found 32.2±2.3 weeks with range from 28 to 36 weeks. The mean birth weight was found 1866.5±529.9 gram with range from 950 to 2800 gram. The mean time of feeding intolerance diagnosis was found 6.1±4.2 days with range from 2 to 15 days.

Table 1: Demographic status of the patients.

Demographic status	mean±STD
Mean gestational age (28-36 weeks)	**32.2±2.3 weeks**
Mean birth weight of neonates	1866.5±529.9 gram
Mean time of feeding intolerance diagnosis	6.1±4.2 days

Figure-2 shows Feeding intolerance with gestational age where 70% patients had feeding intolerance who was born in 28-32 weeks and 30% was in 33-35 weeks of gestation.

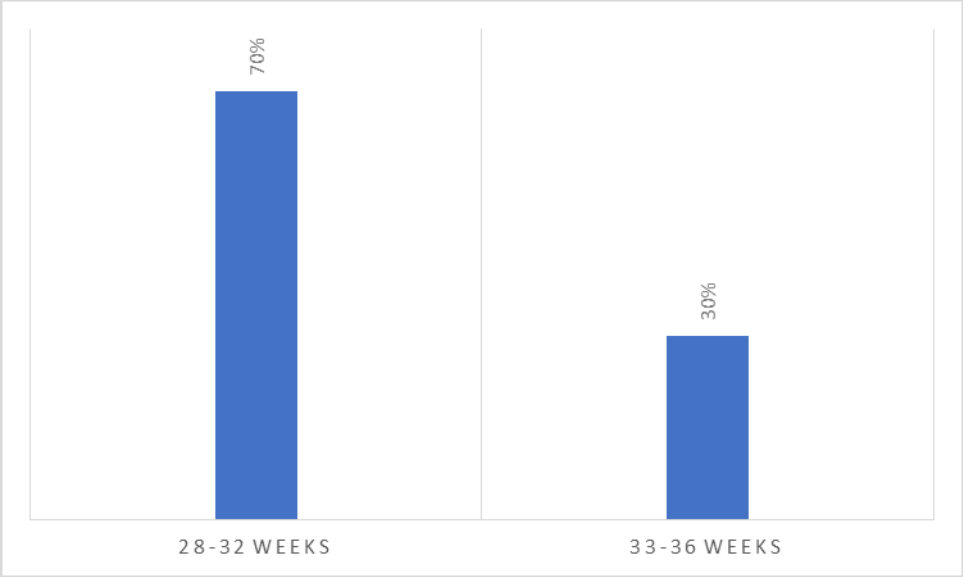

Figure-2: Feeding intolerance with gestational age.

Table-2 shows Distribution of the study patients by signs of feeding intolerance where Majority (52.5%) patients had vomiting, 37.5% had abdominal distension, 20% had gastric residual, 15% had apnea, 12.5% had greenish residual and 12.5% had hemorrhagic residual.

Table 2: Distribution of the study patients by signs of feeding intolerance.

Signs of feeding intolerance	N	Percentage (%)
Vomiting	21	52.5%
Abdominal distension	15	37.5%
Gastric residual	8	20%
Apnea	6	15%
Greenish residual	5	12.5%
Hemorrhagic residual	5	12.5%

***multiple responses were noted**

Table-3 shows Morbidities in the feeding intolerance cases. In feeding intolerance 45% patients was found with respiratory distress followed by 37.5% with respiratory distress syndrome, 10% with necrotizing enterocolitis, 5% with transient tachypnea of the newborn and 5% with hypoxic ischemic encephalopathy.

Table 3: Morbidities in the feeding intolerance cases.

Signs of feeding intolerance	N	Percentage (%)
Respiratory distress (RD)	18	45%
Respiratory distress syndrome (RDS)	15	37.5%
Necrotizing enterocolitis (NEC)	4	10%
Transient tachypnea of the newborn (TTN)	2	5%
Hypoxic ischemic encephalopathy (HIE)	2	5%

DISCUSSION

Feeding intolerance in the preterm infant is defined as follows: "Experiencing difficulty with the ingestion or digestion of formula or breast milk that causes a disruption in the current enteral feeding plan due to the manifestation of one or more defined clinical symptoms.[3] These symptoms include gastric residuals, emesis, abdominal distention, visible bowel loops, and character of stool (diarrhea, guaiac positive or bloody). Apnea, bradycardia, and temperature instability are also included as symptoms of feeding intolerance but solely for the purposes of the nursing assessment in order to provide guidance on identification of potential progression to more serious complications such as pneumatosis intestinalis and necrotizing enterocolitis.[3] FI is one of the most common reasons to delay the advancement of enteral feeds or for suspension of feeds in preterm infants.[8]

In this prospective study, we followed preterm infants who were admitted to Neonatal Intensive Care Unit of Dhaka tertiary care Hospital from 1st January 2021 to 31st December 2021 for the appearance of any signs of feeding intolerance. We assessed the incidence of

feeding intolerance among this preterm neonates. In this study, it was observed that mean gestational age was found 32.1±2.3 weeks with range from 28 to 36 weeks. The mean birth weight was found 1866. 5±529. 9 gram (gm) with range from 950 to 2800 gram. The mean time of feeding intolerance diagnosis was found 6.1±4.2 days with range from 2 to 15 days. Study done by Zoppelli et al. showed that mean GA was 28.5 weeks and birth weight 1057 gm.[9] In another study done by Albanna et al. showed that they had a mean GA of 32 weeks, a mean birth weight of 1500 gm and a mean age at diagnosis of 9 days.[10] The study of Carroll et al.[11] had a mean GA of 30 weeks and mean age at diagnosis of 12 days. In the study of Yang et al. mean GA was found 26.6±2.1 weeks and mean birth weight was 982.1±289.4 gm.[12] Aydemir et al. found in their study that the mean GA was 29 weeks, mean birth weight of 950 gm and a mean age of 14 days at diagnosis.[13] In our study, from a total of 500 neonates, 40 preterm showed signs of feeding intolerance. The incidence of feeding intolerance in our study was 10%. Majority (52.5%) patients had vomiting, 37.5% had abdominal distension, 20% had gastric residual, 15% had apnea, 12.5% had greenish residual and 12.5% had hemorrhagic residual.

70% patients had feeding intolerance in 28-32 weeks and 30% in 33-36 weeks of gestation. In this study, among 40 feeding intolerance 45% patients was found with respiratory distress followed by 37.5% with respiratory distress syndrome, 10% with necrotizing enterocolitis, 5% with transient tachypnea of the newborn and 5% with hypoxicischemic encephalopathy. One case died due to necrotizing enterocolitis. Study done by Aydemir et al. showed that 3 patients had mild necrotizing enterocolitis (Bell's stage IB), 4 had definite necrotizing enterocolitis (Bell's stage IIB) and 3 had clinical signs consistent with advanced necrotizing enterocolitis (Bell's stage IIIA or IIIB).[13]

CONCLUSION

The feeding of preterm neonates is one of the main challenges facing the neonatologist. Feeding intolerance can be defined by difficulty in ingestion or digestion of the milk that causes a disruption in the enteral feeding plan due to the manifestation of clinical symptoms. In our study through cases of feeding indolence has limited but frequency of symptoms and morbidities were higher.

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