

# Study of the pattern of morbidity and mortality in the Pediatric patients (1 month to 15 years) in a tertiary care centre in South West Bihar

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## ABSTRACT

### Introduction

Status of child health in a country is reflected in various morbidity and mortality indicators and their changes over a period of time. India is home to 19% of the world's children and like any other country, the morbidity profile is not static in India and keeps on changing with overall development in socioeconomic and environmental status as well as child health care awareness/facilities in the community. So, the proper documentation of the same is also of great importance for proper health care planning.

### Aim and Objective

This study aimed to determine the patterns of morbidity, mortality in pediatric patients (1 month to 15 years) in a tertiary care centre, Jamuhar in South West Bihar.

### Methodology

This was a retrospective study conducted in a tertiary care hospital, Jamuhar of South West Bihar. Medical records of 2019 children admitted in the department of Pediatrics between 1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020 were reviewed. The data on morbidity patterns in children due to different diseases, causes of death in different age groups, age and gender distribution of pediatric age group mortality, mean time interval between admission and death of children were collected.

### Result

In our study, we enrolled 2019 patients, those who were admitted in the study period. Most common 39.6 % (800 patients) morbidity was acute respiratory infection. Among respiratory illnesses, acute bronchiolitis was the most common respiratory morbidity 601 (75.12%). Second most common morbidity was associated with Gastrointestinal system illness 386 (19.12 %) patients, out of which acute diarrheal diseases accounted for 347(89.89 %). Third most common morbidity was Central nervous system illness 347(17.18%). In our study, the mortality rate of hospitalized pediatric patients was 2.67%, which is comparable to any other hospital of developing countries. In this study we found most common causes of mortality were sepsis and septic shock 48% followed by acute respiratory infection 29.62%.

### Conclusion

In this study we concluded that 3 most common causes of morbidities among 1 month to 15 years age group patients were acute respiratory infection, acute diarrheal illness and acute encephalitis syndrome. Three most common cause of death were sepsis and septic shock, acute bronchiolitis and acute encephalitic syndrome.

**Key Words:** Morbidity, Mortality, Pediatric, Bihar.

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## INTRODUCTION

Children represent a transition from infancy when the child is protected physically & physiologically by the mother. In these initial years of life, the child needs proper health care and any adverse influences during this period may result in severe confines in their development. It has been estimated that 1.9 billion children lived in developing world and one billion of it lived in poverty and deprived of many basic amenities considered as their basic rights. Preschool children are most affected by various common and easily preventable illnesses. Infectious diseases like acute respiratory infections, diarrhea, malaria and whooping cough have been found to be the leading cause of morbidity and premature death especially in developing countries. Three in four episodes of childhood illness are caused by one of these conditions or a combination of these conditions. Of the common morbidities among children, malnutrition is rarely perceived as a morbid event by families, communities, and healthsystem.<sup>1</sup>

Morbidity literally meaning illness and mortality is the end point in the natural history of a disease. The morbidity and mortality pattern in the different age groups were studied by different authors in different aspects like nutritional status, social customs, in disease pattern, dietetic habits, cultural habits, heart, renal, collagen diseases, malignancies, and in normal children.<sup>2</sup> Mortality of children is the prime indicator of country's health status and its development. Understanding the child morbidity and mortality among different age groups is one of the valuable public health insights. In developing countries like India, we are in a position to depend on the hospitalbased data, for studying and evaluating the morbidity and mortality pattern in different age groups.<sup>3</sup>

The majority of childhood deaths in our country result from preventable and reversible causes. While 10–20% of sick children will be referred to a hospital, the delay in recognition, late presentation, lack of resources, and severity of illness make the first 24 hours of hospitalisation the most vulnerable period with one-third of patientdeaths occurring during this time.<sup>4</sup>

Evaluation of the outcomes of medical interventions can assess the efficacy of treatment, making it

possible to make better decisions, to further improve quality of care, to standardize conduct, and to ensure effective management of the high-level resources needed to deliver intensive care services thereby optimizing resource utilization. Although mortality in patients depends on many factors such as demographic and clinical characteristic of population, infrastructure and non-medical factors (management and organization), case mix, and admission practice, it is also affected by ICU performance.<sup>5</sup>

Greater proportion of developing countries have mortality pattern that show larger proportion of infectious disease and the risk of death during pregnancy and childbirth whereas cardiovascular diseases, chronic respiratory diseases and cancers account for most deaths in the developed world. Population-based data on pattern of morbidity and mortality are often lacking in developing countries, hospital-based pattern of morbidity and mortality often offer best alternative.<sup>6</sup>

All tertiary care hospitals have a medical record department, which compiles and maintains the medical records of patients. The application of the principles of the hospital-based childhood mortality and morbidity pattern can be utilized as an effective tool for analysing the cause of death and epidemiological pattern of childhood mortality<sup>3,8</sup>. This information provides the care seeking behaviour 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>3,5</sup>. Children death rate is considered as a significant indicator of the public health in a country<sup>3</sup>

This study is therefore aimed at evaluating the morbidity and mortality pattern in children in a tertiary medical teaching centre of South-West Bihar, Narayan Medical College & Hospital, Sasaram, Rohtas, situated in the village Jamuhar. The hospital serves as a referral centre for neighbouring 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 morbidity and 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 behaviour of the community, planning and implementation of the health care facilities and for re-evaluating the existing healthcare infrastructures. With the above background, this study was conducted in the department of Pediatrics of a tertiary care teaching hospital of south Western Bihar with aims to determine the pattern of morbidity and mortality in the Pediatrics age group (1 month to 15 years old) and their outcome over one year (1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020).

## METHODOLOGY

This study was a retrospective study, done with records of the children (1 month to 15 years of age) admitted in the department of Pediatrics, Narayan Medical College & Hospital, Sasaram, Rohtas, during the period from 1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020. Narayan Medical College & Hospital, Sasaram, Rohtas is a tertiary care Hospital. This study included all the children from 1 month to 15 years of age, who were hospitalized in the department of Pediatrics, both from the out-patient and casualty. This study excluded the neonatal admission (<28days) since most of the time cause is multifactorial. Medical records of a total of 2019 patients belonging to South west Bihar and admitted in the Pediatric Department of Narayan Medical College & Hospital, Sasaram between 1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020 were reviewed. 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 analysed using SPSS software. The study has been approved by the Ethical Committee of Narayan Medical College & Hospital, Jamuhar. Sasaram. After approval of institute ethical committee, we have enrolled 2019 patients aged 1 month to 15 years, who were admitted in the department of Pediatrics. In this study we have excluded neonates, patients with surgical conditions and patients with acute traumatic injury.

## RESULT

The data analysis showed that there were 2019 patients of age group 1 to 15 years were admitted to paediatric department of during 1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020. As shown in Table 1 in the system/cause wise distributions, respiratory tract infections were the most frequent cause of childhood morbidity requiring hospital admission. Total number of patients with respiratory diseases were 800 (39.62%) out of which bronchiolitis accounted for the most common childhood illness 601 (75.12%) patients followed by pneumonia 116 (14.50%), bronchial asthma 62 (7.75%) and tuberculosis 21 (2.63%) patients. Gastrointestinal system illness comprised 386 (19.12 %) patients out of which diarrheal diseases accounted for the majority of hospital admissions 347 (89.89 %) followed by viral hepatitis 33 (8.57 %) and Koch abdomen 6 (1.55%). Central nervous system involved 347 (17.18%) patients out of which seizure disorder 154 (44.40 %) accounted for most admissions. In the seizure disorder most of the patient were of meningitis accounted for 83 (23.91%) patients, followed by acute encephalitis syndrome 44 (12.69%) and febrile convulsion 38 (10.95%) patients, neurocysticercosis 22 (6.34 %) followed by 06 (1.72 %) tuberculoma. Renal system comprised 94 (4.65%) patients. Patients with nephrotic syndrome were 60 (63.82 %), post-streptococcal glomerulonephritis 22 (23.40 %) and urinary tract infection 12 (12.76 %). There were 88 (4.35%) cases of hematological disorders with the most frequent diagnosis of nutritional anemia, thalassaemia, sickle cell anemia and aplastic anemia. Cardiovascular system related illness represented 16 (0.79%) out of which congenital heart disease comprised 11 (68.75 %) and rheumatic heart disease 5 (31.25%) patients. Other illnesses 288 (14.24 %) included malaria, dengue, poisoning, septicaemia, severe protein energy malnutrition, inborn error of metabolism, surgical cases, scorpion sting envenomation, snake bite etc. The minimum number of hospital stay was 1 day and maximum was 18 days with a mean of 3 days.

**Table-1 Distribution of morbidity patterns per system/cause.**

CONDITION	Number Of Patients	% of total admission
RESPIRATORY	800	39.62
GASTROINTESTINAL	386	19.12
NEUROLOGICAL	347	17.18
CARDIOVASCULAR	16	0.79
RENAL	94	4.65
HEMATOLOGICAL	88	4.35
SEPSIS	66	3.27
SCORPION STING	44	2.18
SNAKE BITE	27	1.33
POISON	22	1.09
SURGICAL	55	2.72
IEM	11	0.54
PEM	44	2.18
MALARIA	11	0.54
DENGUE	08	0.39
TOTAL	2019	100

Total 54 (2.67%) patients died during the study period over of 1 year 1<sup>st</sup> May 2019 to 30<sup>th</sup> April 2020. Out of total deaths, leading causes of death in this study were respiratory failure 16 (29.62 %), Sepsis with

septic shock (48.14%), meningoenephalitis 09 (16.66%), Mortality analysis in relation to different diseases is presented in Table 2.

**Table-2 Causes of death in the study population**

DIAGNOSIS	NO OF DEATHS	Mortality (%)
Acute respiratory infection	16	29.62
Sepsis with Septic shock	26	48.14
MENINGOENCEPHALITIS	09	16.66
SNAKE BITE	01	1.85
MODS	02	3.73
TOTAL	54	100

Out of total deaths, mortality in males 19 (53.7%) and in females thirteen (46.29 %). Mortality analysis in relation to gender is presented in Table 3 and fig 1.

Maximum deaths 36 (66.66 %) occurred in the age group post neonatal infants. Mortality analysis in relation to age group is presented in Table 3 and fig 2.

**Table 3: Age and gender distribution of mortality of the studied population.**

Age group	Male deaths	Female deaths	Total deaths
Post-neonatal infants	19	17	36
1-5 years children	6	3	09
5-12 years children	4	5	09
Total	29	25	54

**Table 4. Mean time interval between admission and deaths of children**

Time interval	N	(%)
<24 hours	30	55.55
24-48 hours	10	18.51
48-120 hours	07	12.96
>120 hours	07	12.96
Total	54	100

Out of total deaths, high mortality occurred within 24hrs and 24-48hrs of the hospital stay, which is 55.55% and 18.51% respectively. This finding is

probably due to delayed referral and poor health seeking behaviour of the community.

**Table 5. Outcome of the admitted patients**

OUTCOME	No of Patients	%
Discharged	1559	78.7
Died	54	2.67
Transferred/LAMA	376	18.62
TOTAL	2019	100

High Mortality occurred within 24hrs and 24-48 hrs of the hospital stay, which is 55.55% and 18.51 % pectively.

## DISCUSSION

Among the system/cause wise distribution of pediatric morbidities respiratory tract infections were the most frequent cause of childhood morbidity requiring hospital admission with respiratory diseases were 800(39.62%) out of which bronchiolitis accounted for the most common childhood illness 601 (75.12%) patients followed by pneumonia 116(14.50%), bronchial asthma 62 (7.75%) and tuberculosis 21(2.63%) patients. This is similar to the study done in Lumbini zonal hospital where 309(31.6%) patients comprised respiratory tract infections including pneumonia, acute bronchiolitis and asthma. This finding of respiratory disease being number one is similar to other studies done in Nepalgunj Medical College, a tertiary care centre in western Nepal by Adhikari J et al<sup>7</sup> and different from studies done by abhulimhen-lyoha et al<sup>5</sup> where the three most common disease categories admitted were cardiovascular disease (41.1%), neurological disorders (12.0%), and respiratory disease (10.0%)

Current study shows that that ARI (29.62 %) is the leading cause of death followed by septic shock (25.92 %), sepsis (22.22 %) and meningoenephalitis (16.66%) in post neonatal age group which is similar to study done by Dr D.M. Deenadayalan et al<sup>3</sup> who found that the most common causes of death among paediatric age groups were septicemia (23.1%), ARI (20.9%) and meningitis (19.8%). Out of 2019 patients 1559 (78.7%) patients improved and were discharged, 376(18.62 %) were either transferred or LAMA and 54 (2.67%) expired.

In this study, overall mortality was 2.67 % which is lower than other studies. The overall mortality rate of 2.67% reported here is similar to the mortality data reported by a study done at the Lagos, Nigeria and the mortality rate of 2.7% reported by Singhi S.et.al<sup>9</sup> from PGIMER, Chandigarh but lower than the 4.1% reported by AN Onyiriuka Et.al<sup>11</sup> and 4.0% reported by Abhulimhen-lyoha Bl.et.al<sup>5</sup>, both from Nigeria. Out of 54 patients died, mortality in males 29 (53.7%) and in females 25(46.29 %). This gender distribution is similar to the study done in Govt. Vellore Medical College & Hospital, pediatric inpatients, in which males (69.8%) than

females (64.6%). In another similar study carried out in Kathmandu at a private medical college, out of 453 patients admitted during the study period, there were 267(59%) male and 186(41%) female children<sup>3,4</sup>. A study by Godale L. et.al found higher female childmortality rate insame age group. But studies by RoyR.et.al<sup>(8)</sup> and Singhi S. et.al<sup>(9)</sup> showed no such difference between two sexes. The risk of death is more in the age group of post neonates in our study. Children of 1-4 years and 5-12 years age group experience similar mortality (16.66 %) a finding similar to the studies by Suprabha Shukla et.al<sup>12</sup>, Gulati P. et al<sup>13</sup>. High Mortality occurred within 24hrs and 24-48hrs of the hospital stay, which is 55.55% and 18.51 % respectively. This finding is probably due to delayed referral and poor health seeking behavior of the community. These observations need to be evaluated in a detailed manner in future with longer study duration in our demographical situation.

## CONCLUSION

In this study we found that total admission during the course of study was 2019 in which 78.7% patients were discharged, the most common cause of hospitalization was acute respiratory tract infection. In this study mortality rate was 2.67 % of hospitalized children, most common cause of mortality was sepsis with septic shock and 18.67% patients were transferred/LAMA. We also found that a major proportion of mortality occurred in children under the age of 5 years, and the leading causes of morbidity were infections (ARI, septicemia, and meningoenephalitis) 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 a need to strengthen the Information, Education and Communication activities for increasing the awareness about early health care seeking behavior in the community, so that the provided health facilities are fully utilized. The death of the children within short hours of hospitalization in the majority of the cases highlights the need of early referral to reduce the mortality.



### LIMITATIONS

1. This was a hospital-based study and may not represent the whole community.
2. As this was a medical record-based study,

examination of study subjects was not possible and it relied on the case notes and reports in the medical records.

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