

Study of Fever in Neonates: A Cross-Sectional StudyRiya Patel¹, Ashwin Dangi², Himanshu Joshi³, Parth Patel⁴^{1,4}Assistant Professor, Department of Pediatrics, Nootan Medical College & Research Centre, Visnagar, Gujarat, India²Professor and Head, Department of Pediatrics, Nootan Medical College & Research Centre, Visnagar, Gujarat, India³Dean & Professor, Nootan Medical College & Research Centre, Visnagar, Gujarat, India

Received: 25-07-2023 / Revised: 28-08-2023 / Accepted: 30-09-2023

Corresponding author: Dr. Parth Patel

Conflict of interest: Nil

Abstract:**Background and Aim:** Due to immature thermoregulation system in newborn and lack of heat producing mechanism like shivering, newborn are more prone to hypothermia. The aim of the present study was to evaluate complete clinical profile in arriving at various etiologies of fever in neonates.**Material and Methods:** The present study is observational cross sectional study which was carried out at Nootan General Hospital with aim to identify the cause of fever in early neonatal days and to study clinical and socioeconomical profile of the newborn having dehydration fever. Sample size include 30 admitted newborn presented to our newborn care unit with fever between March 2023 to August 2023. Detailed clinical history, antenatal history, birth history and feeding history was taken to find out contributing factors to fever. Full physical examination of newborn was done. More than 6% weight loss from birth weight per day was considered significant Status of hydration was noted and RFT with electrolytes were sent for dehydration.**Results:** Out of 30 newborns presented with fever, 6 newborn had positive CRP hence considered septic in this study. Rest 24 newborns were studied for the factors contributing to their fever and their clinical presentation. Out of 24 newborn, 75% (18) have primi mother, 66.66% (16) had inadequate feeding, 79.16%(19) of them were belongs to lower socioeconomical status and 29.16%(7) have uneducated mother. Out of 24 newborn with fever, 70.83% (17) newborn had significant weight loss, 62.50% (15) had decreased urine output and 37.50% (9) newborn had altered RFT in term of raised creatinine and 42%(10) had raised serum sodium level.**Conclusion:** As dehydration is a very common and serious complication during the post-natal period especially between 3rd to 5th days of life. As it's a preventable, it is very crucial to educate mother about feeding techniques, good latching and to do regular new born assessment in initial few days of life of newborns.**Keywords:** Cross Sectional, Dehydration, Fever, Neonates.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Newborns are homoeothermic but control of body temperature can only be achieved over a narrower range of ambient condition. Due to immature thermoregulation system in newborn and lack of heat producing mechanism like shivering, newborn is more prone to hypothermia.

But over last few years, it is observed that due to changes in the environmental temperature and humidity, cases of neonatal hyperthermia are also noted especially in particular season. Fever during neonatal period is an alarming sign of systemic infection. but infection is not the only cause of raised body temperature in newborn. Rise in body temperature are seen occasionally on 3rd to 4th day of life in newborn who are otherwise well: overheating and sepsis as a cause must be excluded [1]

Dehydration perhaps an infrequently recognized cause of fever in newborn period. Dramatic weight loss and dehydration related to insufficient breast milk intake may be observed mostly on the initial days of the infants. Weight loss of newborn babies in first few days of life is a clinically known entity. Mean weight loss is approximately 6% of birth weight in well babies during first 3 days of life.[2-4] Neonatal dehydration fever is a clinical diagnosis defined as weight loss >10% with rise in body temperature >37.5 c. Early weighing and examination by skilled healthcare professionals to recognize inadequate feeding are practice recommended by American academy of pediatrics and the UNICEF UK baby friendly initiative.[5,6]

Material and Methods

The present study is observational cross-sectional study which was carried out at Nootan General Hospital with aim to identify the cause of fever in early neonatal days and to study clinical and socioeconomical profile of the newborn having dehydration fever. The ethical committee of the college was informed about the research work. Sample size include 30 admitted newborns presented to our newborn care unit with fever between March 2023 to August 2023. As per preset proforma, detailed clinical history, antenatal history, birth history and feeding history was taken to find out contributing factors to fever. Full physical examination of newborn was done. Weighed using digital scale. More than 6% weight loss from birth weight per day was considered significant Status of hydration (fontanel, skin turgor, urine output) was noted and RFT with electrolytes were sent for dehydration. All febrile newborn were investigated for evidence of infection. Laboratory investigations including sepsis profile; CBC, CRP, blood culture and RFT with electrolytes were sent and treated according to standard protocol. Those with positive blood culture or raised CRP were considered to have

sepsis in this study.

Inclusion Criteria

All newborns admitted in NICU having axillary temperature >100 F measured with the standard digital thermometer in two readings half an hour apart was included in the study.

Exclusion Criteria

Newborn with local focus of infection, major congenital anomalies and mother having fever during labour.

Results

Total 30 Newborns were included in the study. 17 were Mch and 13 were Fch. All newborns were Full Term AGA. Out of 30 newborns presented with fever, 6 newborn had positive CRP hence considered septic in this study. Rest 24 newborns were studied for the factors contributing to their fever and their clinical presentation. out of 24 newborn, 75% (18) have primi mother, 66.66% (16) had inadequate feeding, 79.16% (19) of them were belongs to lower socioeconomical status and 29.16%(7) have uneducated mother. (Table 1).

Table 1: Risk factors contributing to dehydration fever

Risk factor	Percentage	Total patient
Primi mother	75	18
Inadequet feeding	66.66	16
Lower socioeconomic status	79.16	19
Uneducated mother	29.16	7

Out of 24 newborn with fever, 70.83% (17) newborn had significant weight loss, 62.50% (15) had decreased urine output and 37.50% (9) newborn had altered RFT in term of raised creatinine and 42%(10) had raised serum sodium level. (creatinine level >0.8 and serum sodium level >150 meq/l was considered abnormal.)

Table 2: Clinical Presentation

Clinical manifestation	Percentage (%)	No. of patient
Weight loss	70.83	17
Decreased urine output	62.50	15
Raised creatinine	37.50	9
S. Na .150 meq/l	41.66	10

Table 3 describes the age of presentation with 51% (12) newborns presented between 48- 96hours of life, 20.8%(5) within 96-120hour of life,12.5%(3) after 5 days of life,8.3%(2) within 24 -48hours and 4.1%(1)within 24 hour of life.

Table 3: Age of Presentation

Age of presentation (hours of life)	Percentage	No of patient
Within 24 hr	4.16	1
24-48hr	8.33	2
48-96hr	50	12
96-120hr	25	6
>120 hr	12.5	3

Table 4 describes recovery period of this newborn. 50% (12) of newborn were recovered in 24-48 hours of fluid resuscitation and proper feeding establishment. 33 %(8) were recover in 24hr and 17% (4) in 48-72 hours of treatment.

Table 4: Outcome among Study Participants

Recovery period	Percentage	No of patient
Within 24 hr	33.33	8
24-48hr	50	12
48-72hrs	16.66	4

Discussion

Fever in neonates may occur due to secretion of pyretic inflammatory cytokines which raises the hypothalamic temperature, as well lead to elevated body temperature.[7,8] Non-infectious conditions being associated with fever in new born includes dehydration, breast-feeding, high birth weight, and cesarean section.[9]

There is no significant gender association in our study. 75% neonates were born to primiparous mother, which suggest that feeding problems leading to dehydration fever was common in primiparous. These findings were consistent with other studies.[9,10]

There is significant weight loss observed among 70.83% newborn on admission while 62.50% newborn had decreased urine output. So it suggests that early documentation weight loss and decreased urine output will help to identify these neonates and can prevent further complications. Other risk factors include breastfeeding (suggesting difficulties in initiating breastfeeding), delivery by caesarean section, and high birth weight. The majority of these newborn 75% were diagnosed with dehydration fever on 3rd day to 5th day of life and 66.66% had history of inadequate feeding which suggest that day 3 is peak time for development of dehydration fever and measures to prevent dehydration fever should be initiated as early as possible. These measures include proper BF counseling consist of right positioning, good latching, duration of feeding and ways to assess effective feeding by looking for adequate urine output. These findings were consistent with other studies.[8-10] Philip and Hewitt [11] determined the laboratory factors that correlate with serious bacterial infection and found that combined white blood cell and neutrophil count serves as the best indicator of serious bacterial infection. A study was done by Bressanet al to predict SBI in well appearing febrile neonates by means of laboratory markers by. It was found that laboratory markers could predict SBI with greater accuracy if done after 12 hours of fever duration.

Conclusion

As dehydration is a very common and serious complication during the post-natal period especially between 3rd to 5th days of life. As it's a preventable, it is very crucial to educate mother

about feeding techniques, good latching and to do regular newborn assessment (weight and urine output) in initial few days of life of newborns. Appropriate antibiotic therapy helped in reducing the infection and fever.

References

1. Voora S Srinivasan G, Lillien LD, Yeh TF, Phildes RS. Fever in full term newborn in the first four days of life. *Pediatrics* 1982; 69:40-4.
2. Maisels MJ, Gifford K. Breastfeeding, weight loss and jaundice. *J Pediatrics* 1983.
3. Maisels MJ, Gifford K, Antle CE, Leib GR. Jaundice in healthy newborn: a new approach to an old problem. *Pediatrics* 1988,81(4):505-11.
4. Marchini G, Stark S. Thirst and vasopressin secretion counteract dehydration in newborn infant. *J Pediatrics* 1997;130(5):736-9.
5. Palazzi DL, Klein JO, Baker CJ. Bacterial sepsis and meningitis. In: Remington JS, Klein JO, Wilson CB (eds). *Infectious Diseases of the Fetus and Newborn Infant*. 6th edn. Philadelphia, PA: Elsevier Saunders; 2006:247-295.
6. Chandra S, Baumgart S. Temperature regulation of the premature infant. In: Tausch HW, Ballard RA, Gleason CA (eds). *Avery's Diseases of the Newborn*. 8th edn. Philadelphia, PA: Elsevier Saunders; 2004: 364-371.
7. Voora S, Srinivasan G, Lillien LD, Yeh TF, Pildes RS. Fever in full-term newborns in the first four days of life. *Paediatrics*. 1982; 69:40-4.
8. Gartner LM, Morton J, Lawrence RA, Naylor AJ, O'Hare D, Schanler RJ, et al. Breastfeeding and the use of human milk. *pediatr*.2005;115(2):496-506.
9. Anon. Sharing good practice: Prevention and management of excessive weight loss in the breast-fed neonate. *Baby Friendly News*.2006; 20:4.
10. Kaplan JA, Siegler RW, Schmunk GA. Fatal hypernatremic dehydration in exclusively breast-fed newborn infants due to maternal lactation failure. *Am J Forensic Med Pathol*.1998; 19:19-22.
11. Philip AGS, Hewitt JR. Early diagnosis of neonatal sepsis. *Pediatrics*. 1980; 65(5):1036-41.