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**Original Research Article**

# Epidemiological study on admission of infectious diseases in pediatrics department of a tertiary care hospital, Jharkhand, India

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## ABSTRACT

**Background:** Infectious diseases have a major contribution in the mortality and morbidity among children in India. The aim of our study was to assess the infectious diseases and the sociodemographic characteristics along with the assessment of awareness on mode of transmission of these diseases among the family members.
**Methods:** This was a cross-sectional study done in Department of Pediatrics, RIMS, Ranchi, for a period of 6 months by consecutive sampling. Pre-tested, semi structured questionnaire was used for data collection and analysed in SPSS version 20.
**Results:** A total of 220 children were included in the study. Majority of patients (60%) comprised of under 5 age group with male predominance (55%), with 84.1% children fully immunized, among which 54.1% were institutional deliveries and approx. 85.9% children were breast fed for more than 6 months. Malaria, being an endemic disease of Jharkhand affected maximum children (38.2%). Sanitation, (toilet facilities) was about 27% and hand hygiene was only 5% in the family members of the patients admitted. Thus lack of awareness and poor hand hygiene was an important finding in our result.
**Conclusions:** Health education among the community should be the prime concern for the reduction of the diseases.

**Keywords:** Awareness, Characteristics, Infectious diseases, Sociodemographic

## INTRODUCTION

At a global level, disease burden has steadily declined across all the ages over the last decade.[1] However, in India, about one million children die every year before their fifth birthday. The two leading infectious causes of childhood deaths i.e., pneumonia and diarrhea, cause one of every fourth death. Recently, India has shown commendable steps to raise access to interventions such as immunization through Mission Indradhanush and introduction of new vaccines like pneumococcal conjugate vaccine and Rotavirus vaccine. Despite such an effort and progress, infectious diseases continue to contribute a great deal in the child mortality and morbidity in India.[2]

An infectious disease is, a clinically manifest disease of man or animals resulting from an infection and a Communicable disease is an illness due to a specific infectious agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal, or from the environment to man or animal.[3,4] While all communicable diseases are infectious, not all infections are communicable.Even in developed economies where populations have high-quality housing, sanitation, secure food and drinking water supplies, good personal hygiene standards, widespread vaccine use and access to high-quality medical care, infectious diseases remain the most common cause of significant morbidity, and occasionally mortality, in early childhood.[5-10]

Incidence rates of acute respiratory infections (ARI), are the highest during the first 2 years of life where on average infants experience six to eight ARIs each year.[11] Complication rates from acute otitis media (30%) and sinusitis (8%) are also highest in this age group, while 3-5% of all infants are hospitalised for viral lower respiratory tract infections, including bronchiolitis, pneumonia, croup and secondary bacterial pneumonia.[12,13] There is emerging evidence that infectious insults to the growing and developing lung during early childhood contribute to the pathogenesis of chronic pulmonary disorders in older children and adulthood, such as asthma, chronic obstructive pulmonary disease and bronchiectasis.[14-17] Young children are often household introducers, actively transmitting respiratory infections to other family members.[18] Taken together, ARIs in children result in enormous current and future costs to the healthcare system, families and society.[19]

The early childhood years are significantly burdened by Infections and the Young children usually fall an easy prey to infectious diseases. The leading childhood diseases are diarrhoea, respiratory infections, measles, pertussis, polio, neonatal tetanus, tuberculosis and diphtheria. It is a well-known fact that a child may get affected several times in a year; and the aggravation of state of malnutrition increases its incidence. Of about four million deaths a year from acute respiratory infections in the developing world, a quarter are linked to malnutrition, and a further quarter associated with complications of measles, pertussis, malaria and HIV/AIDS. During 2015, about 9% of under 5 mortality worldwide was due to diarrhoeal diseases, about 13% due to ARI, about 1%deaths were due to measles and about 5% due to malaria. In India, during the year 2017, 5,293 cases of diphtheria, 17,068 cases of measles, 23,779 cases of pertussis and 295 cases of neonatal tetanus were reported.[20]

The actual figures may be several times higher since there is considerable under reporting like in the cases of eruptive fevers, malaria, intestinal parasites such as ascariasis, hookworm, giardiasis, amoebiasis etc. which are common because of poor environmental sanitation and paucity of potable drinking water. The prevention and treatment of children's illnesses may interrupt the transmission of infection in community.

The subject of epidemiology originally developed from the study of epidemics of infectious diseases. The prevention and control of infectious diseases need epidemiological knowledge and experience.[21]

Some important factors in the child include age, immunity, nutrition, genetic makeup, and general health. Newborns are at risk because their protective systems are not yet tested and are not always mature. Infants are at risk because they tend to put everything into their mouths and rarely clean their hands. Older children are less at risk because their hygiene is better and they have become immune through prior infection or carriage of bacteria.

Infections are a normal part of childhood. Most children will have at least 6 to 8 respiratory (breathing tract) infections each year. These include colds, ear infections, sinus infections, bronchitis, and pneumonia. Infections of the bowels also are common.

0-15 years of age group is most important age group in all societies as the determinant of chronic diseases in later life and health behaviour are laid down at this stage. Diagnosis of the disease, investigation to understand the source of transmission, implementation of control strategies and programmes, research to develop adequate means to treat the disease and prevent its spread and the production and distribution of necessary drugs and vaccines are the most important pillars for prevention of infectious diseases.

### *Aims and objectives*

The aim of the study was to describe socio-demographic factors related to children suffering from infectious disease, to evaluate the epidemiology of infectious disease admissions in paediatrics department of Rajendra Institute of Medical Sciences (RIMS), Ranchi, and to find out the awareness on mode of transmission of infectious diseases among children and their parents/family members.

## METHODS

This was a cross-sectional study done in Department of Pediatrics, Rajendra Institute of Medical Sciences (RIMS), Ranchi, for a period of 6 months (May 2019 to November 2019), by consecutive sampling. 234 children having any infectious disease admitted in Pediatric Department, RIMS, were contacted for the study during the period of data collection. All children admitted during this period in the pediatric department were approached to be included in the study. Consent was taken from their parents to participate in the study. Out of them, 14 didn't give consent for participation. Thus, our sample size came out to be 220 (234-14). Pre tested, semi structured questionnaire was used for data collection.

### *Inclusion criteria*

Children infected with communicable diseases and willing to participate were included in the study.

### *Exclusion criteria*

Those critically ill and unable to respond were excluded.

Ethical approval was taken from the Institutional Ethics Committee of RIMS, Ranchi. Data was entered in MS Excel and analysed in SPSS software version 20.

## RESULTS

A total of 220 children were included in this study, almost 94% of the total children admitted in the pediatrics department of RIMS, Ranchi. Socio-demographic characteristics of the study population are shown in Table 1.

**Table 1: Sociodemographic characteristics.**

| Sociodemographic characteristics | | Frequency (n=220) | Percentage (%) |
|---|---|---|---|
| **Age** | <5 years | 132 | 60.0 |
| | 5-10 years | 48 | 21.8 |
| | 10 - 15 years | 40 | 18.2 |
| **Sex** | Male | 99 | 45.0 |
| | Female | 121 | 55.0 |
| **Religion** | Hindu | 132 | 60.0 |
| | Muslim | 24 | 10.9 |
| | Christian | 11 | 5.0 |
| | Sarna | 53 | 24.1 |
| **Ethnicity** | Tribal | 66 | 30.0 |
| | Non-Tribal | 154 | 70.0 |
| **Residence** | Rural | 169 | 76.8 |
| | Urban | 51 | 23.2 |
| **Type of house** | Kutcha | 99 | 45.0 |
| | Pucca | 121 | 55.0 |
| **Type of family** | Nuclear | 167 | 75.9 |
| | Joint | 53 | 24.1 |

**Table 2: Other characteristics of the patients.**

| Characteristics | | Frequency (n=220) | Percentage (%) |
|---|---|---|---|
| **Immunization status** | Fully immunized as per age | 185 | 84.1 |
| | Partially immunized as per age | 35 | 15.9 |
| **Place of delivery** | Institutional delivery | 119 | 54.1 |
| | Home delivery | 101 | 45.9 |
| **Type of delivery** | Normal | 202 | 91.8 |
| | Caesarean | 18 | 8.2 |
| **Duration of breast-feeding** | <6 months | 31 | 14.1 |
| | >6 months | 189 | 85.9 |
| **Mother's education** | Illiterate | 77 | 35.0 |
| | Primary | 72 | 32.7 |
| | Secondary | 49 | 22.3 |
| | Higher secondary | 11 | 5.0 |
| | Others | 11 | 5.0 |

132 children (60%) were found to be under the age of 5 years with predominance of male children i.e., 121 (55%). Maximum children belonged to the Hindu religion i.e., 132 (60%) followed by Sarna i.e., 53 (24.1%) which is a religion followed by tribals in the region of Jharkhand. Tribal children admitted were found to be about 66 out of 220 (30%) a higher proportion as compared to the other states of the country. Most of the study population were from rural area (76.8%) and lived in a nuclear family (75.9%) and pucca house (55%).

Table 2 shows other characteristics like immunization status, children who were fully immunized as per their age were found to be 184 (84.1%) which should have been 100%. Only 119 (54.1%) children underwent institutional delivery while almost 202 (91.8%) had normal delivery. Mothers of this children who breastfed their babies for more than 6 months were 189 (85.9%). Overall a good proportion of the study population did not possess any formal education i.e. 77 (35%) followed by mothers receiving up to primary education i.e. 72 (32.7%).

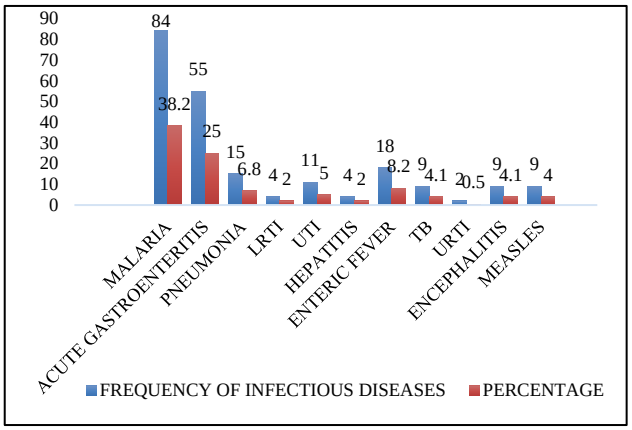


**Figure 1: Frequency of infectious diseases.**

Figure 1 shows the occurrence of various infectious diseases. The predominant disease prevailing in the children admitted in the Pediatrics department was Malaria amounting to almost 38.2% of the whole study population i.e., 84. This proves the fact that Jharkhand is an endemic state for Malaria. The sequence of other infections found in this children in descending order were acute gastroenteritis, the second most common amounting to 25% i.e., 55, followed by enteric fever and pneumonia, 18% and 15% respectively. The other less common infectious diseases were UTI, TB, encephalitis, measles and LRTI. The least common was URTI approximately 0.5% i.e. 2.

Figure 2 shows the source of drinking water of this study population. Maximum drank hand-pumped water i.e., 110 (50%) followed by water drawn from well about 64 children i.e. 29%. The others source were supply water and some from nearby pond or river. This study also brings into light poor sanitation and hygiene practiced by this study population and their mothers in Figure 3. About 73% of the children had no proper toilet facility at their

home while about 95% of the mothers did not wash their hands before breast-feeding the children.

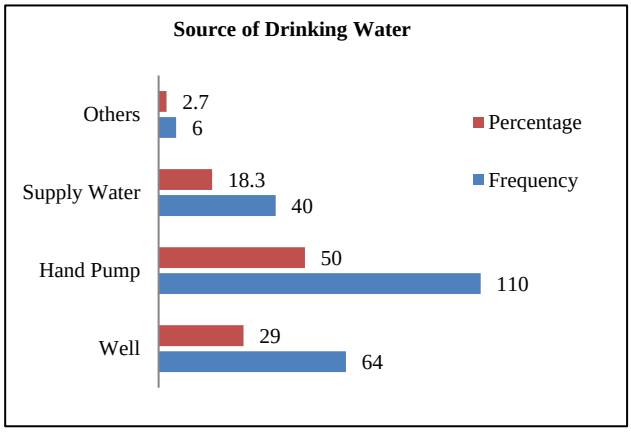


**Figure 2: Source of drinking water.**

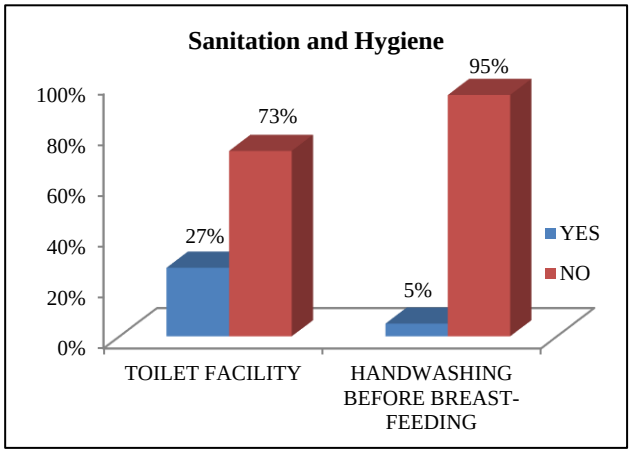


**Figure 3: Sanitation and hygiene showing presence of toilet facility and practice of handwashing before breastfeeding.**

Figure 4 depicts the poor awareness about hand hygiene among mothers of this children. Only 60.9% of mothers had knowledge about proper hand hygiene including handwashing habit.

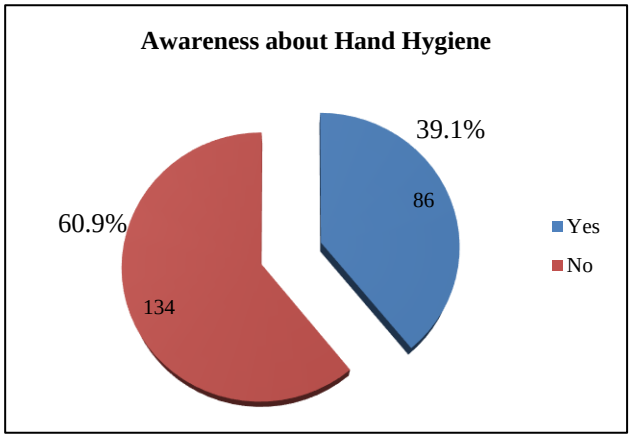


**Figure 4: Awareness about hand hygiene.**

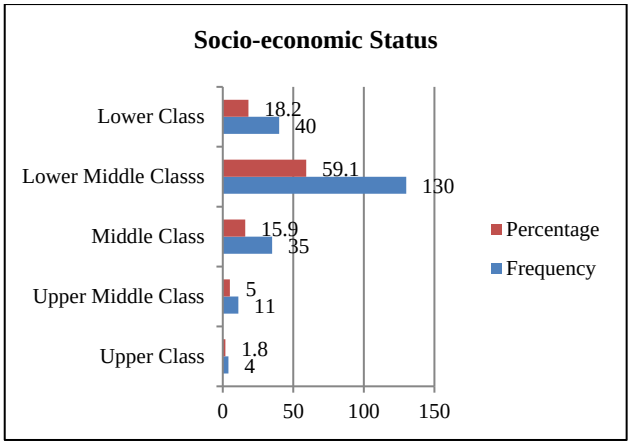


**Figure 5: Socioeconomic status according to the modified B. G. Prasad classification 2019.**

Figure 5 shows the socio-economic status of the children according to Modified B. G. Prasad Classification (2019). Most of them belonged to the lower middle class approximately, 130 (59.1%) followed by lower class amounting to 40 (18.2%). The least number of children belonged to the upper caste i.e. 4 (1.8%).

## DISCUSSION

In the present study, about 35% of the mothers were found to be illiterate and rest 65% received primary education or higher. In a similar study by Kadirvelu et al, done in urban settlement in Delhi, percentage of illiterate mothers were much lower almost 14.4%.[22] While another study done in Aligarh showed completely different result showing 80% illiteracy among mothers.[23] The huge variance in the results among all the three studies may be attributed to the higher literacy in Delhi as compared to Jharkhand as well as other parts of the country.

Almost 54.1% children underwent institutional deliveries and most of them i.e., about 91.8% were delivered normally. While according to NFHS-4 Jharkhand (2015), 76.9% children were institutionally delivered and percentage of births delivered normally were 78.8% in the district of Ranchi. The difference in our study can be due to the presence of private hospitals and higher number of institutional deliveries there with comparative higher number of caesarean deliveries as compared to the government hospital.

In our study, the prevalence of malaria was highest about 38.2% followed by acute gastroenteritis i.e., 25% and the third common infection was enteric fever amounting to 8.2%. ARI was less prevalent in our study unlike other studies done in Delhi and Gujarat where maximum morbidities were due to ARI.[22,24] The difference in our result is due to the endemicity of malaria in this region. Another study done at Vellore, Tamil Nadu, showed respiratory illness to be most frequent about 87.8% followed by gastrointestinal (52.9%). The greater use of firewood as the primary cooking fuel among the families

were the reason for higher respiratory illness in that study.[25] In our study we did not take into account the indoor air pollution because the outcome of our study was different.

There are very less study comparing source of drinking water like our study. But a study done in rural Ethiopia showed the higher incidence of diarrhoea in unimproved source of water based on WHO standards, i.e., around 18% with percentage of incidence in Well as the water source was found to be 39% while incidence in surface water was 16.67%.[26]

In another study done in Kenya, over 80% of households in rural Kenya owned a latrine, but only 20% had proper access to an improved latrine. While availability of soap in the handwashing location was less than 15%.[27] On the other hand in our study, only 27% of the families had proper access to toilet facility with only 5% practicing handwashing before breastfeeding. Even though with the implementation of Swachh Bharat Abhiyaan, many toilets have been installed in nearly every village possible. There is still inadequate use of such toilets due to maintenance problem.

This study had some limitations. Since the study was done for a very short duration and the sample size was small, so, the results could not be generalized to the population. This study was conducted in a tertiary care hospital where maximum cases are referred and complicated one, so, it may be different from the actual picture of infectious disease prevalent in the community

## CONCLUSION

Majority of children were female under 5 years of age(60%) and most of them belonged to rural area(76.8%).The parents of the children were mostly illiterate(35%) or received only primary education(32.7%) and most of them came under Lower middle socioeconomic status(59.1%). Sanitation facilities was poor. Only 27% had proper toilet facilities and only 5% practiced proper hand washing before feeding. Among the infectious diseases, malaria was found out to be the leading cause of morbidity among children(38.2%), which was followed by Acute gastroenteritis(25%), pneumonia, respiratory infection and UTI.TB and Hepatitis cases were found in equal number. Among the less common were measles and encephalitis.

### *Recommendations*

Health is influenced by number of factors such as adequate food, basic sanitation, housing, healthy lifestyles, protection against common communicable diseases. So, the frontiers of health should extend beyond the narrow limits of healthcare. There should be health education among the people so that there is increased awareness and ultimately leading to decreased child mortality rate.

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*Ethical approval: The study was approved by the Institutional Ethics Committee RIMS, Ranchi*

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