Morbidity Pattern Among Hospitalized Children (1month To 5 Years) In A Tertiary Care Hospital

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Abstract

Objective: To study the morbidity pattern among admitted children (1 month to 5 years) in a tertiary care hospital in order to find out the common illnesses and their relationship with the change in weather over a year.

Method: A retrospective observational study done in Pediatric unit, Punjab Rangers Teaching Hospital (PRTH), Lahore, over one year (1st Jan 2019-31st Dec 2019). All admitted children 1month - 5years of age were included. Newborns and children >5 years of age were excluded from study.

Data was collected from Medical Records of the admitted patients. Permission was taken from hospital ethical committee

Results: Total admissions in one year were 846, out of which 462 (54.7%) were children 1 month to 5 years of age. 267 children (57.7%) were males and 195 (42.2%) were females. Admissions due to acute respiratory tract infections (ARI) were 111 (24.0 %) and acute gastroenteritis (AGE) led to 138 admissions (29.8%). Together these two illnesses are responsible for almost half of the total admissions in this age group (53.8%). Admissions due to infectious causes were 83.3 % compared to 16.6% admissions due to noninfectious causes. It was observed that AGE was more prevalent in summer months ((May-August) and ARI being the leading cause in winter months (Nov-Feb). However, the association between AGE and ARI was not found to be significant.

Key Words: Morbidity pattern, Tertiary care hospital, Acute respiratory infection (ARI), Acute gastroenteritis (AGE)

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Introduction

Pediatric age groups (0 to 14 years) constitute nearly 43% of Pakistan's population, of which 15% are up to 5 years of age (34.88%).[1] This age group is vulnerable to multiple health related issues. Status of a child's health determines overall economic development and priorities of a community. It reflects a child's access to basic health and education facilities.

ARI and AGE are responsible for 76.5% of morbidity among pediatric age groups of up to 5 years at least once in 3 months.[2] Various health care programs are based on prevention and treatment of these two conditions. 3.5% of global burden of disease is caused by ARI. On an average, in developing countries each child has at least five episodes of ARI in a year.3 These preventable illnesses are responsible for 30 to 50% of total OPD visits and 20 to 30% of hospital admissions. Recent community based estimates from prospective study report 70% of childhood morbidities among children less than 5 years are due to ARI.[4] ARI and diarrheal diseases show seasonal variations.[5] Admissions due

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to ARI are maximum in the winter months and those due to AGE are more in the summer months. Both can be prevented and treated by simple, least expensive measures. Preventable infections are the major causes of morbidity and mortality in Children Emergency Room and children less than 5 years of age are commonly affected.[6] Awareness of seasonal variations can help physicians in counselling of patients and parents regarding preventive measures.[7] A hospital can be better equipped beforehand and optimal control measures can be taken well in time. Morbidity patterns among children can be determined following the indoor admissions in a tertiary care hospital. A tertiary care hospital provides basic and specialized healthcare facilities. Review of such information is helpful not only in accessing the healthcare system but at the same time it identifies the loopholes in the existing system, thus helpful in formulating guidelines for future planning. Overall economic burden due to illnesses which can be easily prevented and treated is massive. Simple preventive measures like health education regarding personal hygiene, provision of clean drinking water and improving sanitary conditions can be helpful. Promotion of breast feeding and vigilant immunization programs can also prevent such illnesses. Morbidity pattern is not static and is dependent on provision of basic healthcare facilities, ensuring the preventive measures and certain environmental factors as well. Medical records can help in determining the disease burden and health care needs of the community and the adequacy of health care resources.[8] Proper documentations is therefore important for better health care planning and appropriate resource allocation for improving health care facilities.

Pakistan being an underdeveloped country lags behind in provision of basic healthcare to the pediatric age group despite all its efforts. Identification of the disease trends can be helpful in determining the effects of already existing health programs. Future planning and implementation efforts are also based on such studies.

Material and Methods

This retrospective observational study was conducted at PRTH. It provides all basic and specialized healthcare facilities to Rangers employees, their families and general public. Department of Pediatrics at PRTH-has a general Pediatrics ward besides a well-established neonatal unit. General Pediatrics ward has a well-equipped High dependency Unit (HDU). Patients are admitted through OPD as well as through emergency. This data was collected in the initial year of the hospital's inauguration as a tertiary care facility. All cases of pediatric inpatients (1 month to 05 years of age) between 1st January 2019 and 31st December 2019 have been included in the study. Neonates and Pediatric patients older than 5 years of age were excluded from the study. Data was collected from medical records of admitted patients. Morbidity pattern among these admitted cases was studied according to parameters of age, gender, infectious versus noninfectious causes and seasonal variations in the most common causes of admissions.

Results

Total admissions in one year (1st Jan-31st Dec 2019) were 846, out of which 462 were children >1 month to 5 years of age (54.7%). 267(57.7%) were male and 195 (42.2%) were female patients. Male children outnumbered female cases throughout the year except in the month of February. Total admissions due to infectious causes were 83.3 %, with only 16.6 % admissions were due to noninfectious causes. ARI and Diarrhea constitute 53.8% of total admissions in a year. It was observed that AGE being more prevalent (41.7%) in summer months (May-August) and ARI being the leading cause (43.5%) in winter months (Nov-Feb). (Fig-1) The mean admissions with ARI are 9.2 and median 9.0, ranging from 1-21 with standard deviation of 6.0. 5 admissions were in 25th centile, 9 in 50th centile and 11.7 in 75th centile. Mean admissions with AGE are 11.0 and median

Table 1: *Month-wise Distribution of cases according to age*

Month	(1 mo - 5 yr)	>5 yrs	Total admissions	% of <5yrs
Jan	38	42	80	47.5
Feb	23	18	41	56
Mar	34	33	67	50.7
April	47	31	79	60.7
May	70	24	96	75
June	33	21	54	61
July	42	38	80	52.5
August	42	31	75	58.6
September	32	25	57	56.1
October	22	50	72	30.5
November	37	36	74	51.3
December	42	35	77	54.5
Total	**462**	**384**	**852**	**54.9**

is 9.0 ranging from with a standard deviation of 8.89. The Pearson correlation of ARI versus AGE is negative at -0.261, and 2-tier value is 0.412 which is not significant. This is again seen when Chi Square test was applied, 0.355 in ARI and 0.343 in AGE. (Fig-2). Besides ARI and AGE, children in this age group were also admitted with other infectious diseases like Enteric fever, Acute Viral Hepatitis, Meningitis and Urinary Tract Infection. (Fig-3) Among noninfectious causes of admission, malnutrition and iron deficiency anemia were common. Children with chronic illnesses like congenital heart disease, nephrotic syndrome, chronic kidney disease, epilepsy and cerebral palsy were also admitted. Noninfectious illnesses contribute to only 16.6% of total admissions.

Out of the total admissions, 54.9% were of the children 1 month to 5years.

Table 2: *Distribution of cases according to gender (n= 462)*

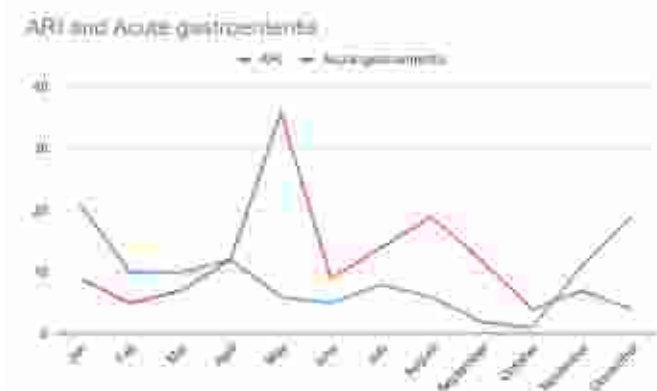| Month	Male	Female
Jan	24	14
Feb	10	13
Mar	20	14
April	26	22
May	53	19
June	14	19
July	24	18
August	25	19
September	17	15
October	12	10
November	20	18
December	24	18
TOTAL	**269**	**199**

Fig-1: *Admissions due to Acute respiratory infection and Acute gastroenteritis*
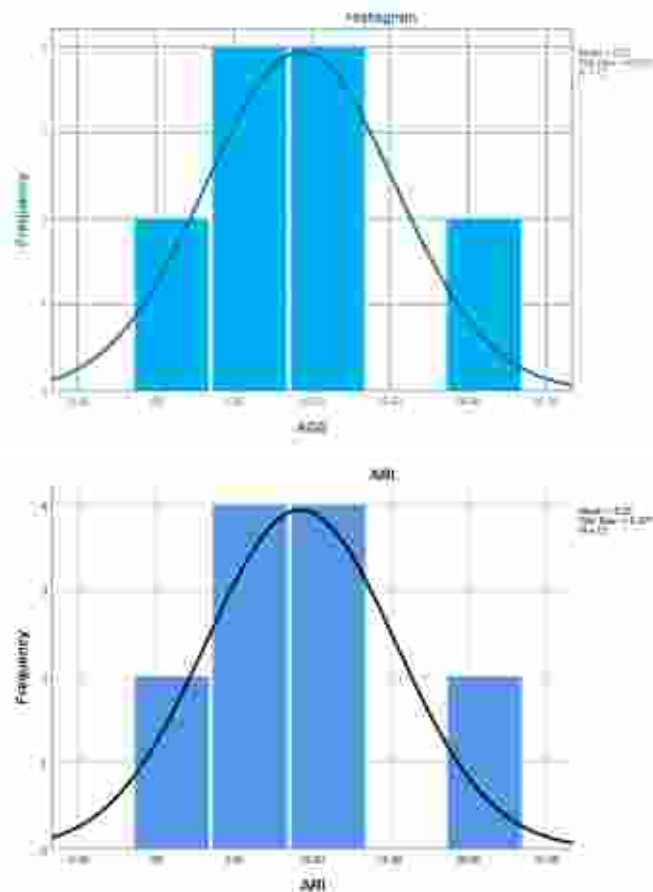

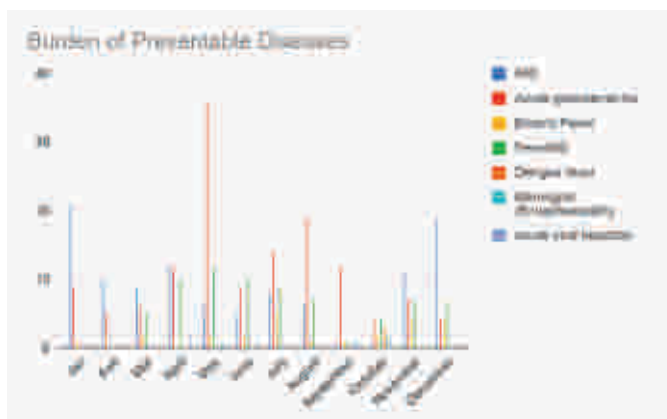**Fig-2:** *Frequency of AGE and ARI over 12 months*

Fig-3: *Burden of preventable disease*

Discussion

Status of child health care in Pakistan is grave. In our study 24.0% and 29.8 % children were admitted with ARI and AGE respectively in a year, which signifies the fact that diarrhea and ARI are the leading causes of childhood morbidity in children till 5 years of age. Morbidity in all age groups was maximum due to Acute Respiratory Infections (ARI), with overall morbidity

of 43.4% followed by Acute Diarrheal Diseases (16.8%) in a similar study done at Uttar Pradesh, India.[8] In our study these two illnesses constitute 53.8 % of total admissions in a year. In our study 41.4% of admissions of ARI were due to upper respiratory tract infections and the rest (58.5%) were lower respiratory tract infections.

Most of the admissions with gastroenteritis were acute cases (98.6%. Due to the study being conducted in the inaugural year of hospital as a tertiary care facility, chronic cases of gastroenteritis (1.4%) were still new to follow-up and work-up was in progress. A number of these patients were readmitted more than once with similar complaints in this one-year study. It was observed that AGE is more prevalent in summer months ((May-August) and ARI being the leading cause in winter months (November -February). A study by Gowa et al reveals that respiratory tract infections was most common (41.2%) in the last quarter of the year (Oct - Dec) and AGE during the second quarter (38.7%). Together these 2 illnesses form the majority of Emergency department burden.[9] In a study conducted in Multan, Pakistan by Tayyaba Amin and Shahid Iqbal it was found out that bronchiolitis started in October and November. Maximum number of cases due to ARI were observed in December, January and February, with minimal cases in June, July and August.10 Majority of patients admitted in summer months were of AGE with peak during July-August. Respiratory illnesses mostly presented in January and March.[11] Similar observations was made in our study also. This is multifactorial due to extremes of weather, lack of sanitation, improper health education and facilities. A better understanding of seasonal infectious disease outbreaks and persistence is likely to result in better understanding of the optimal control strategies.[12] A hospital can be better equipped and prepared beforehand to control and manage such outbreaks. As both the illnesses can be prevented by simple measures, the need of appropriate health education is highly recommended.

Other common causes of childhood illnesses are also communicable and preventable. At Least 7 out of 10(70%) most common diseases were of infectious origin.[13] It was found in our study that 83.3 % of total admissions were due to an infectious disease. Fever is one of the most common presenting complaints in childhood and most frequently is due to an infection.[14] Preventable infections are the major causes of morbidity and mortality among children less than 5 years of age.[6]

Simple preventive measures like health education regarding personal hygiene, provision of clean drinking water and improving sanitary conditions can be helpful. Promotion of breast feeding and vigilant immunization programs can also prevent such illnesses. Good health, good immunity and clean environment is required in preventing pneumonia[9] Likewise, Diarrhea is both preventable and treatable by simple and less costly measures. In USA, gastroenteritis accounts for 10% of hospital admissions. Most children affected with diarrhea are not dehydrated and can be managed at home. Worldwide most cases are due to viral infections.[15] Sanitation and hygiene are particularly important in institutions, including schools and hospitals where nosocomial infections are common. Repeated GI infections lead to impaired immunity and malnutrition. Diarrhea and fever can result in long term health effect, including depletion of immune strength, malnutrition and making children susceptible to other diseases.[16] In our study it was observed that patients admitted with ARI and AGE also had clinical signs of anemia and malnutrition. Similarly, children with chronic illnesses also had signs of nutritional deficiencies and presented with failure to thrive. Thus, childhood illnesses can have both short- and long-term implications. Overall impact will be less productivity and economic burden. Simple protective, preventive and treatment solutions do exit. All can be achieved by breast feeding, proper nutrition and promoting hand washing.[3] Some factors found to significantly influence the healthcare-seeking pattern were age and sex of the children, nutritional score, age and education of the mother, wealth status and access to electronic media.[17] ARI in this age group is caused by bacterial pathogens like H. Influenza and S. pneumonia. Both can be prevented by effective immunization. Likewise, ARI due to pertussis, measles and diphtheria can also be reduced.[18] In our study 41.4% of admissions of ARI were due to upper respiratory tract infections and the rest (58.5%) were lower respiratory tract infections, however due to limitation of resources, as in all developing countries, the exact pathogen was not identifiable.

Understanding the seasonal variations among these two common illnesses will also help in designing protocols for the proper management of the common ailments, health education and advocacy as it may apply.[6] In our study, beside ARI and AGE, children in this age group were also admitted with other infections like Enteric fever, acute viral Hepatitis, nonspecific fever and CNS infections, fever being the presenting symptom in most of these diseases.

Admissions due to infectious and communicable disea-

ses were 5 times more than noninfectious diseases (83.3%) as shown in this study. Amongst the other causes of morbidity in the pediatric age group, anemia was most prevalent, with overall 6.5% of children admitted due to severe anemia.[8] In our study, iron deficiency anemia (IDA) was prevalent in 1.94% of total admitted patients. The prevalence of IDA amongst Pakistani children represents a moderate burden that disproportionately affects the youngest, growth retarded children, affected children are more likely to have mothers with IDA and live in areas where food security is lacking.[19] Malnutrition and iron deficiency anemia collectively constitute 3.45 % of all admissions. Clinical signs of anemia and malnutrition were also noticed in children admitted with repeated ARI and AGE and among children with chronic illnesses. In a study conducted at Lahore by Zaman et al, vaccine-preventable diseases were only 0.5% of the total. Anemia and rickets were rare (2.0%), but commonly seen among the nutritional deficiencies.[20] Other important causes of morbidity in under-5 age group were cardiovascular system (CVS) diseases constituting 5.9%, followed by neurologic diseases (3.7% admissions).[8] In our study, CVS diseases were responsible for 1.29% cases, hematological other than IDA and kidney diseases were responsible for 2.59 % and 1.29%% of total admissions, respectively. CNS disorders other than infections form 4.11% of total admissions.

Of the total admissions in a year, 54.6 % of patients were less than 5 years of age, with more than half of these (58.8%) were in the age group 1 month to 2 years. Majority of the admissions in this age group was with acute gastroenteritis and ARI. Children less than five years were responsible for 80.1% of all admissions, while those less than two years accounted for 56.8%, as shown in a study done in Nigeria.[21] Similar observations was made by Srivastav et al as admissions in under-5 age group were maximum below 12 months of age (26.8%) followed by 20.9% admissions in 3–4-year age group.[8]

Hospital records can help in accessing the morbidity pattern which will determine the health care needs of the community and check the effectiveness of already planned health care facilities.[8] Understanding the epidemiological trends in hospital admission is vital for health care planning, resource allocation and improving existing service facilities. Disease spread can be traced, notified and spread can be controlled in this way. Such studies can form the basis for developing nationwide recommendations for improving healthcare in children.

The common causes of morbidity among children in this age group as observed in our study can be avoided by implementing primary health care programs. Intensification of the actions recommended by the programs directed to child health is all that is required.[22]

Conclusion

Hospital records can help in determining the common causes of morbidity. In this study it is observed that ARI and Diarrhea are still the leading causes of childhood morbidity and hospital admissions. Both are infectious, affected by change in weather but can be easily prevented by taking simple measures. Huge burden on the already limited economic resources can be lessened by proper planning and implementation of already existing preventive strategies. Such studies can provide the foundation for crafting recommendations for improving health care in children.

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Authors Contribution

SN: Conceptualization of Project
MR: Data Collection
RAK : Literature Search
MA: Statistical Analysis
MIK: Drafting, Revision
SN: Writing of Manuscript