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Comparison of Pediatric Emergency Patients in a Tertiary Care Hospital vs A Community Hospital

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This study was conducted to compare the profile of patients attending the pediatric emergency services of a tertiary care teaching and referral hospital, Chandigarh, and a community level hospital in Ambala district, Haryana. Records of children (≤ 12 years) attending emergency services over a period of one year; from 1st March 1999 to 28th February 2000, at both the health facilities were analyzed for demographic details, diagnostic categories, monthly trends of illnesses and mortality pattern. Five hundred ninety six children attended the Community Hospital's emergency service while 8301 children were seen at the pediatric emergency service of the tertiary care hospital during the same period. The most common morbidities at both the centers were diarrhea and respiratory infections (58% at community hospital, 45% at tertiary care hospital respectively). Neonatal illnesses and CNS diseases were other important morbidities. There was a significant use of emergency facilities for management of trivial complaints. At tertiary care hospital 26% of ARI cases had upper respiratory infections, while 70% of diarrhea cases seen were without dehydration. At both the hospitals neonatal deaths formed the major proportion of all the deaths. We concluded that diarrhea and ARI continue to be the most important reasons for utilization of pediatric emergency service at a primary as well as a tertiary care hospital.

Key words: *Community hospital, Emergency medicine, Emergency service, Intensive care.*

Epidemiological data comparing the pediatric emergency attendance and admission profile of a community hospital with a tertiary care hospital is not available. This data is necessary for evidence-based decisions by health planners to study disease

epidemiology and appropriately allocate the scarce health resources in these two different types of health care facilities(1). Non-availability of trained staff, inadequate drugs and equipments and lack of triage are some of the deficiencies commonly encountered in the

community setup, especially in a developing country. This leads to increasing morbidity and mortality⁽²⁾. This study was undertaken to compare data on the pattern of pediatric diseases in the emergency services of a tertiary care hospital with that of a block (tehsil) level community hospital.

Subjects and Methods

A retrospective analysis of records of patients (12 years or less) attending the Pediatric Emergency Service, over a 12-month period from 1st March 1999 to 28th February 2000 was conducted in Advanced Pediatric Center, PGIMER, Chandigarh, as well as Civil Hospital, Naraingarh.

PGIMER is a tertiary level referral center, with a total bed strength of 1460, and has an exclusive Advanced Pediatric Center for the pediatric population (bed strength 180). It caters primarily to the Union territory of Chandigarh, adjacent towns of Panchkula and Mohali (population 1.5 million) and referrals from four surrounding states (combined population of around 61 million, Census, 1991). Other health care facilities in Chandigarh include 2 major Government hospitals, a medical college hospital (48 pediatric beds), and another general hospital (40 pediatric beds). There are several government dispensaries and small private hospitals and nursing homes practitioners (around 40-50 pediatricians).

The pediatric emergency service at PGIMER has both observational and admission facilities for neonates and children. All pediatric and surgical emergencies are managed here except trauma and burns because the hospital has separate Burns unit, and trauma is handled by surgical emergency unit. Pediatric Emergency is manned round-the-clock by four trainee residents, one senior resident (trained post graduate pediatrician)

along with trained nursing staff. A consultant pediatrician is available for supervision round the clock, and a senior consultant is in charge of the overall functioning of the emergency (SS). Patients' demographic and illness data is recorded in a register by the senior resident under the supervision of the consultant in charge of the emergency.

Naraingarh Civil hospital is a 60-bedded Community Health Center with combined pediatric and adult emergency services. Naraingarh is a small town and is head-quarter of Naraingarh block of Ambala District, Haryana. It has a population of 15,000 and caters to the rest of the community development block with a total population of 95,000. Naraingarh does not have any other major healthcare facility in public or private sector. There are a few registered medical practitioners, but no qualified pediatrician. Naraingarh hospital's emergency department was manned 24 hours by a Medical Officer, not necessarily a pediatrician. Paramedical staff is available but not specifically trained for pediatric emergencies. No separate super-specialty care is available for neonates, burns or trauma. Patient diagnoses and clinical data was verified and entered by the medical officer 'on duty' in the emergency.

Data was analyzed using descriptive statistics-frequency and proportions, and compared by using Chi-square test.

Results

A total of 596 children were examined in Naraingarh Civil hospital during 12 months period (mean age 43.7 mo). In comparison, 8301 children were seen at PGIMER Pediatric Emergency Department (mean age 40.5 mo). The age distribution of patients at the two facilities is depicted in *Table 1*. Male to female ratio was 3:1 at both centers.

The morbidity profile of the two Hospitals

is presented in *Table II*. The most important cause of morbidity in Naraingarh was diarrhea accounting for 38% of all cases. In contrast, acute respiratory cases contributed maximally to PGIMER emergency (24%). The other important categories for morbidity in Naraingarh include neonates (11%) and fever without any obvious focus (10%). PGIMER had a higher percentage of CNS diseases and neonatal illnesses (17% and 16% respectively). Renal and hematological emergencies together accounted for 6.5%, cardiac illness and systemic infections for 4% each. Vaccine preventable diseases constituted 0.7% of Pediatric emergency visits to PGIMER. Naraingarh had a total of 5 poisoning cases (1%), all due to kerosene ingestion, PGIMER was much higher. In Naraingarh 24 cases reported with injuries (4%), while 4 children presented with burns. Similar figures are not available from the Advanced Pediatric Center, PGIMER as these were looked after by Trauma and Burns units.

There was significant use of emergency facilities for minor illnesses; 10% of ARI cases from Naraingarh were upper respiratory tract infections, while the corresponding figure from PGIMER was much higher at 35.15%. Similarly acute gastroenteritis without dehydration constituted 66% of cases of diarrhea in Naraingarh versus 70% at PGIMER. Cellulitis and/or skin abscesses were seen in 12 cases (2%) in Naraingarh.

TABLE I—Age Distribution of Children Seen at Emergencies of PGIMER and Naraingarh Hospital

Age group	Naraingarh	PGIMER
0-30 days	69 (12%)	1360 (16%)
1-12 months	141 (24%)	2561 (31%)
12-60 months	229 (38%)	1990 (24%)
>60 months	157 (26%)	2390 (29%)

TABLE II—Important Causes of Morbidity

	Naraingarh (%)	PGIMER (%)
Total seen	596	8301
GIT	249 (41)	1713 (21)
Diarrhea	228	1175
With no dehydration	151	823
With some dehydration	77	352
Hepatitis	3	96
Abdominal pain	11	129
ARI	108 (18)	2003 (24)
Pneumonia	87	494
URI	11	703
Asthma	4	468
Foreign body	Nil	53
Neonates	69 (11)	1360 (16)
Neonatal sepsis	65	408
Neonatal Jaundice	4	402
CNS	35 (6)	1374 (17)
Seizures-generalized	17	195
Febrile seizures	3	64
Focal seizures	NA	325
Hematological	5 (1)	223 (3)
Sepsis	13 (2)	80 (1)
Fever without focus	60 (10)	31 (<1)
Poisoning	5 (1)	194 (2.3)

Monthly comparison revealed remarkable similarities in the prevalence of major illnesses at the two Centers (*Fig. 1*). Both the centers were busiest in the early winter months (December in Naraingarh, November in PGIMER), with other busy months being May, July and August. Maximum numbers of ARI cases were in the months of December and January. In both the places GIT illnesses (diarrhea) had a bimodal distribution with peaks in April-May and November. Neonatal admissions were maximum in the months of August in both the centers, while CNS

illnesses had no significant seasonal variation.

Referrals and Mortality

A total of 10 patients were referred to higher centers from Naraingarh (including PGIMER), three of them had sepsis and two had suspected pyogenic meningitis. There were 5 deaths (1%) during the study period, which included three neonates 2 had asphyxia, 1 had sepsis. One 4-month old male died due to sepsis, while another 4-year male had fever without obvious focus mentioned as the cause of death. All the deaths were in male children.

In contrast to Naraingarh, overall mortality among patients in PGIMER emergency department (during stay in the emergency) was 2.7% (220 deaths). Maximum mortality was in the neonatal period (n = 101, 46% of total deaths), followed by children between 1-12 years (62 deaths, 28%) and infants between

1-12 months (57 deaths, 26%). Major cause of neonatal morbidity was birth asphyxia (33%), followed closely by sepsis (27%) and prematurity (27%). Mortality in older children was primarily contributed by cardiovascular illnesses (24%) like congestive cardiac failure (CCF) and congenital heart diseases, shock (21%), CNS diseases (21%) like pyogenic meningitis and encephalitis, pneumonias (18%), and diarrheal diseases (16%).

Discussion

Emergency records can help in assessing the disease burden and health care needs of a community, and the adequacy of health care resources. This study was done to generate data that can help in understanding the health care needs in an urban and rural health care settings and help the health managers to plan rational distribution of resources.

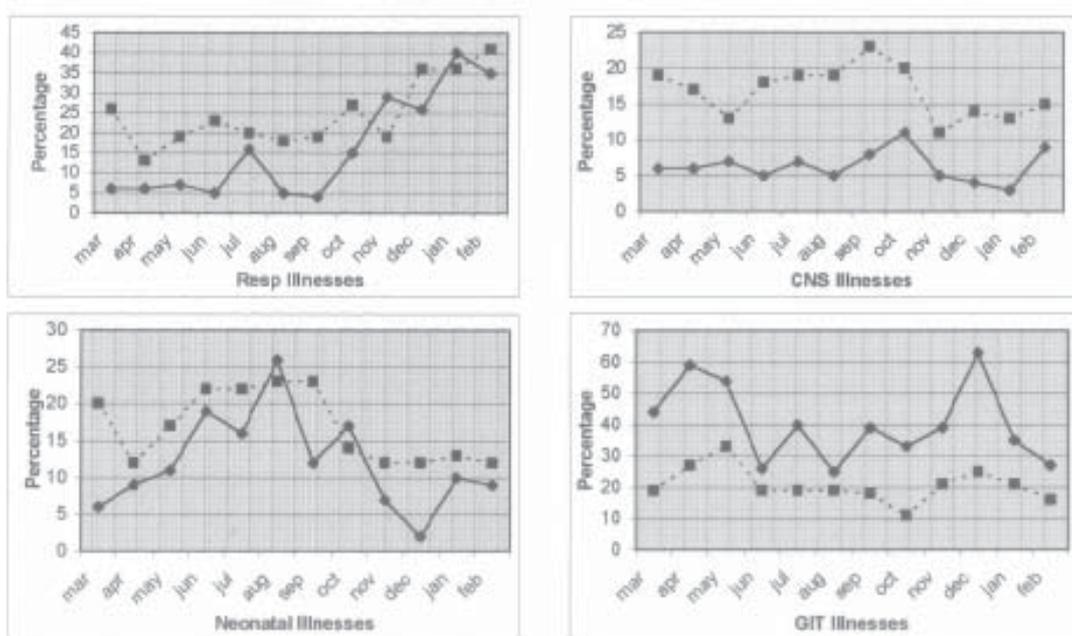


Fig. 1. Comparison of monthly trends of common illnesses (x-axis: Respiratory, CNS, Gastrointestinal and Neonatal; y-axis: percentage of Total admissions for the given month) in PGIMER, Chandigarh and Naraingarh Civil Hospital. (— Naraingarh, - - - - - PGIMER)

PGIMER and Naraingarh both had a male:female ratio of 3:1. This could be related to the biological vulnerability of males to infection, but a more likely reason is the premium attached to male children in our society, leading to preferential medical referral. A male preponderance in the emergency care has been well documented in previous studies(7,8).

Diarrheal illness was the most frequent morbidity at both the places. At Naraingarh the frequency of diarrheal illness was similar to that of National CSSM data(3) and another Indian study(4). The prevalence at PGIMER, however was lower than National CSSM data. The lower prevalence of diarrhea in a tertiary care facility is a welcome sign; perhaps it indicates success of "Acute diarrheal disease control program", especially the use of ORS. Our findings support a recent survey in a rural community of this region(5). Acute respiratory infections ranked among top two illness categories at both the centers. However, their proportion at both the centers was lower as compared to the WHO estimates that peg the emergency visits due to ARI at 30-50%(6).

CNS illnesses constituted a higher percentage of patients attending PGIMER. It was expected since many of these patients were in need of diagnostic and management facilities that are not available in the peripheral setups. Also a lack of diagnostic facilities and specialists was probably the main reason for 10% of cases being labeled as "fever without focus" in Naraingarh civil hospital. Not all the physicians 'on duty' in the Emergency at Naraingarh Hospital were qualified pediatricians. We believe that an improvement in laboratory facilities, and level of medical expertise may improve the diagnostic accuracy and management of this group of patients and reduce the abuse of antibiotics without identification of the cause of fever.

Neonates formed a significant proportion

of patients seen in both hospitals. The common problems included birth asphyxia, sepsis and prematurity with its complications. Born outside the hospital, about 50% of these neonates were referred for further care, and had highest rate of mortality at both the centers. The overall mortality was higher among patients seen at PGIMER. It was to be expected because of a large number of complicated and critically ill patients are referred to PGIMER, sometimes very late in illness and without proper transport. This fact highlights the inadequate availability of health care resources and their utilization in the community(9).

Emergency visits for seemingly trivial complaints formed a significant proportion of visits to emergency services. More than two-third patients with diarrhea reporting to either of the centers were without dehydration and could have been easily managed at home with oral rehydration through outpatient clinics. Similarly almost a third of the acute respiratory cases coming to the PGIMER Emergency were due to upper respiratory tract infections (URI). It is surprising that in Chandigarh, with all its medical facilities, so many patients came to PGIMER for URI. One of the reasons for these visits could be inability of the anxious parents to appreciate the (lack of) severity of these illnesses in young children. It could be also be that they had more faith in PGIMER, as compared to other emergency care facilities in the town.

The peak number of emergency visits in both the hospitals was reached in winters. This was possibly due to a rise in ARI and asthma, and winter-peak of diarrhea. GI illnesses had a peak in May and another in November/December in Naraingarh and PGIMER. The peak in summers could be due to lack of availability of potable water and poor sanitation, while winter diarrhea is likely to be

Key Messages

- Diarrhea and ARI continue to be the most important reasons for utilization of pediatric emergency service at a primary as well as a tertiary care hospital.

due to rotavirus infection(10). CNS illnesses did not reveal any significant seasonal variations though encephalitis was commoner in the months of September and October. This was probably related to the post-monsoon increase in the number of mosquitoes, which have been implicated as vectors of encephalitis(11). These seasonal variations should have important implications for health care managers for o]eal illness and ARI were the most prevalent morbidity at a Community level hospital and at the tertiary care facility. There is a need to introduce triage facilities in tertiary care hospitals to reduce the burden on emergency facilities for trivial complaints, and rationalize the availability of primary care. Attention also needs to be given to the referral and transport of sick children from primary care to tertiary care centers. It is hoped that this study will provide information necessary to optimize allocation of resources according to seasonal variation in disease frequency.

Contributors: SS planned the study protocol, did the critical review and created the final draft of the document. SS will act as the guarantor for the script. GG conceived the study, collected and analyzed the data. VJ reviewed and helped in drafting the manuscript.

Funding: None.

Competing interests: None stated.

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