

Original Research Article

Disparities among pediatric hospital admissions according to gender

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ABSTRACT

Background: The objective of the study was to determine the pattern of disparities among paediatric hospital admissions according to gender.

Methods: This retrospective observational study was done at pediatric ward of Al-Tibri Medical College and Hospital Karachi from June 2018 to May 2019. Pediatric patients below 12 years of age admitted to the pediatric ward of the hospital were included while patients who were admitted for less than 24 hours, refused for consent by parent/guardian, surgical or ICU pediatric patients were excluded. SPSS was used for data analysis. Quantitative data included age, gender, diagnosis and seasonal variation, expressed as frequency in percentages and chi-square test was applied to test for significance.

Results: Among 734 pediatric hospital admissions, 423 (58%) were males and 311 (42%) females. Highest percentages of pediatric admission in both genders were infants after which second most patients were from the 1-4 years group in both genders ($p=0.01$). 215 patients of acute gastroenteritis were male while 142 females. Among patients admitted with respiratory disease, 56 were males while 48 were females. 52 male patients were admitted with viral fever while 34 patients admitted were females ($p=0.01$).

Conclusions: Our study reported a significant difference among gender variances in pediatric hospital admissions. Overall, not only males were predominant in admission to pediatric wards, they were also found to be predominant in disease categorization. Further studies set to determine the reasons behind such gender differences would help in determining plans accordingly to improve outcome of diseases.

Keywords: Gender disparity, Pediatric admissions, Male to female pre-dominance

INTRODUCTION

The term gender does not only include differences at anatomic or physiological levels, but also the factors in relation to the environment, society, culture and psychology of females and males. A sample parameter by which we can deduce variation in health system between males and females is the different mortality rates of males and different rates for females.¹ In addition, many

researches especially in the last decade have been carried out on male gender specifically. This results in information bias on risk factors and disease development among the female populations. Furthermore, it causes a lack of pharmacokinetic as well as pharmacodynamics data among females.² In the recent decade, multiple studies have published gender medicine among adults but very scanty data is available for children.³ It has been reported that the first year mortality rate of girls has been

twice the rate as compared to boys and in addition, the risk of death has been reported to be thrice the times in comparison to boys.⁴ Even in healthcare system, gender disparities have been reported. In South Asia, the immunization coverage is reported to be greater or higher among boys as compared with girls. In the year 2005-2006 it was reported to be 45.4 % in males and 41.6 % in females.⁵

Gender has been reported to have a major impact on the outcomes of different infectious disease, beginning from the start of life. In general, however, it is seen that the overall mortality and morbidity is higher among males as compared to females throughout life.⁶ Throughout the duration of infancy and childhood, an increase susceptibility and infectious disease severity among males have accounted for an uneven distribution to a larger degree.⁷ Among humans, it is reported that females have stronger cellular and humoral immune responses to antigenic stimulation or infection in comparison to males.⁸

The increased immunity levels might benefit for protection and for clearance from a proportion of pathogens. Nevertheless, increased immunity can also be harmful to the body, thereby an increase in immunopathology in some infections can predispose to autoimmune diseases.⁹

The over lying mechanism for these gender di-morphism are multi-factorial that include endocrine, infectious, genetic effects on immune system, physiology as well as gender-associated behavioural differences. From the point of birth up till adulthood, dynamic for sexual maturation are overlapping with continued developments of immune system, demonstrating a differential outcome among gender's, across age groups especially after pathogen exposure.¹⁰

The objective of this study was to determine the pattern of disparity among paediatric hospital admissions according to gender.

METHODS

This study was done in the pediatric ward of Al-Tibri Medical College and Hospital Karachi from June 2018 to May 2019, for a period of 12 months. The study design was retrospective observational with the use of non-probability convenient sampling technique. Institutional Review Board of the hospital was sought for approval after which data collection was started.

Inclusion criteria

After taking written and informed consent from the patient's parent or guardian, the patients admitted to the pediatric ward from the out-patient department or emergency for more than 24 hours were selected for this study.

Exclusion criteria

Pediatric patients which were admitted to ward for day care or less than 24 hours, referred from the hospital within 24 hours, surgical pediatric patients, ICU pediatric patients and those patients whose parents or guardian refused to give consent were excluded from the study.

After ethical approval from the hospital, the study was carried out and data collection started after applying inclusion criteria and excluding patients according to the exclusion criteria. Patients that were admitted during the study time period were included and their data regarding demographics, diagnosis, month and duration of hospital stay were all recorded.

SPSS version 23 was used for data analysis. Collection and analysis of data was kept confidential and discreet. Demographic statistics included gender, age, diagnosis and season. Quantitative data was reported as frequency in percentages. Chi-square test was applied to test for significance of age and diagnosis of pediatric patients according to gender, keeping p value of <0.05 as significant.

RESULTS

This study included a total of 734 pediatric patients that were admitted during the period of June 2018 to May 2019. From the total patients, 423 (58%) were males and 311 (42%) were females (Figure 1).

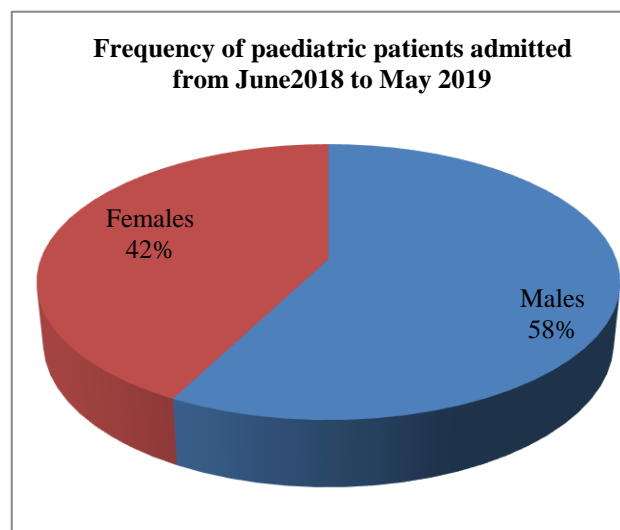


Figure 1: Percentage of pediatric patients admitted in terms of gender.

158 infants were male while 126 infants were female. 159 male patients were between the ages of 1-4 years while there were 130 females between 1-4 years. 71 male patients were between 5-8 years while there were 35 females between 5-8 years. 35 male patients were between the ages of 9-12 years while 20 female patients were between the ages of 9-12 years. A significant

difference existed between the ages of admitted pediatric patients according to gender (Table 1).

314 male pediatric patients were admitted during the summer season while in the same season, a total of 109 female pediatric patients were admitted. In winter, 234 male pediatric patients were admitted while in the same season, a total of 77 female pediatric patients were admitted (Figure 2).

Table 1: Age wise distribution of admitted pediatric patients according to gender.

Age distribution of patients	Frequency of males (n=423) N (%)	Frequency of females (n=311) N (%)	P value
Infants	158 (37)	126 (41)	0.05
1-4 years	159 (38)	130 (42)	
5-8 years	71 (17)	35 (11)	
9-12 years	35 (8)	20 (6)	

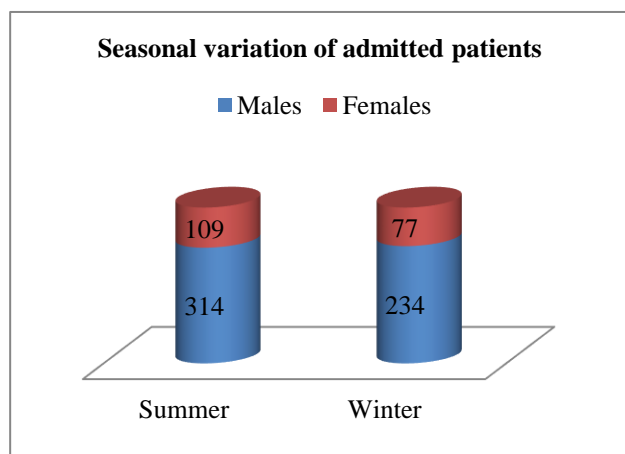


Figure 2: Admitted pediatric patients in seasons according to gender.

Table 2: Diagnosis of admitted pediatric patients according to gender from June 2018 to May 2019.

Diagnosis	Males (n=423) N (%)	Females (n=311) N (%)	P value
Acute gastroenteritis	215 (51)	142 (46)	0.01
Respiratory disease	56 (13)	48 (16)	
Viral fever	52 (12)	34 (11)	
Urine tract infection	40 (10)	27 (9)	
Neurological disease	22 (5)	14 (5)	
Hematologic disease	05 (1)	15 (5)	
Enteric fever	15 (4)	10 (3)	
Sepsis	04 (1)	06 (2)	
Protein malnutrition	14 (3)	15 (5)	

In the same period, a total of 215 patients of acute gastroenteritis were male while 142 were females. In patients admitted with respiratory disease, 56 were males while 48 were females. 52 male patients were admitted with viral fever while 34 patients admitted were females. In patients of urinary tract infection, 40 were males while 27 were females. In patients with neurological disease, 22 were males while 14 were females. 05 male patients were admitted due to hematological disease while 15 patients were female. 15 male patients were admitted due to enteric fever and 10 were female patients. With sepsis, 04 patients were male while 06 were females. 14 male patients and 15 female patients were admitted due to protein caloric malnutrition. A significant difference was reported between the diagnosis of admitted pediatric patients with regards to gender (Table 2).

DISCUSSION

Difference according to gender in childhood disease incidence have been recognised for a long time, however the magnitude of their effects as well as consistency across various disease categories have not appeared to attract much attention for research purposes.

Although some researchers have also reported incidence of pediatric diseases according to gender differentiation, more work needs to be done to fulfil the difference pattern.¹¹⁻¹⁴ In our study, a consistent excess of male admissions (58%) was observed overall but not for all diseases. Higher rates of male admissions were found in patients admitted due to acute gastroenteritis (51%) and viral fever (12%). Females predominance was seen in patients admitted due to respiratory disease (16%), haematological disease (5%) and protein malnutrition (5%).

Similar to our study, other studies have also reported the same pattern of male predominance for gastroenteritis and respiratory diseases.^{15,16} A study by Cho et al reported that 57 % of their admissions were males, which is similar to our study. Occurrence of urinary tract infection has been reported to be more in neonatal males but the incidence decreases with increasing age and by adulthood, an increase incidence has been reported in females.¹⁷ A study reported that more than 70% of urinary tract infection patients were males who were under the age of 5 years.¹⁸

Over 75% of the admitted patients in our study were below the age of 5 years. This shows the vulnerability of this age group, be it male or female and is in accordance to the findings of studies done in the past. In either gender, the most prevalent disease of admission was acute gastroenteritis owing to the fact that there must be more strategies placed in order to combat and prevent the common pediatric diseases. Effective programs include the extended program of immunization, exclusive breast-feeding awareness etc.

In a study by Hon et al, reported from 92,332 admitted patients in the general pediatric ward the highest numbers of patients were admitted due to acute gastroenteritis (14%), respiratory tract infection (12%) and viral fever (07%). In almost all of the disease categories, male predominance was reported with an overall incidence of male admissions at 59%. This is in accordance with our study where in almost all of the disease admission had a greater percentage of males as compared with females.¹⁹

Even though the results of our study are consistent with that of the published data, it also aids in emphasizing the consistency of the gender differentiations across a wider range of diseases. Although the data this consistent, the reason behind this male predominance has not been identified or studied much. Partial explanations include presence of an extra chromosome or absent Y chromosome helps in conferring inherent survival advantage and so the differences in admissions reflect their susceptibility to a wide range of diseases. Another explanation might be attributed to social influences, where parents who favor their male offspring tend to visit health-care facilities more often than they would with female offspring.

A potential limitation of the study includes selection, observer bias, using male as a default assignment of gender which might have results in bias during entry of data. Since the purpose of this research was to identify the variations in pediatric admission of different disease according to gender, an in-depth analysis or the reasons behind such differences were not studied. Therefore, further multi-centered studies on a larger population, focused on identifying the reasons behind gender differentiations would help in establishing and laying out plans to improve the health-care status of individuals and prevent diseases in high rates of susceptibility areas.

CONCLUSION

Our study reported a significant difference among gender variances in pediatric hospital admissions. Overall, not only males were the predominant in admission to pediatric wards, they were also found to be predominant in the different disease categories. Further studies set to determine the reasons behind such gender differences would help in determining a strategy accordingly.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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