

An Observational Descriptive study on the scenario of Neonatal Septicemia

Srinivasarao Devarakonda¹, Nagireddy Tatam Naidu², SivaiahThokala^{3*}

^{1, 2}Assistant Professor, Department of Paediatrics, Govt. Medical College, Ongole, Andhra Pradesh, India

³Associate Professor, Department of Community Medicine, Govt. Medical College, Anathapuram, Andhra Pradesh, India

Received: 11-05-2021 / Revised: 04-06-2021 / Accepted: 30-07-2021

Abstract

Background: As the Neonatal sepsis occupies the major cause of Neonatal mortality in developing countries like India, the present study was planned to understand the scenario of the neonatal septicemia cases so as to allow the better planning and management of these cases to control and reduce the total neonatal mortality. **Research Question:** What are the socio demographic profiles and various reasons associated for the cause of higher incidence of Neonatal sepsis in our setup? The setting of the study was at NICU, department of Pediatrics, Government medical College, Ongole, Andhra Pradesh. A one year observational study was conducted during the period from January 2019 to January 2020 on 100 Neonatal Septicemia Patients admitted in NICU by studying their Socio demographic profiles, Parity of mothers, Preterm delivery, Birth weight and Clinical factors etc. **Results:** Both male and female babies suffering from Neonatal Septicemia during the above specified period were taken into study and majority of the study group (64%) were males. And among the total study group maximum 82% of cases were babies delivered to mothers came from rural area and also interestingly maximum number of cases were LBW(low birth weight) babies and preterm babies. In this study the cases were distributed inversely proportional to the parity of mother. Low birth weight (82%), poor socio-economic status (78%), male predominance (66%), Birth anoxia and Resuscitation (30%) and preterm delivery (28%) were noted as predominant predisposing factors. And finally, it was observed that deaths were more among LBL babies (23%) and Preterm babies (9%) in this study with the overall mortality (27%).

Keywords: NICU (Neonatal Intensive Care Unit), LBW (Low Birth Weight), Neonatal Septicemia.

This is an Open Access article that uses a fund-ing 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

Sepsis is the commonest cause of neonatal mortality and it accounts for 30-50% of neonatal deaths each year in developing countries[1,2]. It is estimated that 20% of all neonates develop sepsis and approximately 1% die of sepsis related causes². And this neonatal sepsis and related mortality is largely preventable with proper antenatal & intranatal care and use of rational antimicrobial therapy with aggressive supportive care. In 2017 almost half of all global sepsis cases occurred among children, with an estimated 20 million cases and 2.9 million global deaths in children under five years of age [3].

Significant regional disparities in sepsis incidence and mortality exist; approximately 85% of sepsis cases and sepsis related deaths worldwide occurred in low and middle income countries[3]. Sepsis a clinical manifestation of infections acquired both in the community setting & in health care facilities. Health care associated infections are one of the adverse events to occur during care delivery and effects hundreds of millions of patients worldwide every year [4].

In India as per the data from National Neonatal Perinatal database (NNPD) 2000, the incidence of neonatal sepsis has been reported to be 38/1000 intramural live births in tertiary care institutions[5]. And neonatal sepsis was one of the common causes of neonatal mortality contributing to organisms KlebsiellaPneumonia was the commonest one (36.4%), followed by Staphylococcus aureus (44.3%) and Pseudomonas (13.2%)[4]. And the neonatal sepsis associated to high neonatal mortality in developing countries like India, the present study was planned to understand the scenario of the neonatal septicemia cases so as to allow the better planning and management of these cases to control & reduce the total neonatal mortality.

Materials & Methodology

The setting of the study was at NICU in the department of Pediatrics, Government Medical College, Ongole, Andhra Pradesh, India. The study was conducted during the period from January 2019 to December 2020. According to hospital Census, the prevalence of the Neonatal cases admitting to NICU was found to be 52% and the sample size was calculated by using the formula $N = 4P/L2$ Where $P = 35.5\%$, $Q = 100 - P = 64.5\%$, $L = 20\%$ allowable error in Pie 7.1 so $N = 182$, and assuming there may be 10% attrition, additional 10% was taken which was calculated and rounded to 200. All the cases of clinically diagnosed Neonatal Septicemia admitted in NICU during the above one year period up to reach the sample size were included in the study after duly following the inclusion and exclusion criteria and obtained the informed written consent from the mothers by duly explaining the detailed procedure and purpose of the study. The babies of the mothers those who were given willingness to come into study was used as inclusion criteria and not given willingness used as exclusion criteria. The aim of the study was to find out the various socio-demographic and clinical factors associated strongly for the cause of Neonatal sepsis.

After receiving Ethical clearance from the institution the required data was collected by using a pretested questionnaire proforma pertaining to their Socio-demographic profiles, Birth Weight, period of delivery, parity of mother, H/O maternal toxemias and infections, factors related to delivery, H/O Birth anoxia and Resuscitation and investigations which includes blood counts, ESR and Culture & sensitively etc. All the study cases were managed and followed until discharge.

The data collected was analysed by using suitable statistical techniques like percentages, proportions, measures of central tendency, measures of dispersion, standard error of mean and test of significance with the help of computer software. The study results were discussed by comparing the published material of other similar studies and there by conclusions and recommendations were made.

*Correspondence

Dr. SivaiahThokala

Associate Professor, Department of Community Medicine, Govt. Medical College, Anathapuram, Andhra Pradesh, India.

E-mail: drsivaiah@gmail.com

Table-1: Sex & Geographical Area wise distribution of Neonatal Septicemia Cases

Sr. No.	Geographical Area	Sex		Total
		Male	Female	
1.	Urban	11%	7%	18%
2.	Rural	53%	29%	82%
Total		64%	36%	100%

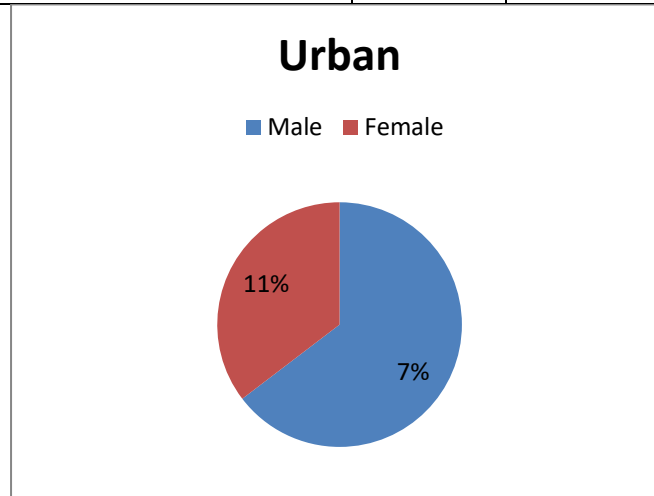


Fig 1: Sex & Geographical Area wise distribution of Neonatal Septicemia Cases

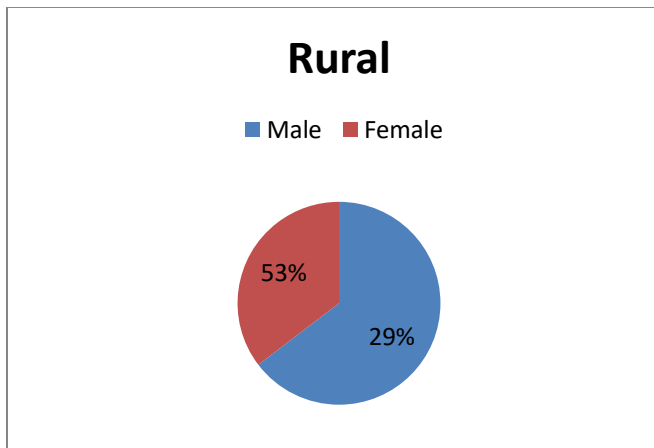


Fig 2: Sex & Geographical Area wise distribution of Neonatal Septicemia Cases

- Maximum (82%) of cases were babies delivered to mothers came from rural area. And sepsis is more among male babies (64%) when compared to female babies (36%).

Table-2: Distribution of cases according to Gestational Age and Birth Weight

Sr.No.	Gestational Age		Birth Weight	Total
	LBW < 2.5 kg	Normal weight > 2.5 kg		
1	Preterm	28%	0%	28%
2	Term	54%	18%	72%
Total		82%	18%	100%

P< 0.005

- Maximum numbers of Neonatal Septicemia cases were observed among low birth weight babies and preterm babies.

Table-3: Parity wise distribution of Neonatal Septicemia Cases

Parity of Mother	Number of Cases
P1	98 (49%)
P2	56 (28%)
P3	28 (14%)
P4	6 (03%)
Total	100%

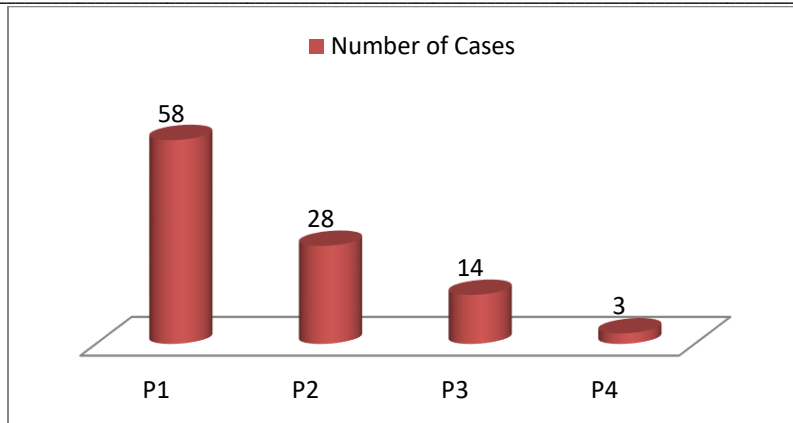


Fig 3:Parity wise distribution of Neonatal Septicemia Cases

- It was observed that the occurrence of neonatal septicemia is inversely proportional to the parity of mother.

Table-4: Distribution of Predisposing factors among the Neonatal Septicemia Cases

Sr.No.	Predisposing Factor	% of Cases
1	Pre Term	28%
2	LBW (< 2.5kg)	81%
3	Predominance of Male babies	66%
4	Perinatal Maternal complications	6%
	a. Maternal Toxemia	
	b. Pre eclampsia	
	c. Eclampsia	6%
5	Prolonged Rupture of Membranes	6%
6	Repeated Pervaginal Examination	10%
7	Fripty delivery	5%
8	Leucorrhoea (Maternal)	13%
9	UTI(Maternal)	6%
10	Fever(Maternal)	13%
11	Birth Anoxia and Resuscitation	30%
12	Poor Socio-economics status	78%

- Among the pre disposing factors to neonatal septicemia maximum LBW occupies 81% followed by poor socio-economic status 78%, Birth anoxia and Resuscitation 30%, preterm delivery 28% etc.

Discussion

In this study the neonatal sepsis is more among males (64%) when compared to females (36%) which correlates with the figures of RekhaSriram study [4] i.e. 60.3% males and 39.7% females and many other studies also reported similar findings[5]. Though the exact reason for this male preponderance is not known with certainty, it is probably due to the fact that the factors regulating the synthesis of gammaglobulin are situated on the X-chromosome. Since the male has only one X-chromosome so he is less immunologically protected than the female in new born life and it is observed that maximum 82% of the cases were the babies delivered to mothers came from rural area which signifies that the villages are lacuna of adequate medical facilities & lack of transport and low levels of awareness among the pregnant ladies belongs to rural area regarding proper care during pregnancy and delivery when compared to urban women[6].

And also it was noticed that maximum (78.3%) of the mothers of the study group belongs to low socio-economic status (upper lower class as per Kuppaswamy classification). As we pretty know that poverty leads to poor intake (malnutrition), poor hygiene and low standard of living which increases the chances of amniotic fluid infection which results with giving birth to LBW and pre term babies who are at risk of infections again similar finding was noticed in Naeeye and Dellinger et al study[5].

In our present study maximum number of neonatal septicemia cases and higher mortality rate was observed among low Birth Weight (LBW) babies (82%) and preterm babies (28%)

significantly when compared to normal birth weight and term babies and similar findings were observed in other studies like RekhaSriram study[4], NB Mathur study[6], SS Thallur et al [7] Saxena et al study[8], Khatua SP et al study[9] and Buetow KC et al study[10].

And finally it was observed that the overall mortality in this present was 27% which correlates with the finding of Meharbon Sing et al study[11] where as the high rates of mortality was observed in similar other studies like RekhaSriram [4] 46.5%, Saxena et al[8] 52%, NB Mathar et al[10] 43%, Khathua et al[9] 69.1% Sinha et al[12]62%, Mishra et al[13]61%, Chugh et al[14] 53.3%, Nidhigoel et al[15](50.1%), Sharma et al[16]45% respectively.

And also it was noticed that the occurrence of Neonatal Septicemia is inversely proportional to the Parity of mother and maximum (58%) of cases are babies delivered to primies. This is because usually the young prime have prolonged second stage of labor which leads to increased chances of neonatal infection.

With regard to pre disposing factors to neonatal septicemia in the present study, LBW occupies 81% followed by poor Socio-economic status 78%, Birth anoxia and Resuscitation 30% and preterm babies 28% predominantly observed and Gluck L et al[17] reported that about 19.6% of the septicemia neonates required intubation and resuscitation in his study.

Conclusions and Recommendations

As the low Socio-economic status of the mother is the major social risk factor observed in our study, it is to recommend that the

standard of living and the purchasing capacity of the mother should be raised as a primary large scale measure in the community.

And also basing on our study findings that the of neonatal septicemia is more among LBW and preterm babies it is necessary to strengthen the transportation, medical facilities and MCH services mainly at Rural set up which includes provision of Iron & Folic acid tablets during second half of pregnancy, adequate antenatal checkups with lab tests, health education to pregnant ladies regarding nutritious diet, personal hygiene, advice on rest and sleep etc., early identification of “at risk mothers” and prompt referral to FRUs and promotion of institutional deliveries, mother craft training etc., to improve the health of the mother and bay as a whole.

Furthermore it is important to target the social factors like prevention of early marriages, increase of female literacy, elimination of false beliefs and practices related to pregnancy, delivery & lactation and promotion of small family norm etc., by involving NGOs, local community leaders, social media, Electronic and Print media etc..

Result infection control practices in nursery and labor room, minimally invasive procedures and rational use of antibiotics are practical options to improve mortality from sepsis. And not only have that please taken necessary steps ensured the establishment and proper functioning of ‘Hospital Infection Control Committees in every hospital set up.

References

- Bang AT, Bang RA, Bactule SB, Reddy HM, Deshmuch MD, Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India. *Lanet* 1993; 354: 1955-61.
- Stoll BJ. The global impact of neonatal infection. *Clin Perinatal* 1997; 24: 1-21.
- Rudd KE, Johnson SC, Agesa KM, Shakel ford KA, Tsoi D, Klevlan DR, et al Glogalreginal and national sepsis incidence and mortality, 1990-2017: analysis for the Global burden of disease study. *Lanet (London, England)*. 2020; 395:10219; 200-1.
- RehkaSriram. “Correlation of blood cultur results with sepsis score and the sepsis screen in the diagnosis of Neonatal Septicemia” *Indian Journal of Biological & Medical Research*. 2011; 2(1): 360-368.
- Naeeye RL and Delinger W S, Blanc WA. Fetal and Maternal features of antenatal bacterial infection *J. Pediatrics*; 1971 Nov;79(5):733-9.
- NB Mathur . Neonatal sepsis *Indian Peadeiatrics*, 1996; 33 (8) 663-74.
- SS Thallur, AV, Kasturi, SD.Nadgir, BV.Krishna. “Clinico-bacteriological study of Neonatal Septicemia in Hubli”, *The Indian Journal of Pediatrics* 2000;67: 169-174.
- Saxena S, Anand SK Saini L, Mittal SK. Bacterial infections among home delivered neonates clinical picture and Bacteriological profile. *Indian Pediatr* 1990; 17: 17-24.
- Khatua SP, Das AK,Chattarjee BD, Khatua S, Ghose B, Saha A. Neonatal septicemia. *Indian J. Pediatr* 1986; 53(4): 509-514.
- KC Buetow, S.Wayne Klein, Rosemary BL. “Septicemia in Premature infants” *Amj Dis child*: 1965; 110(1): 29-41.
- M Singh, VK Paul, AK Deorari, D Ray, M.V.Murali, KR Sundaram . Strategies which reduced sepsis related neonatal mortality. *Indian J Pediatr* 1998; 55(6): 955-960.
- Sinha N, Deb A, Mukharjee AK. Septicemia in neonates and early infancy. *Indian Journal Pediatr* 1986; 53: 249-256.
- Mishra JN, Rai MG, Chakraborty S Prasad S. Study of neonatal septicemia. *Indian Pediatr* 1985; 22: 281-285.
- Chugh K, Agarwal B B, Kaul V K and S C Arya Bacteriological profile of neonatal septicemia. *Indian J Pediatr* 1998;55: 961-965.
- Nidhi Goel, Prabhat K Ranjan, Ritu Aggarwal, Uma Chaudhary, Nanda Sanjeev. “Emergence of Non albicans Candida in Neonatal Septicemia and Antifungal Susceptibility: Experience from a tertiary case centre”, 2009;1(2): 53-55.
- Sharma PP, Halder D, Dutta AK, Dutta R, Bhatnagar S, Bali A, Kumari S . Bacteriological profile of neonatal septicemia. *Indian J pediatr* 1987;24(11): 1011-1017.
- Gulck L, Horrison F. Wood, Midred Fousetpediatr *Clin. Nort Am*, 1996;13: 1131-1147.

Conflict of Interest: Nil Source of support: Nil