

Original Research Article

Risk factors and mortality profile of post neonatal deaths; 1 month to 1 year, in a rural medical college hospital, South India

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ABSTRACT

Background: Infant mortality is the most important indicator which reflect country growth standards and development. This study was aimed to assess the risk factors and clinical profile of post neonatal deaths, admitted in PICU, government Villupuram medical college.

Methods: A retrospective analysis was done on post neonatal mortality data by pediatric department of government Villupuram medical college, Mundiambakkam from January 2019 to December 2020, referral and LAMA patients were excluded from study. Data was analyzed using SPSS 18.0

Results: Overall post neonatal mortality was 7.3%. Mortality amongst boys were 28 (41.1%) and girls were 40 (58.8%). Mortality of female babies were higher than male babies.

Among the 68 post neonatal deaths, maximum number of mortalities was seen in 1-3 months (61.9%), maximum within 24 hours of hospital stay (54.4%), 37 cases (54.4%) were referred from GPHC and private practitioners of the nearby districts, 28 babies (41.1%) had previous admissions, 22 babies had SNCU admissions and 6 babies had pediatric admissions. Three most common causes of mortality were bronchopneumonia, sepsis and acute CNS infections. Congenital malformations and heart disease along with failure to thrive are other causes of morbidity.

Conclusions: Analysis reflects the disease occurrence, treatment modalities and quality of treatment available. Treatment at primary level can prevent postnatal deaths from infections. The preventive and primary health care system should be strengthened. All special newborn care units (SNCU) discharged babies should have both community and district early intervention centre (DEIC) follow up, immunization practices, explaining danger signs to the parents, improving the quality of life has got great impact on the post neonatal outcome.

Keywords: Post neonate, Infant mortality rate, Pneumonia, Sepsis, SNCU, DEIC

INTRODUCTION

Infant mortality rate (IMR) of India in 2018 was 32 out of 1000 children as per SRS data reported in May 2020.¹ Tamil Nadu is one of the 4 states with lowest IMR in the country.² As per NFHS-4 (2015-16), Tamil Nadu had IMR of 20 (2016), of which 23 were from urban and 18 from rural Tamil Nadu.³ State IMR has been on decreasing trend from 20 in 2016 to 15 in 2018, says NRHM. It reflects the good SNCU performance and care of the small and sick newborns, post-natal care for the

mother and the baby in the community. RBSK team do active delivery point screening for congenital heart disease, making early intervention possible.

As per NRHM, 70% of IMR is from the neonates and 30% from the post neonates (SRS data). Also, says there is still a rural-urban divide in the IMR. Still, state inhabitants, especially Villupuram district which is the most backward district of the state, predominantly live-in rural areas, where standards of living as well as access to medical care and hygiene are traditionally lower and

more complicated than cities. Public health programs are put in place by government to ensure facility improvement.

Government Villupuram medical college at Mundiampakkam, is a peripheral tertiary care centre, having 10 bedded PICU, receives sick babies from at least 3 districts such as Villupuram, Cuddalore, Kallakuruchi. We have well established SNCU which maintains newborn records through NRHM. Pediatric data is lagging. The pediatric resuscitation and emergency medical units in non-medical college hospital act as a bridge between newborn ICUs and pediatric ICUs.

This study is intended to analyze the post neonatal deaths in this institution during the period 2019 to 2020 to know the clinical profile and factors contributing to their death. This is the first study done in South India, concentrating only on post neonates.

METHODS

A retrospective descriptive analysis was done on data of all the children aged 1-month to 1-year who expired in pediatric intensive care unit (PICU), government Villupuram medical college hospital (GVMCH), Mundiampakkam over a period of 2 years from 1st January 2019 to 31st December 2020.

Pediatric department, GVMCH, receives sick cases from at least 3 nearby districts. The pediatric unit of GVMCH has 10 bedded PICU, which is fully equipped, 60 bedded pediatric wards and 60 bedded SNCU. Children from 29 days to 12 years get admitted in the pediatric units from both as outpatient and emergency. The deaths of all hospitalized children from the 29th day of life to 1 year of age were included in the study.

Incomplete data, neonates admitted to SNCU, referral and LAMA patients, pediatric surgical patients were excluded from the study. Data was retrieved from the infant death register which is maintained in PICU. Data extracted include age, sex, socioeconomic status, referral details, previous pediatric/SNCU admissions, underlying cause leading to death. Data was analyzed with the SPSS software ver. 18.0. 95% confidence level was derived for all the collected data which reflects the true value in the community.

This study has been approved by institutional ethics committee conducted in GVMCH.

RESULTS

Total pediatric admissions (29 days to 12 years) during the period of 2019 to 2020 was 3360. Post neonatal admissions were 926, of which boys were 358 and girls were 530. Out of 926 admissions, 68 babies died during the hospital stay which is 7.3%.

Mortality amongst boys were 28 (41.1%) (95% CI-30.3-53) and girls were 40 (58.8%) (95% CI-47-69.4). Mortality of female babies were higher than male babies.

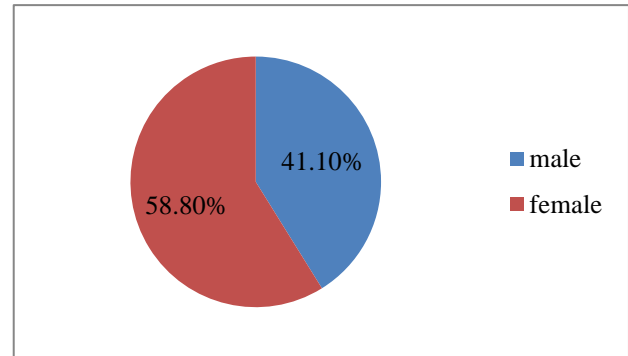


Figure 1: Sex ratio.

Among the 68 post neonatal deaths, maximum number of mortalities was seen in 1-3 months (63.5%) (95%-49.9-72.4), maximum death happened within 24 hours of hospital stay (54.4%) (95% CI-42.7-65.7).

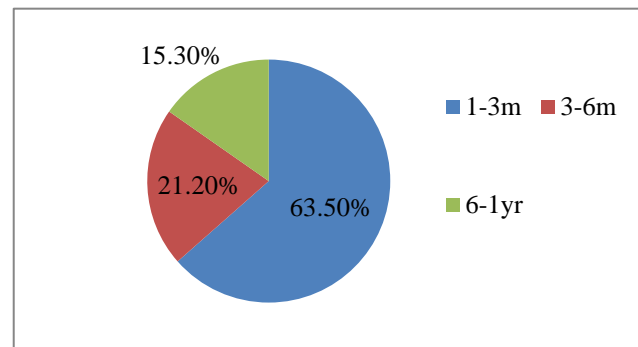


Figure 2: Age distribution in postnatal deaths.

Out of 68 babies, 37 babies stayed only for less than 24 hours.

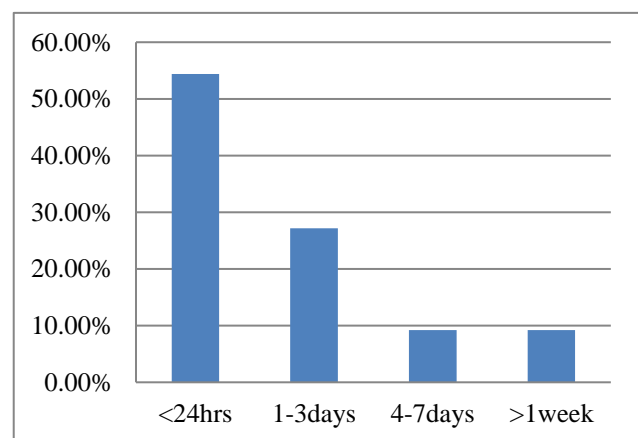


Figure 3: Duration of stay in hospital.

The 37 cases (54.4%) (95% CI-42.7-65.7) out of 68 cases, had been referred from GH, PHC and private

practitioners. Majority of cases came from Kallakuruchi GH, almost all cases were received in a moribund state requiring mechanical ventilation after arrival.

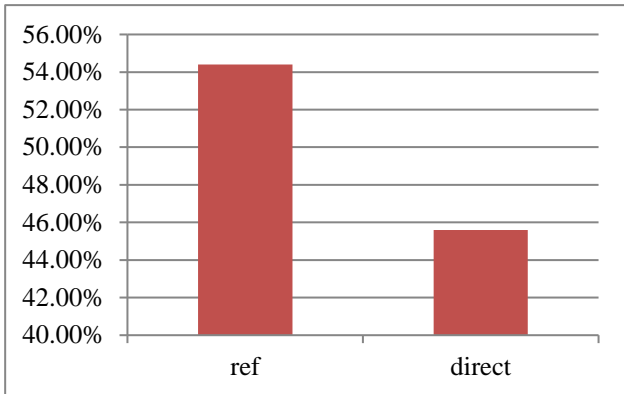


Figure 4: Mode of referral.

Out of 68 deaths, 28 babies (41.1%) (95% CI-30.3-53) had previous admissions. The 22 babies had SNCU admission for prematurity, birth asphyxia, neonatal jaundice, congenital malformations and congenital heart disease and 6 babies had pediatric admission for ARI (Acute respiratory infection), CHD and malformations.

Common causes of mortality were- Bronchopneumonia-25, sepsis-19, acute CNS infection-10 and congenital heart disease (CHD) and congenital malformations with failure to thrive-14.

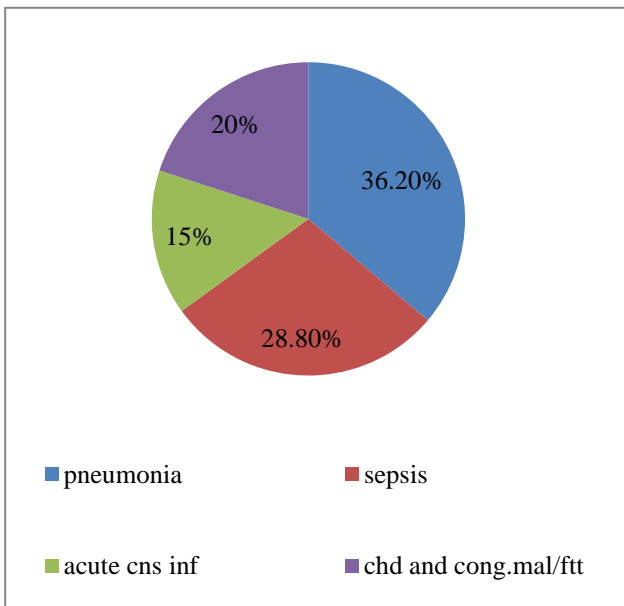


Figure 5: Causes of mortality.

DISCUSSION

In this retrospective study, post neonatal death rate was 7.3%, which is very high, neonates were not included in this study. Mortality amongst girls were 58.8% which is

more than boys. Common causes of death were bronchopneumonia (36.2%), sepsis (28.8%), acute CNS infection (15%), congenital heart disease and congenital malformations along with failure to thrive (20%). The 54.4% of the deaths happened within 24 hours of the hospital stay, which reflect the severity of the illness. There are no established hospitals with good pediatric care in this district, so cases come here even 100 km away from the medical college, without proper stabilization. Since most of the cases come in a moribund state, arriving at a definitive diagnosis is a great challenge. More than half (54.4%) of the cases were referred from GH, PHC, private practitioners and direct-walk in. Majority from GH as far as pediatric age group especially infants are concerned, general physicians will have difficulty in managing the sick cases in GH or PHCs. So, cases were referred here for expert opinion and management, most of the time the golden hour of resuscitation is lost during the transit time. GVMCH is the only medical college for the nearby three districts. The 63.5% of the infants were between 1-3 months of age, the reason could be the poor socioeconomic status and poor educational status of the mothers, leading to poor hygienic conditions predisposing to infections and sepsis, recognition of danger signs in young infant is also not very easy, because of the subtle non-specific symptoms. This could delay the health seeking attitude. Almost 72% of the cases come from class V (lower class) according to updated BG Prasad scale 2021.^{4,5} 82% of cases come from rural areas. Among these 68 children, 22 had NICU admissions especially for prematurity, asphyxia and sepsis.⁶ Had pediatric admissions for ARI, congenital heart disease and malformations. The risk of malnutrition due to other co-morbidities were significantly high and the risk of acquiring infection is also relatively high.

A similar study conducted in tertiary care hospital in Uttarakhand, a retrospective cross sectional descriptive study, which analyzed the deaths of all the post neonates up to 14 years not including newborn for a period of 10 years between 2008-2018. Common cause of death among post neonates being septicemia (31.3%), PEM (11.6%) and pneumonia (10.78%) with male predominance, seasonal variation in death was mentioned.⁶

In a community-based study on infant mortality in rural district of Aligarh, there is female predominance in both neonates and post neonates. study period was between July 2005-June 2006. most common cause of death in post neonates were diarrhea (46.6%) and pneumonia (33.33%). It has analyzed about the relation between maternal age at delivery and IMR.⁷

In the epidemiological study conducted on the cause and risk factor for IMR in Iran, which is a population-based case-control study, 156 infants were analyzed and found gastroenteritis as the common cause (30.3%), followed by Iri (22.7%), and opium intoxication (13.6%).⁸

The study by Selvakumar and Raghupathy showed most common cause of mortality in the infants is septicemia.⁹ In the age group 1 month to 1 years, septicemia was the most common cause of mortality in other studies, but in this study, bronchopneumonia is the most common cause of mortality.¹⁰⁻¹³

Limitations of the study are non-inclusion of neonates. Neonatal deaths are the predominant causes of mortality in India.¹⁴ The risk assessment of mortality with pediatric mortality scores was not done in this study.

CONCLUSION

This is the first study on post neonatal mortality profile done in this community. Villupuram medical college, being the only tertiary care centre, which caters almost 3 backward districts, the results reflect the community also to a major extent. The state IMR has been on decreasing trend from 2014 onwards because of excellent SNCU service, still there is rural, urban divide. From this study, we infer, most of the deaths among post neonates are due to infection, prematurity, failure to thrive and congenital malformations. These deaths could be reduced through community and faculty follow up of all discharged SNCU babies. Strengthening of referral system, early recognition of danger signs and periodic retraining of health workers, follow up of nutritionally deprived babies in DEIC clinics, emphasizing strict hand washing both at the institution and at home to prevent hospital acquired and environmental related infections for the infant. There is also need to improve management of congenital malformations, especially critical heart diseases. Promotion of household wealth and maternal education plays an important role in infant mortality.

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