# Top Five Indications of Hospital Admission of Infants

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**Abstract**

***Background :*** *Infants are at increased risk of morbidity and mortality. So, it is necessary for clinicians to properly place judgement on if an infant requires hospital admission. However, there is a lack of data on which diseases frequently need hospitalization in infancy. Hence the aim of this study was to provide a comprehensive description of infants requiring admissions to healthcare facilities.*

***Materials and methods :*** *This was a cross-sectional study conducted at the out-patient department of a tertiary level hospital. Hundred infants between 1 month to 12 months of age, who were advised for hospitalization following a provisional diagnosis by an expert clinician were enrolled as study subjects. Their details were obtained from caregivers during their visit and the results were analyzed manually.*

***Results :*** *The mean age of infants was 5.4±3.7 months with 2-month-old being the most common age group. The male: female ratio was 1.6:1 while the ratio forurban vs rural settings was 2.2:1. The most common religion was Islam (87%) followed by Hinduism (12%) and then Buddhism (1%). The most common diagnosis of study subjects in descending order of frequency were acute respiratory infection (46%) acute watery diarrhea (34%) burn and scald injury (13%) congenital disorders (10%) and late onset neonatal sepsis (8%).*

***Conclusion :*** *Most common indicators requiring hospital admissions among infants are acute respiratory infection, acute watery diarrhea, burn and scald injury, congenital disorders and late onset neonatal sepsis. Further study needs to be done to look for seasonal variation and variation between neonates and other under-5 age group children.*

**Key words :** Hospitalization; Infants; IMCI; LONS; Morbidity and mortality.

## INTRODUCTION

Children are vulnerable to diseases and a good number of morbid children are hospitalized daily. In developing countries, mortality among under five children is highest during infancy with about 80% of infant deaths occurring within the first 6 months of life[1]. In Bangladesh, infant mortality rate has been falling drastically from 40.5 deaths per thousand live births to 25.6 between 2009 to 2019[2]. These mortality declines are a result of 'improved coverage of effective interventions' to prevent or treat important causes of child mortality[3]. Crucial to these reductions were introduction of programs ensuring high vaccine coverage, treatment of diarrhea and ARIs and implementation of Integrated Management of Childhood Illnesses (IMCI) guidelines. These guidelines, developed by WHO and UNICEF, enabled primary health workers to diagnose and manage illnesses which are thought to be responsible for 70% of childhood deaths in developing countries[4].

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However, further information on how effective the current IMCI guidelines are in predicting hospital admissions based on provisional diagnosis are unknown. Additionally, there is lack of data on common disease conditions among infants that currently require hospitalization in the city of Chattogram. Hence, the aim of this study was to identify disease conditions among infants that require hospitalization from a clinician's point of view.

## MATERIALS AND METHODS

This cross sectional study was done at the outpatient department of a tertiary level hospital. Patient's illness history and presenting clinical signs and symptoms were evaluated by the attending medical officer and a clinical diagnosis was made.A total of 100 sick infants (1 to 12 months of age) brought from homes requiring hospitalization due to severity of their illness were included as study subjects.
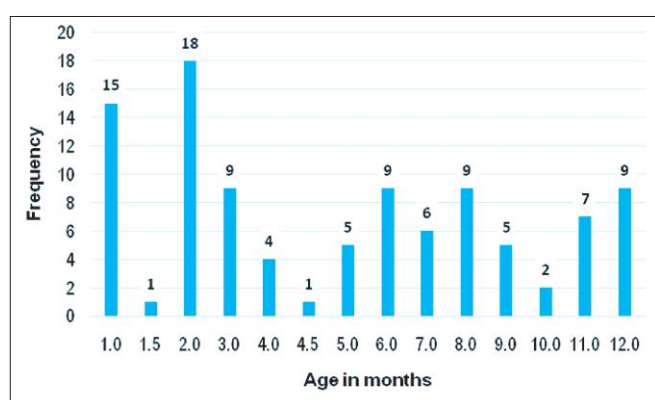
## RESULTS



**Figure 1 :** Ages of infants

The figure above shows the ages of infants that required hospital admissions. The mean age was 5.4±3.7 months with the highest number of cases in the 2-month-old age group.

**Table I :** Gender variation

| Gender | Frequency | Percent |
|--------|-----------|---------|
| Male | 61 | 61.0 |
| Female | 39 | 39.0 |
| Total | 100 | 100.0 |

The majority of the cases were male making up over 60% of the study sample. The male to female ratio was 1.6:1.

**Table II :** Variation in religion

| Religion | Frequency | Percent |
|----------|-----------|---------|
| Islam | 87 | 87% |
| Hinduism | 12 | 12% |
| Buddhism | 1 | 1% |
| Total | 100 | 100% |

Most of the infants belonged to Muslim families' while 12% infants belonged to Hindu families and only 1 child belonged to a Buddhist family.

**Table III :** Variation in location

| Location | Frequency | Percent |
|----------|-----------|---------|
| Urban | 69 | 69.0% |
| Rural | 31 | 31.0% |

Almost 70% of the population belonged to urban settings and the ratio of urban: rural was 2.2:1.

**Table IV :** Most common causes of hospital admissions (n=100)

| Diagnosis | Percentage |
|-----------|------------|
| Acute respiratory infection | 46% |
| Acute watery Diarrhea | 34% |
| Burn and scald injury | 13% |
| Congenital disorders | 10% |
| Late onset neonatal sepsis | 8% |

The top five most common indicators requiring hospital admission are mentioned in the table above. Close to half (46%) of the study population had acute respiratory infection. This was followed by acute watery diarrhea (34%), burn and scald injury (13%), Congenital disorders (10%), and late onset neonatal sepsis (8%).

## DISCUSSION

All though admission-requiring conditions were present throughout infancy, the most common age at which infants fell seriously ill was the 2-month-old age group (n=18). One study by English et al showed the most common age group to be neonates followed by the 2-3-month (61 – 90 days) age group[4]. Since out study excluded neonates, we found 2-month old's to be the most common age group.

In case of gender, our study showed that the male infants were more in number than the female infants. This is consistent with another study conducted by Naheed et al were incidences of hospitalizations for pneumonia at different severities were evaluated[5]. It was observed that only 35% of total admissions were females. Interestingly, cases of severe pneumonia were more prevalent in female children suggesting that gender- based disparities in health seeking behavior were present. According to that study, even the death in female children from severe pneumonia was 4 time higher than that of male children.

Since the data was collected at urban settings, majority of the patients were from urban settings. Patients from rural setting came to seek better treatment for their infants. Based on religion, the treatment seeking behavior is consistent with the prevalence of different religions in our country.

When referring infants with a serious illness for admission, IMCI guidelines have a good sensitivity in helping pediatricians make a judgement for hospitalization. However, an older study by Kalter et al showed diarrhea and dysentery to be the most common provisional diagnosis missed by the IMCI clinical

algorithm in case of hospital admission[6]. In other words, pediatricians were unable to appropriately advice caretakers to admit their infants for hospital admissions in case of diarrhea. Half of these children were malnourished and hence the chances of increased severity, duration of disease and mortality were missed by the pediatrician. Thus, consideration of nutritional status when evaluating patients for hospital admission is necessary. On the other hand, the most frequent diagnosis that was referred by the IMCI algorithm to unnecessary hospitalization was pneumonia. According to a pediatrician's assessment, IMCI guidelines have good sensitivity, but low to moderate specificity in referring infants and children for hospitalization overall.

In our study, we can see a high percentage of acute respiratory infections (46%), followed by acute watery diarrhea (34%). Since IMCI guidelines were followed to diagnose cases, there are odds of over referrals for ARI cases and under-referrals for AWD cases.

Multiple studies were conducted on injuries in infants. While most studies recorded falls to be the most common type of accident resulting in infant injuries with burns and scalds making a small proportion[7]. One study showed children of non-western mothers had a higher chance of being admitted for scald injuries, than for falls or poisoning accidents[8]. Another study by Laitakari et al showed majority of burn and scald injuries requiring surgical treatment occurred in infants between 9- 12 months[9]. In our study 13 children were referred for admission with burns and scald injury with all cases between 7 months to 12-month age group.

The most frequent congenital anomaly in one European study was congenital heart defects followed by limb defects, urinary system anomalies and nervous system defects[10]. In our study, majority of the congenital disorders requiring admission were congenital heart diseases. Other diseases were meningomyelo-cele and Hirschsprung disease.

Out of the total number of study subjects, 8% were diagnosed with Late Onset Neonatal Sepsis (LONS) with male to female ratio of 2:1. This is comparable to a study by Giannoni et al where infants diagnosed with community acquired late onset neonatal sepsis were mostly male[11].

Like all studies, our study was not free from limitations. Although advice was given for admission, further follow up of the patient following admission could help us understand if the infant actually required hospitalization thus helping us evaluate the sensitivity of IMCI guidelines.

## CONCLUSION

Most common indicators requiring hospital admissions among infants are acute respiratory infection, acute watery diarrhea, burn and scald injury, congenital disorders and late onset neonatal sepsis. Further study needs to be done to evaluate what impact does seasonal variation have on the results of this study. Also, a comparison can be done with neonates and other under- five children to see how much the results vary between these groups.

## DISCLOSURE

All the authors declared no competing interest.

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