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CLINICAL PROFILE OF NEONATES WITH DEHYDRATION AND ANALYSIS OF AETIOLOGY IN A TERTIARY CARE HOSPITAL.

KEY WORDS: Dehydration, Neonates, Breast Feeding, Acute renal failure.

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ABSTRACT

Background: Exclusive breastfeeding is crucial for the first six months, but inadequate feeding can cause life-threatening dehydration, leading to severe renal impairment or acute kidney injury. This study examines the clinical and etiological profile of dehydrated neonates. **Material And Methods:** The present study was a single-center, prospective Cohort study, conducted on neonates with Dehydration admitted in the Department of paediatrics of tertiary care center from March 2022 to September 2022. Fifty neonates with dehydration and fulfilling the inclusion criteria were enrolled in the study. **Results:** In this study, 62% of neonates had a gestational age of 37 to 39 weeks, with 46% male and 54% female. Fever was present in 30%, while 24% had acute renal failure, 76% had hypernatremia, and 10% had diarrhea. All neonates received phototherapy and feeding, with 98% given intravenous fluids. Breastfeeding was initiated after one hour in 76% of cases. Most neonates (74%) were exclusively breastfed, though some mothers experienced lactation issues, including retracted (6%), cracked (6%), or inverted (2%) nipples, leading to inadequate feeding and lactation failure. **Conclusion:** This study emphasizes the importance of early detection and treatment of neonatal dehydration. Maternal factors like socioeconomic status and lactation issues contribute significantly. Enhancing breastfeeding education and support in the early postnatal period is vital to reduce dehydration risks and improve neonatal health.

INTRODUCTION:

Dehydration in neonates can be life-threatening, leading to severe renal impairment and acute kidney injury.[1] Breastfeeding is crucial for infant growth, but inadequate milk production can result in dehydration, especially during hot seasons.[2, 3]Neonatal weight loss is common, with significant dehydration often linked to insufficient breast milk intake.[4, 5]Symptoms include fever, decreased activity, weight loss, and seizures.[6]This study aims to determine the incidence, clinical profile, and etiology of dehydration in exclusively breastfed neonates, along with associated morbidity and mortality.

MATERIAL AND METHODS:

This cross-sectional, hospital-based study was conducted at a tertiary care hospital for7months, from March 2022 to September 2022. The study included all neonates with dehydration admitted to the Department of Paediatrics during this period, meeting the inclusion criteria. A total of 50 neonates with dehydration were included in the study. The inclusion criteria comprised all neonates under 28 days of life admitted to the Neonatal Care Unit with dehydration and weight loss at the time of admission, neonates showing signs and symptoms of dehydration, and parents who provided informed consent. Exclusion criteria included neonates with blood culture-proven sepsis, birth weight under 1500 grams, perinatal asphyxia, and those referred to the institute after receiving intravenous fluids within 48 hours before the diagnosis of hypernatremia.

The study was conducted following approval from the institutional ethical committee. Informed written consent was obtained from the parents of all eligible neonates. Data collection was carried out using a predesigned and pretested proforma. Neonates underwent clinical examinations and laboratory investigations. Detailed history and clinical examination were performed, and data regarding gender, gestational age in weeks, mode of delivery, birth weight, current weight, and feeding method were recorded. Axillary temperature above 38°C was considered indicative of fever. Information on the duration of hospital stay, complications during hospitalization, and neurological outcomes were also documented. All neonates were given breastfeeding along with supplementary feeding. Many required Intravenous (IV) fluids who showed signs and symptoms of dehydration.

Breastfeeding was ensured for all babies recovering from morbidity. Mothers were educated on the correct breastfeeding position and attachment, with specific instructions given to four mothers with flat nipples on the technique of syringing. All mothers received counseling on the benefits of breast milk for both the baby and themselves and were encouraged to increase the frequency of feeding.

Statistical Analysis:

Data were entered into an Excel sheet and analyzed using SPSS software version 21. Descriptive statistics, including percentages, were calculated. Associations were studied using the Chi-square test, with a p-value of less than 0.05 considered statistically significant.

RESULTS:

Demography

In the present study, 50 neonates with signs and symptoms of dehydration were enrolled. Here, females were predominantly present compared to males (54% vs 46%). The mean age of the neonates was 71.50±15.32 Hrs. The maximum proportion of the neonates had 37-39 weeks gestation age (n=13, 62%) followed by 26% (n=13) and 12% (n=6) of neonates belonging to <37 weeks and >39 weeks gestational age categories respectively.

Weight Variables:

The mean weight at birth for the neonates was 2750.06 grams, with a standard deviation of 394.55 grams.The mean weight of the neonates on admission was 2366.48 grams, with a standard deviation of 498.12 grams. This shows a significant decrease in weight from birth to the time of admission, with most weights ranging between about 1868.36 to 2864.60 grams.The mean weight loss experienced by the neonates was 343.18 grams, with a standard deviation of 108.03 grams. The mean percentage of weight loss was 12.45%, with a standard deviation of 3.62% (Table 1).

Clinical Presentations:
All 50 neonates (100%) presented with jaundice, indicating this was a common symptom among the study subjects. Fever was observed in 15 neonates, accounting for 30% of the cases.Acute renal failure (ARF) was found in 12 neonates (24%). Only 1 neonate (2%) showed signs of respiratory distress. Hypernatremia was identified in 38 neonates (76%), demonstrating a high prevalence of this electrolyte imbalance among the dehydrated neonates. Diarrhoea was reported in 5 neonates (10%), showing it was a less common but notable symptom in this cohort (Table 2).

Treatment:
Intravenous fluids were administered to 49 neonates, accounting for 98% of the cases.All 50 neonates (100%) received feeds and phototherapy (Table 3). The mean urine output following treatment was 109.38±24.43ml whereas, the mean hospital stay was 3.52±0.86 days.

Maternal Factors:
The majority of cases were from the lower middle class, comprising 29 cases (58%). The upper middle class accounted for 11 cases (22%), while both the lower class and upper lower class each had 5 cases (10%). There were 23 primigravida mothers (46%) and 27 multigravida mothers (54%), indicating a slightly higher prevalence of multigravida mothers in the study.The mode of delivery was evenly distributed, with 25 cases (50%) delivered via lower segment caesarean section (LSCS) and 25 cases (50%) delivered vaginally. The majority of mothers (38 cases, 76%) started breastfeeding more than one hour after birth. A smaller proportion of mothers-initiated breastfeeding within half an hour (2 cases, 4%), within one hour (5 cases, 10%), and more than two hours after birth (5 cases, 10%). Cracked nipples and poor latching were each observed in 3 cases (6%), retracted nipples in 6 cases (12%), and inverted nipples in 1 case (2%). A significant majority of mothers (37 cases, 74%) reported no lactation issues.the most common blood group was O Positive, found in 18 cases (36%). This was followed by A Positive in 13 cases (26%), B Positive in 11 cases (22%), AB Positive in 6 cases (12%), and O Negative in 2 cases (4%) (Table 4).

DISCUSSION:
This study aimed to determine the clinical and etiological profile of neonates admitted with dehydration and to understand the outcomes of dehydration in terms of morbidity and mortality. The study focused on exclusively breastfed neonates, highlighting critical insights into the incidence, clinical presentations, and contributing maternal factors.

In our study, we enrolled 50 neonates with signs and symptoms of dehydration, with a slightly higher proportion of females (54%) compared to males (46%). The mean age of the neonates was 71.50±15.32 hours, reflecting early postnatal dehydration issues. The majority of neonates (62%) had a gestational age of 37-39 weeks, aligning with typical term neonates, while 26% were <37 weeks, and 12% were >39 weeks. This distribution indicates that dehydration can affect both preterm and term neonates, although term neonates were more frequently represented in our cohort.

The gender distribution in our study is similar to the findings of Sajad Ahmad Bhat et al., who reported a higher proportion of females (55%) compared to males (45%) in their study.[7] In contrast, studies conducted by Michael L. Moritz et al. and Hassan Boskabadi et al. reported lower proportions of females (48% and 44%, respectively).[8, 9] This discrepancy may be due to the lower number of males admitted during our study period, highlighting the importance of considering local demographic and admission patterns when interpreting such data.

In terms of the age at admission, our findings contrast with other studies that reported a higher mean age. Bajaj M et al. reported a mean age of presentation of 10.5 days, with a range from 3 to 28 days.[10] Similarly, Livingstone et al. and Hassan Boskabadi et al. reported mean ages of 8 days and 9 days, respectively.[3, 9] The earlier mean age of admission in our study suggests that dehydration was recognized and addressed more promptly, which is crucial for preventing severe complications.

The weight data underscored the significant weight loss from birth to the time of admission. The mean birth weight was 2750.06 grams, which decreased to 2366.48 grams on admission, with a mean weight loss of 343.18 grams. The mean percentage of weight loss was 12.45%, which is considerably higher than the average weight loss typically observed in healthy neonates (approximately 6%). This significant weight loss is a critical indicator of dehydration severity and highlights the need for vigilant monitoring of neonatal weight in the early postnatal period.

All neonates in the study presented with jaundice, making it the most common clinical symptom. Hypernatremia was identified in 76% of the neonates, indicating a high prevalence of this serious electrolyte imbalance among the dehydrated neonates. Fever was observed in 30% of the cases, and ARF was noted in 24% of the neonates, highlighting the severe impact of dehydration on renal function. Respiratory distress and diarrhea were less common but notable symptoms, reported in 2% and 10% of the cases, respectively. These clinical presentations underscore the multifaceted impact of dehydration on neonatal health, necessitating a comprehensive clinical assessment.

Comparing our findings with those of Smita Nair et al.,[11] we note several similarities and differences in the clinical presentations of dehydrated neonates. Nair et al. reported fever in 34.6% of cases, which is slightly higher than the 30% observed in our study. Poor feeding (42.8%) and loose stools (40.8%) were significant presenting complaints in their study, whereas in our study, diarrhea was noted in 10% of the cases. Lethargy (26.5%) and decreased urine output (8.2%) were also reported by Nair et al., aligning with the general symptoms of dehydration observed in our cohort. Notably, 75.5% of neonates in their study experienced weight loss, which resonates with the significant weight loss observed in our study. Additionally, 24.5% of neonates in Nair et al.'s study presented with neurological complaints, and a doughy feel of the skin was noted in 90% of cases, indicating severe dehydration. Furthermore, 12.2% of neonates had a history of birth asphyxia, which was not a focus in our study but could be a relevant contributing factor to neonatal dehydration.

The majority of the neonates (98%) received intravenous fluids, emphasizing the necessity of rehydration therapy in managing dehydration. All neonates received feeds and phototherapy, indicating that breastfeeding support and management of jaundice were integral components of the treatment protocol. The mean urine output following treatment was 109.38±24.43 ml, and the average hospital stay was 3.52±0.86 days. These outcomes suggest that timely and appropriate treatment can lead to satisfactory recovery, although the duration of hospitalization indicates the need for ongoing monitoring and care.

Socio-economic status, as categorized by the Kuppuswamy classification, revealed that the majority of cases were from the lower middle class (58%), suggesting that socio-economic factors might influence neonatal dehydration risks. The study also noted a slightly higher prevalence of multigravida mothers (54%) compared to primigravida mothers (46%). The mode of delivery was evenly split between caesarean sections (50%) and vaginal deliveries (50%), indicating that delivery mode did not significantly affect dehydration incidence.

Breastfeeding initiation was delayed in the majority of cases, with 76% of mothers starting breastfeeding more than one hour after birth. Early initiation of breastfeeding is crucial for neonatal hydration and nutrition; thus, these findings highlight a critical area for intervention. Lactation issues were reported by 26% of mothers, with retracted nipples being the most common issue. The high incidence of lactation problems underscores the need for better breastfeeding support and education for new mothers.

The limitation of this study is that this study was conducted in a single centre, which may limit the generalizability of the findings to a broader population. The incidence of dehydration is subjected to regional variations in healthcare practices and patient demographics.

In conclusion, the study highlights the critical need for early identification and treatment of dehydration in exclusively breastfed neonates. Significant weight loss, jaundice, and hypernatremia were prevalent among the neonates, indicating severe dehydration risks. Timely administering intravenous fluids, continued breastfeeding support, and phototherapy were crucial in managing these cases. Maternal factors, including socio-economic status and lactation issues, play a significant role in neonatal dehydration. Improving breastfeeding education and support, particularly in the early postnatal period, is essential to mitigate dehydration risks and improve neonatal health outcomes.

Table 1. Distribution of weight variables

Variables	Mean	SD
Weight at birth (gm)	2750.06	394.55
Weight on admission (gm)	2366.48	498.12
Weight loss (gm)	343.18	108.03
Percentage of weight loss	12.45%	3.62%

*SD: Standard deviation

Table 2. Distribution Of Clinical Presentation

Clinical presentation	Frequency (n)	Percentage (%)
Jaundice	50	100
Fever	15	30
ARF	12	24
Respiratory distress	1	2
Hypernatremia	38	76
Diarrheal	5	10

*ARF: Acute renal failure

Table 3. Distribution OfTreatment

Treatment	Frequency (n)	Percentage (%)
IV fluids	49	98
Feeds	50	100
Phototherapy	50	100

*IV: Intravenous

Table 4. Distribution Of Maternal Factors

Particular	Sub-categories	No. of cases	Percentage
Kuppuswamy Classification	lower class	5	10.0
	lower middle class	29	58.0
	upper lower class	5	10.0
	upper middle class	11	22.0
Gravida	Primi	23	46.0
	Multi	27	54.0
Mode of delivery	LSCS	25	50.0
	Vaginal	25	50.0
Initiation of Breastfeeding	<0.5 Hour	2	4.0
	≤1 Hour	05	10.0
	>1 hour	38	76.0
	>2 Hours	05	10.0
Lactation Issues	Cracked Nipples	3	6.0
	Inverted Nipples	1	2.0
	Poor Latching	3	6.0
	Retracted Nipples	6	12.0
	No Issues	37	74.0
Mothers Blood group	A Positive	13	26.0
	AB Positive	6	12.0
	B Positive	11	22.0
	O Negative	2	4.0
	O Positive	18	36.0

*LSCS: lower segment caesarean section

List Of Abbreviations

ARF: Acute renal failure
IV: Intravenous
LSCS: lower segment caesarean section
SD: Standard deviation

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