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AN INTROSPECTION OF NEONATES DIED BEFORE REACHING SPECIAL CARE NEWBORN UNIT

Pediatrics

Dr. Saurabh Kumar Patel* Senior Resident, Department of Pediatrics, Gandhi Memorial Hospital, Shyam Shah Medical College, APS University, Rewa.MP. India.*Corresponding Author

Dr. Jyoti Singh MD (Pediatrics), FIAP. Professor and Head, Department of Pediatrics, Gandhi Memorial Hospital, Shyam Shah Medical College, APS University, Rewa.MP. India.

Dr. Naresh Bajaj MD (Pediatrics), Professor Department of Pediatrics, Gandhi Memorial Hospital, Shyam Shah Medical College, APS University, Rewa.MP. India.

ABSTRACT

Background: Neonatal mortality is high in our country and the most of the neonates are brought dead in health care facilities. Considering this fact, a research is done to determine the probable causes and factors associated with neonate presented dead to the neonatal unit in tertiary care hospital. Methods: Retrospective analysis of the medical case records of one-year period from January 2016 to December 2016 was done in the neonatal unit in tertiary care teaching hospital. Information was collected from the attenders and other family members who accompanied the baby. Result: In one year period total 167 brought dead cases presented to the neonatal unit, amongst them 70.6% were males. 41.3% were preterm and 70% weigh less than 2.5 Kg. More than 85% of cases were brought by Ambulance and most (78.4%) took 1 to 6 hours to reach the destination. Probable cause could be found in only 53.2% (89/167) cases. Neonatal sepsis accounted for one third of cases followed by respiratory difficulty.Conclusion: Sepsis is the leading cause of brought dead neonates. Low birth weight is associated risk factor. Ambulance utilization rate is better than other countries. There is need of well-designed studies regarding neonates brought dead in emergency units.

KEYWORDS

Ambulance, Brought Dead, Newborn, Sepsis

Background: Neonatal mortality remains high despite a declining proportion of under five deaths [1]. Every year, nearly 40% of all under-five deaths are among newborns (1).Between 10% and 50% of these deaths occur before reaching hospitals [2,3]. The burden of these deaths is disproportionately high in low- and middle-income countries (LMIC) [3,4]. This interest has not only extended into the international scene, it has led to the development of sound interventions to reduce child mortality among children under the age of five between 1990 and 2015, and between 2015 and 2030 as tagged in the United Nation's Millennium Development Goals (MDGs) [5], and Sustainable Development Goals (SDGs) respectively[6].

There is lacuna in defining/explaining the sudden death in neonates or neonate brought dead (BD) on arrival due to their overlapping signs and symptoms and lack of literature in this area.The literature lacks a consensus-based definition of deaths before reaching a facility [3,7]. This imprecision results from patients without vital signs who are pronounced dead after receiving some care in the emergency department [7]. This study is a novel attempt to study the pattern and cause of BD in neonatal unit.

Material and Methods: Data of one-year period from January 2016 to December 2016 was analyzed retrospectively from the medical case records. The medical records included those cases that had no signs of life on arrival or was declared dead within 20 minutes of start of treatment. Entry in medical case record was done on the basis of available documents at time of presentation and verbal autopsy. Ethical clearance was obtained for the research project.

Result: In one year period total 167 BD cases presented to the neonatal unit, amongst them 70.6% were males. Most of the BD cases presented in month of August. 41.3% were preterm and over 70% weigh less than 2.5 Kg.most of the deliveries (79.6%) were attended by health care workers,77.2% referrals were from within district, of which 85.2% belong to rural area.87.4% cases were brought by Ambulance. Only 4.8% cases reached within one hour whereas and most of them (78.4%) reached between 1 to 6 hours. Probable cause could be found in only 53.2% (89/167) cases on the basis of verbal autopsy.Neonatal sepsis accounted for 33.3% of BD cases followed by breathing difficulty (26.9%), Birth asphyxia (23.6%) and meconium stained amniotic fluid (19.1%).

Discussion: A total of 167 BD cases were presented to the department of pediatrics neonatal unit during study period. More than two third (70.6%) were males. On studying the neonatal mortality trend in Nigeria over a decade from 2003 to 2013 similar trend with higher mortality in males is observed [8]. It may be due to biological fragility of males. Most of the death occurred in the month of August, followed by November and December.

Low birth weight (LBW, birth weight less than 2.5 Kg and more than 1.5 Kg) and very low birth weight (VLBW, birth weight less than 1.5 Kg) were the leading associated cause of death (70%). Parallel to our findings low birth weight is reported as important causes of perinatal mortality [9].Neonatal death is more common in premature babies than in terms [9] but in our analysis more cases of BD was found in terms' (58.7%).

More than 85.2% BD cases belonged to rural area, which is similar to other study [10] and mostly (78.4%) took one to six hours to reach hospital. Of all BD 16.7% reached hospital after 6 hours of life and only 0.6% patients reached within one hour of life. In our study most of the newborns (87.4%) were brought by Ambulance, which is quiet high. Nevertheless, the ambulance utilization rate from India is much higher then reported from high income countries which have reported percentage of ambulance use between 14.2% and 30% for patients coming to the emergency department [11-13]. Similarly Ambulance utilization rate is low in most of the LMCIs [14,15]. Similarly higher percentage of 67.3% was reported in a recent study from India [16]. In spite of such higher utilization of ambulance neonatal death could not be prevented, It is due to lack of basic resources and trained personnel, emergency services in LMICs are a low priority and are often limited to providing basic transportation facilities without efficient triage services. There is also a general lack of public trust in ambulance services in LMICs [17].

The verbal autopsy is a technique whereby family members and other informants are interviewed to elicit the deceased's cause of death, to identify risk factors for the death and to assess the accessibility and quality of health care received by the deceased [18-21]. Based on verbal autopsy Among 167 dead on arrival newborns probable cause could be made in only 53.2% (89/167); no cause can be identified or worked out in remaining cases due to overlapping signs and symptoms of diseases in them. Neonatal sepsis accounted for one third of all deaths (33.3%) followed by breathing difficulty (26.9%), Birth asphyxia (23.6%) and meconium stained fluid (19.1%.). In other studies Respiratory distress syndrome (24.2%) and sepsis (18.2%) were reported as the leading causes of neonatal deaths where as Sepsis (26.7%), birth asphyxia (18.8%) and persistent pulmonary arrest (17.2%) were main primary causes of BD [21,22].

Neonatal death has been linked to the endogenous (genetically-induced malfunctions, premature births) status of a child, quality of antenatal care, whether assistance was given during delivery and post-partum care [23]. It may be due to lack of antenatal care, home deliveries without a skilled birth attendant, unhygienic deliveries and care of umbilical cord, birth trauma, inability of care givers to recognize danger signs and unavailability/barriers to access the health care facilities [24]. Studies in developing countries have shown discouraging results on knowledge of danger signs among postnatal mothers [25]. Senarath also found that only 11% of Sri Lankan expectant mothers were educated on danger signs [26]. Ensuring adequate nutritional status of adolescent girl and early sensitization regarding neonatal care can prematurity, low birth weight thereby preventing neonatal morbidity and mortality.

Limitations of this study were: The study includes brought dead neonates only visiting single tertiary public health care facility; lack of structured questionnaire; predictability, shortcomings in verbal autopsies due to lack of logical causal structure, and recall bias before death events by participating family members and subjective variation of duty doctor while asking details from parents There by, these technical inconsistencies may lead to misclassification of causes. Strength of study:It is the novel and first of its kind study in neonatal population in India. We kept low threshold to find out the cause of death on which functional diagnosis was made. This work will provide useful direction for future research and making policies to improve neonatal outcome and strengthening health care delivery system.

Conclusion: Analysis of our study suggests that infectious disease remains the primary cause of neonatal mortality. Underweight in newborns (70%) was estimated as a leading associated risk factor.There is lack of proper documentation of such records. Despite of higher utilization of ambulance, neonates were brought dead. There is need for improving the prehospital care and basic life support training. Further work is needed in this area in a prospective manner with standardized recruitment of BD cases based on the appropriate definition of death using standard questionnaire with proper documentation.

Table-I General Profile of Brought Dead Newborns -I

Month	Male	Female	Preterm	Term	< 1 Kg	1-1.5 Kg	1.5-2.5 Kg	> 2.5 Kg	Total
January	4	4	4	4	0	1	7	0	8
February	9	2	3	8	0	0	5	6	11
March	7	7	4	10	4	3	3	4	14
April	5	2	4	3	1	2	4	0	7
May	10	4	3	11	1	2	5	6	14
June	9	1	4	6	0	2	4	4	10
July	10	6	4	12	0	1	8	7	16
August	21	7	18	10	1	12	9	6	28
September	9	3	6	6	3	2	5	2	12
October	6	5	2	9	1	0	5	5	11
November	15	3	9	9	1	5	4	8	18
December	13	5	8	10	0	3	13	2	18
Total	118	49	69	98	12	33	72	50	167

Table - II General Profile of Brought Dead Newborns - II

Delivery Attended By						Place of Referral
Doctor	Nurse	ANM	Others	Within District		Outside District
20	102	11	34	Rural	Urban	
				110	19	38

Table - III Referral Pattern of Brought Dead Newborns

Time Taken to Reach Hospital			Mode of Transport	
< 1 Hour	1-6 Hours	> 6 Hours	Self	Ambulance
8	131	28	21	146

Table - IV Probable causes / associated finding of Brought Dead Newborns

Probable Cause	Number of Cases
Birth Asphyxia	21 (23.6%)
Neonatal Sepsis	27 (33.3)
Respiratory Difficulty	24 (26.9%)
Meconium Stained Fluid	17 (19.1%)
Total	89

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