



## Mortality Pattern among Hospitalized Children (29 Days to 12 Years) At a Tertiary Care Hospital in South India

Authors

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### Abstract

**Introduction:** Mortality of children is the prime indicator of country's health status and its development. Understanding the child mortality among different age groups is one of the valuable public health insights. Therefore, studies regarding the child mortality pattern are essential for re-evaluating the existing health services. This study was aimed to evaluate the mortality pattern of hospitalized children in the age group of 29 days to 12 yrs in a tertiary care hospital in Vellore.

**Material and Methods:** A retrospective analysis was done with the medical records of Pediatric patients (29 days to 12 years) died in the Pediatrics department of Government Medical College and Hospital, Vellore from 1<sup>st</sup> Jan 2016 to 31<sup>st</sup> Dec 2016.

**Results:** Overall Childhood mortality was found to be 2.5% from this study. Among the 91 children died, most number of deaths occurred in the Post neonatal (29 days to 1 year) age group (67%). Mortality rate was higher in girls (52.7%) than in boys (47.3%) in 1-4 year age group in this study. Septicemia (23.1%), ARI (20.9%) and Meningitis (19.8%) were the three commonest causes of childhood mortality. 58.3% of the deaths were occurred within 48 hours after hospitalization of the child.

**Conclusion:** Present study of childhood mortality pattern suggests that we are in need of strengthening and re-evaluating the existing health care systems to combat the three leading causes of childhood death.

**Keywords:** Mortality pattern, children, Septicemia, ARI - Acute respiratory infection, Health care, Medical records.

### INTRODUCTION

Mortality of children is the prime indicator of country's health status and its development. Understanding the child mortality among different age groups is one of the valuable public health insights <sup>(1)</sup>. In developing countries like India, we are in a position to depend on the hospital based

data, for studying and evaluating the mortality pattern in different age groups.

All tertiary care hospitals have a Medical record department, which compiles and maintains the medical records patients. The application of the principles of the hospital based childhood mortality pattern can be utilized as an effective

tool for analyzing the cause of death and epidemiological pattern of childhood mortality<sup>(2)</sup>. This information provides the care seeking behavior of the community and also the quality of the health care being provided.

When we look at the history of health services in many developing countries, their social and health needs were realized rather late due to lack of review regarding child mortality<sup>(3)</sup>. Children death rate is considered as a significant indicator of the public health in a country<sup>(1)</sup>. This study is therefore aimed at evaluating the mortality pattern in children in Govt. Vellore Medical College. The hospital serves as a referral center for neighboring districts. The information obtained from this study might be used in re-evaluating existing health services and in improving health facilities and children care.

The application of the hospital based childhood mortality pattern to obtain a more complete understanding of the problem of the children, which may help in preventing the delay in the medical seeking behavior of the community, planning and implementation of the health care facilities and for re-evaluating the existing the healthcare infrastructures.

## MATERIAL AND METHODS

This study was a retrospective study, done with records of the expired children (29 days to 12 years of age) admitted in the department of Paediatrics, Govt. Vellore Medical College & Hospital during the period from 1st January 2016 to 31st December 2016. Govt. Medical College & Hospital, Vellore, Tamilnadu is a tertiary care Hospital.

This study included all the children from 29 days to 12 years of age, who were hospitalized to the Paediatric Department, both from the out-patient and casualty. Under the guidance of senior professors, qualified Pediatrician is available for consultation round-the clock in these places. This study excluded the neonatal deaths (<28 days) since most of the time cause is multifactorial. Paediatric surgical and trauma cases which are

treated by the surgical department were also excluded.

Data about age, gender, duration of stay, cause of death of the children were collected and entered in MS office Excel, and were analyzed using SPSS software ver. 18.0.

The study has been approved by the Ethical Committee of Govt. Medical College & Hospital, Vellore.

## RESULTS

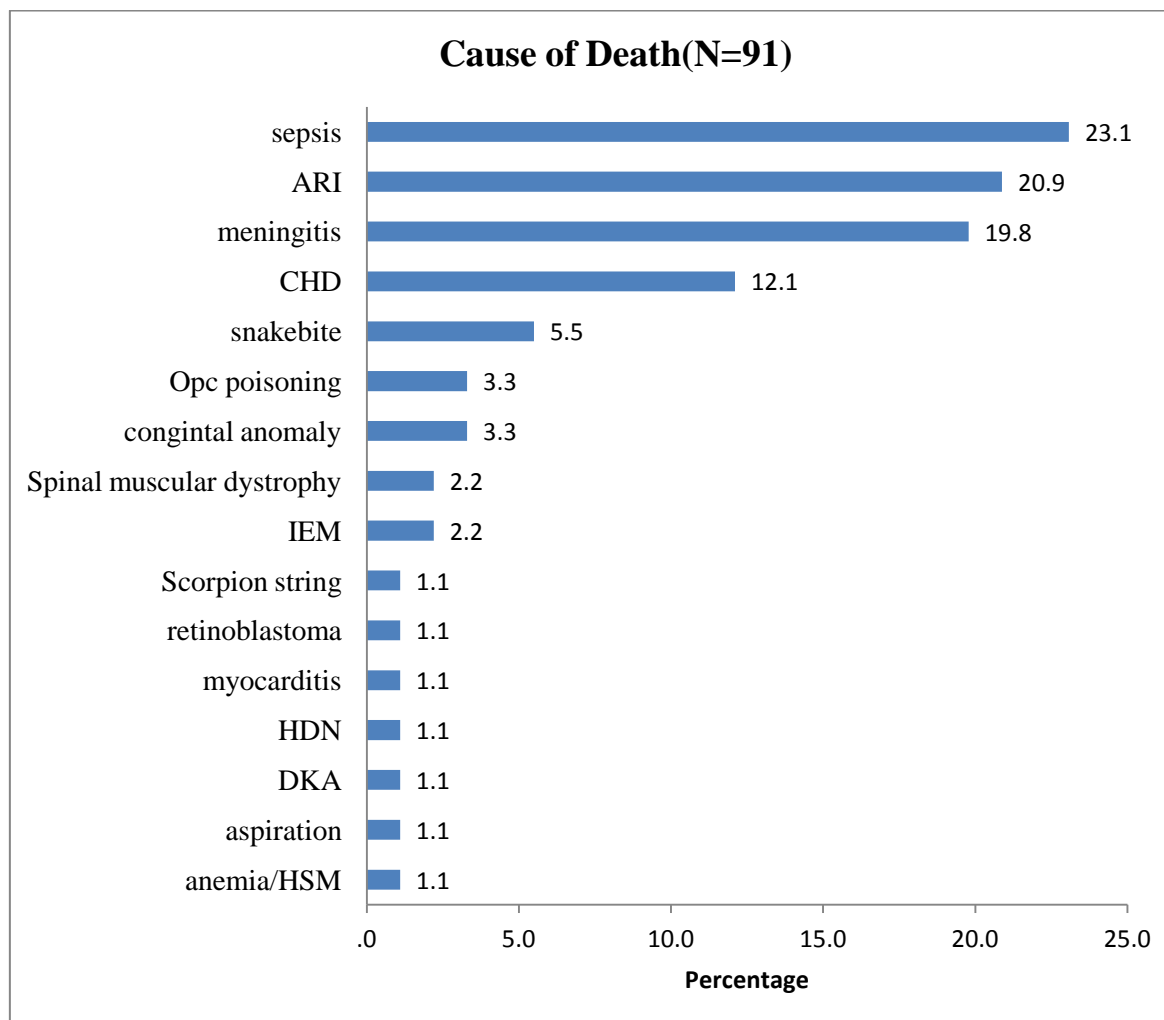
A total of 3522 children were admitted to the Paediatric department during 1st January 2016 to 31<sup>st</sup> December 2016. A total of 91 deaths were recorded. An overall mortality of 2.5% was noted in the cases admitted to the Paediatric Department. Among the 91 children expired, 43(47.3%) children were male and 48(52.7%) children were female. Out of total paediatric deaths, 61 children i.e., 67% of children were post neonatal deaths. Among these 61 children, 30(69.8%) children were male and 31(64.6%) children were female. Among the children of 1-4 year age group and 5-12 year age group, deaths were 13(14.3%) and 17(18.7%) respectively. The risk of death was found to be more in female children of 1-4 year age group, when compared to male children of same age group (Table 1).

In this study, we found that the most common causes of death among paediatric age group were septicemia(23.1%), ARI(20.9%) and meningitis (19.8%). (chart 1) Among post neonates, septicemia (29.5%), ARI (24.6%) and congenital heart disease (16.4%) were the leading causes of death while meningitis was the leading cause of death among 1-4 years were 38.5% and 5-12 years were 29.4%.(Table 2). Among the 91 deaths, 53(58.3%) were occurred within the first 48 hours of admission to the hospital. (Table 3)

The seasonal pattern of mortality showed a bimodal distribution with twin peaks in a year, once in summer (March to May) and again during rainy seasons (July to September) with 34.06% and 30.76% mortality respectively. (Chart 2)

**Table 1:** Age & Sex Distribution of Pediatric Deaths

| Age group       | Male deaths | Female deaths | Total deaths |
|-----------------|-------------|---------------|--------------|
| 29 days -1 year | 30(69.8%)   | 31(64.6%)     | 61(67.0%)    |
| 1-4 years       | 5(11.6%)    | 8(16.7%)      | 13(14.3%)    |
| 5-12 years      | 8(18.6%)    | 9(18.8%)      | 17(18.7%)    |
| Total           | 43(100.0%)  | 48(100.0%)    | 91(100.0%)   |

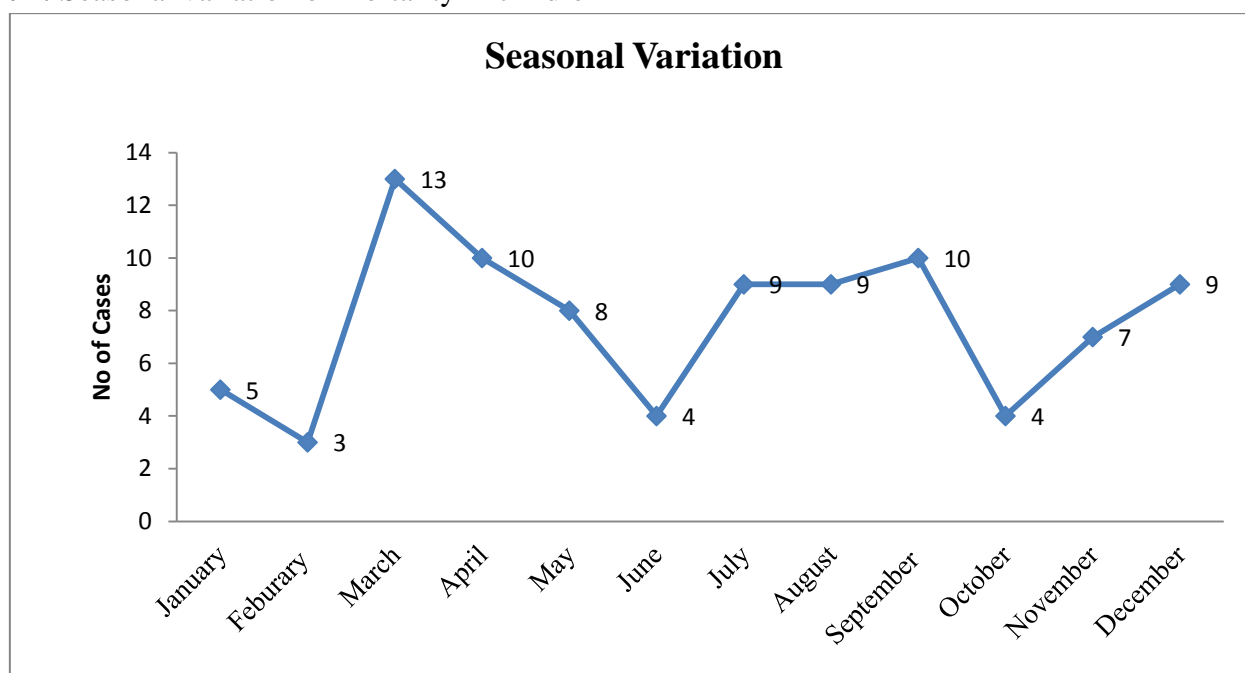
**Chart 1:** Causes of death

**Table 2:** Causes of death in different age groups

| Age Group        | Cause of Death(N=91)      | n  | %     |
|------------------|---------------------------|----|-------|
| 29days to 1 year | Aspiration Pneumonitis    | 1  | 1.6   |
|                  | ARI                       | 15 | 24.6  |
|                  | CHD                       | 10 | 16.4  |
|                  | Congenital anomaly        | 3  | 4.9   |
|                  | HDN                       | 1  | 1.6   |
|                  | IEM                       | 2  | 3.3   |
|                  | meningitis                | 8  | 13.1  |
|                  | Myocarditis               | 1  | 1.6   |
|                  | sepsis                    | 18 | 29.5  |
|                  | Spinal muscular dystrophy | 2  | 3.3   |
|                  | Total                     | 61 | 100.0 |
| 1 to 4 years     | Anaemia                   | 1  | 7.7   |
|                  | ARI                       | 1  | 7.7   |
|                  | DKA                       | 1  | 7.7   |
|                  | meningitis                | 5  | 38.5  |
|                  | OPC poisoning             | 3  | 23.1  |
|                  | sepsis                    | 2  | 15.4  |
|                  | Total                     | 13 | 100.0 |
| 5 to 12 years    | ARI                       | 3  | 17.6  |
|                  | CHD                       | 1  | 5.9   |
|                  | meningitis                | 5  | 29.4  |
|                  | retinoblastoma            | 1  | 5.9   |
|                  | Scorpion sting            | 1  | 5.9   |
|                  | sepsis                    | 1  | 5.9   |
|                  | snakebite                 | 5  | 29.4  |
|                  | Total                     | 17 | 100.0 |

**Table 3:** Mortality according to duration of stay

| Number of death (N=91) |             | N  | %     |
|------------------------|-------------|----|-------|
| duration of stay       | <24 hrs     | 36 | 39.6  |
|                        | 24 to 48hrs | 17 | 18.7  |
|                        | >48hrs      | 38 | 41.8  |
|                        | Total       | 91 | 100.0 |

**Chart 2:** Seasonal variation of mortality in children

## DISCUSSION

In this study, overall mortality was 2.5% which is lower than other studies <sup>(4)(5)</sup>. The overall mortality rate of 2.5% reported here is similar to the mortality data reported by a study done at the Lagos, Nigeria <sup>(6)</sup> and the mortality rate of 2.7% reported by Singhi S.et.al <sup>(7)</sup> from PGIMER, Chandigarh but lower than the 4.1% reported by AN Onyiriuka Et.al <sup>(4)</sup> and 4.0% reported by Abhulimhen-Iyoha BI.et.al, both from Nigeria <sup>(5)</sup>. Reason for the lower mortality found here, might be due to timely intervention of the hospitalized children, use of standardised protocols of care and primary health care services available in this part of country.

The mortality pattern was high in males (69.8%) than females (64.6%) noted in post neonatal period, and it is similar to the mortality rate found in various studies <sup>(8)</sup>. On the other side, higher female mortality pattern is noted in the age group of 1-4 yrs which is similar to the WHO statement <sup>(9)</sup>. A study by Godale L.et.al <sup>(10)</sup> also found higher female child mortality rate in same age group. But studies by Roy R.et.al <sup>(2)</sup> and Singhi S.et.al <sup>(7)</sup> showed no such difference between two sexes. In this study we found, female children succumbed to poisoning and snake bite, which indicate the

importance of evaluating the social aspects of female mortality in future.

The risk of death is more in the age group of post neonates, a finding similar to the studies by Suprabha Shukla et.al <sup>(11)</sup>, Gulati P. et. Al <sup>(12)</sup> and Deivanayagam N. et. Al <sup>(13)</sup>. Current study shows that septicemia (29.5%) is the leading cause of death followed by ARI (24.6%) and congenital heart diseases (16.4%) in post neonatal age group. Children of 1-4 year age group experience higher mortality (14.3%) when compared to older children, which may be due to the fact that they are more prone for infection. This study shows that, meningitis as the major infection among 1-4 year children. Mortality among 5-12 years children were mainly due to meningitis (29.4%) shared by the snake bite followed by ARI (17.6%).

High Mortality occurred within 24hrs and 24 - 48hrs of the hospital stay, which is 39.6% and 18.7% respectively. This finding is probably due to delayed referral and poor health seeking behavior of the community <sup>(8)</sup>.

In this study, three major causes of paediatric deaths are Septicemia(23.1%), ARI(20.9%) and Meningitis(19.8%) which is similar to the findings found in various studies. <sup>(14)(11)</sup>.

Present study shows, the summer peak in childhood mortality which is in contrast to the finding by Singhi et al <sup>(7)</sup>, where they found that peak of mortality happened in rainy season. This contrary is better explained by more number of deaths due to snake bite, which is common in summer in this part of the country <sup>(15)</sup>. These observations need to be evaluated in a detailed manner in future with longer study duration in our demographical situation.

## CONCLUSION

In conclusion, this study shows that, the mortality rate of hospitalized children in this hospital is comparable to any other hospital of developing countries. We also found that major proportion of mortality occurred in children under the age of 5 years, and the leading causes were infections (septicemia, ARI and meningitis) which suggest that, these deaths are preventable. Hence, we should focus on improving public health (sanitation, immunization etc.) and strengthening of the existing health care systems to combat these three leading causes of childhood death. There is need to strengthen the Information, Education and Communication (IEC) activities for increasing the awareness about early care seeking behavior in community, so that the provided health facilities are fully utilized. The death of the children within short hours of hospitalization in majority of the cases highlights the need of early referral to reduce the mortality.

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