Surveillance of the Most Prevalent Medical Diseases among Pediatric Age Groups and Evaluation of the Control Measures Used At Tabuk Hospitals, Saudi Arabia

Ameinah Omar Al Tabbal[1*], Seham Sulaiman Al Humedi[2]

[1]*Pediatric Department, Medical College, University of Tabuk, Tabuk, Saudi Arabia;* [2]*Ophthalmic Department, Medical College, University of Tabuk, Tabuk, Saudi Arabia*

Abstract

BACKGROUND: During the last decades, medical recordings has increased dramatically leading to more awareness of the diseases commonly affecting paediatric age groups opening a wide entrance to the prevention of possible complications and decrease its incidence.

AIM: This article aims to assess the prevalence of the commonly encountered paediatric medical diseases by affected system among admitted paediatric patients of different age groups in Tabuk and to identify their burden.

METHODS: This is a retrospective research studying disease pattern according to age, gender, nationality, admission status and length of stay.

RESULTS: Admissions due to respiratory system disorders were the most common among children under the age of six years (39.7%). Acute gastroenteritis was the most common disease leading to hospitalisation of children below the age of three years and cast a financial burden heavily on family and society.

CONCLUSIONS: Respiratory diseases and acute gastroenteritis constitute a significant burden of childhood illnesses in Tabuk City. Efforts are required to reduce the impact to achieve the Saudi ministry of health (SMOH) Goal. Even though Rota vaccine is added to the national Saudi program of vaccination schedule, other causes should be looked for, and preventive measures are important as a part of public education.

Introduction

During the last decades, medical recordings have increased dramatically leading to more awareness of the diseases commonly affecting paediatric age groups opening a wide entrance to the prevention of possible complications and decrease its incidence.

Respiratory diseases remain a major cause of morbidity and mortality in children as well as hospitalisation globally especially among those below the age of five years old [1]. Even though Global under-five mortality rate dropped 53% since 1990, the World Health Organization (WHO) estimates that approximately 5.9 million children under age five died in 2015 [2], 16 000 every day, and respiratory infections especially pneumonia contributes about 13% [3] of the total number of deaths. Few are known about the burden of respiratory disease in Tabuk.

According to the Saudi Arabia demographics profile of 2014 population numbered about 27 million with 30% or more were immigrants. Those who aged between 0 and 14 years make up 27.6 % of all

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population (7.5 million total, approximately 51% are males) [4]. This is a big number with a good burden on the health system to meet the optimal health services needed. Studying the prevalence of pediatric medical diseases by the affected system in KSA still of shortage especially in the rural areas.

In a research done in 2001, it showed an increased prevalence of bronchial asthma in Saudi Arabia and labelled as the most common chronic illness of childhood [5]. In one study conducted in the endocrine clinic in Riyadh city showed rickets as the most common endocrinologist disorder of childhood at all age groups nutritional rickets was the most common cause [6]. Ambiguous genitalia was common with congenital adrenal hyperplasia as the predominant cause (96%) in 46xx genetic female. Short stature was a frequent reason for referral 54% were of familial types [6], cardiovascular disorders mostly of congenital heart diseases of which VSD was 32.5% of cases, and PDA 15.8% [7]. Rheumatic fever with the mean age of presentation was nine years .in 37% arthritis was associated with carditis [8].

Brucellosis is common in Saudi Arabia. Most cases presented with fever, arthralgia and myalgia. In a study conducted on those with Osteoarticular complications of brucellosis, all patients had arthritis as the main presenting symptom being monoarticular in 70% of cases [9].

Regarding neurological disorders mental retardation and cerebral palsy were the commonest among Saudi children [10] pediculosis capitis, verruca vulgaris and tinea pedis were the most prevalent as transmitted skin diseases in boys between 11 and 19-year-old, while acne vulgaris was the most of the non-transmissible skin diseases among the same age group [11]. Haematological iron deficiency anaemia, sickle cell anaemia and thalassemia were the commonest [12], [13], and [14].

Paediatric Nephrology nowadays is a growing subspecialty in the kingdom of Saudi Arabia. Nephrologists are challenged with a different spectrum of renal disease the higher rates were for congenital and infectious nephrotic syndrome [15]. It was the most common indication for renal biopsy in Riyadh King Khaled Hospital during the period 1982-1994 accounting for 77% of cases [16] Post-infectious glomerulonephritis still common but declining [15].

Gastroenterological diseases are the second most common cause of morbidity in toddlerhood. Determination of the burden of the most common paediatric diseases causing hospitalisation will help ascertain their collective impact on the health system to develop preventive measures. Gastrointestinal disorders inflict a heavy burden economically. In the USA It was showed according to data extracted from some publicity and proprietary national database that the most prevalent diseases were the non-food borne gastroenteritis, food-borne gastroenteritis, GERD and irritable bowel syndrome [17].

In a study done in New South Wales, 1993 showed about 3700 children fewer than five were admitted for rotavirus gastroenteritis annually in NSW at an estimated annual cost of 4.6 million dollars. Annual rates were highest for children aged 12-23 months [18]. During the pre-rotavirus vaccine era, four of five children in the US had symptomatic rotavirus gastroenteritis, one in seven required a clinic or emergency department (ED) visit, one in 70 was hospitalised, and one in 200,000 would die from this disease, within the first five years of life. However, in developing countries, rotavirus gastroenteritis continues to be a major cause of severe childhood morbidity; responsible for approximately half a million deaths per year among children aged <5 years [19].

The introduction of rotavirus vaccines would be expected to lead to changes in the relative importance of other pathogens as causes of clinically important diarrhoea. Other diseases like congenital heart disease and sickle cell disease have a good burden impact especially below the age of 5 years [20].

In this article, we are to assess the commonly encountered paediatric medical diseases by affected system among different age groups in Tabuk, KSA over the period between 2011 and 2015.

Research objectives are: 1) To assess the prevalence of medical diseases in admitted patients of pediatric age groups in Tabuk; 2) To identify the burden of commonly prevalent diseases among pediatric age groups and determine the frequency of the commonly prevalent; and 3) To classify the medical coding in Tabuk hospitals according to ICD-10 (International Statistical Classification of Diseases and Related Health Problems 10th version).

Material and Methods

This is a retrospective study conducted in two governmental hospitals of Tabuk city in KSA aiming to assess the commonly encountered paediatric medical diseases by affected system among different age groups.

Data was collected from case notes of patients being admitted to (MCH) maternal and child hospital oro (KKH) King Khalid hospital in Tabuk City during the period from 2011 till 2015. The disease pattern was studied depending on age, gender, nationality, system affected, admission status, and length of stay. Inclusion criteria involved those below 14 years of age admitted to hospital either MCH or KKH during the mentioned period for one day or more because of a medical reason and regardless of their gender or nationality.

Data is programmed and entered into Excel

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office sheet, 2013 then exported into Statistical Package for Social Sciences (SPSS), version 20, the sheet for analysis. Medical coding in Tabuk hospitals was classified according to ICD-10 (International Statistical Classification of Diseases and Related Health Problems 10th version).

Frequencies of disease by system affected were calculated using descriptive statistics, and percentages were plotted in a bar chart. Descriptive statistics also used for calculating mean values and standard deviations to assess the relation between gender and age on the pattern of paediatric diseases. Disease types were coded according to ICD-10 code system.

Descriptive and (Chi-square) statistics were used to find an association between the various diseases by system affected, age and gender and to ascertain association of the disease outcome, the length of stay with the types of diseases.

Results

A total of 400 cases extracted from patient files among those admitted during the period 1432 and 1436, 325 cases were only valid for the study, 129 (39.7%) were due to respiratory diseases. The mean age of all the children with respiratory diseases was 2.5 years (SD 0.991).

Asthma exacerbation was the common cause of admissions among all the respiratory causes, $p < 0.001$. The frequency of respiratory diseases decreases with age, children who are five years old or less encountered a percent of 83% of all respiratory diseases.

The median duration of hospital stay was two days [range 1 to 6 and above]. The most common cause of admission by disease was acute gastroenteritis with a percent of 25.2% (82 cases out of 325).

The sample collected from the two hospitals; maternal and children hospital (MCH) and King Khaled Hospital (KKH) 222 (68%) and 103 (31.7%) cases respectively with a total of 325 cases (Table 1).

Table 1: Number of cases extracted by hospital in Tabuk City

		Frequency	Valid Percent
Valid	KKH	103	31.7
	MCH	222	68.3
Total		325	100.0

Out of these 325 cases, 161 cases were toddlers, making the highest percentage of admitted paediatric group; it was 49.5 % of all admissions. 82.5% of the cases are below six years of age. Male to female ratio showed male predominance with an

approximate ratio of 3:2 (Figure 1).

In comparing the means according to different age groups, hospitalised children between the ages one and three years and being admitted with respiratory aetiology and mostly they were males. Those were admitted to hospital because of urinary tract disorders or endocrinological etiologies were mostly females of older age groups mostly school ages.
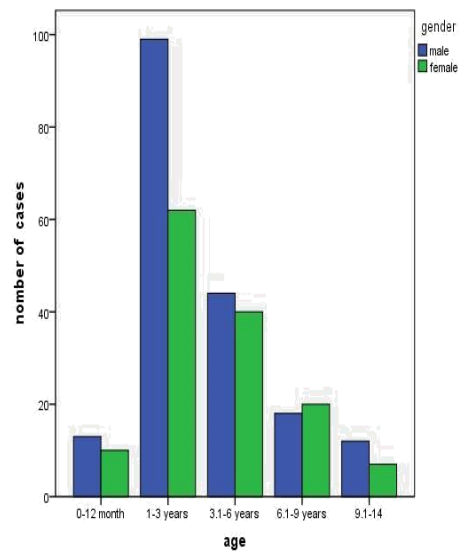

Figure 1: Number of sample cases labo ut age and gender (49.5% of cases were between 1 and three years of age mean age 2.6 years. male gender predominate most of the cases with an M: F ratio of 3:2)

Cardiological disorders causing the patient to be admitted to the hospital such as rheumatic fever in this sample showed mean age value of 3 that is preschool age, from three to six years old and most were males. Gastrointestinal causes contribute to about 30% of all the cases studied which is considered as the second most common cause of hospitalisation by system affected.
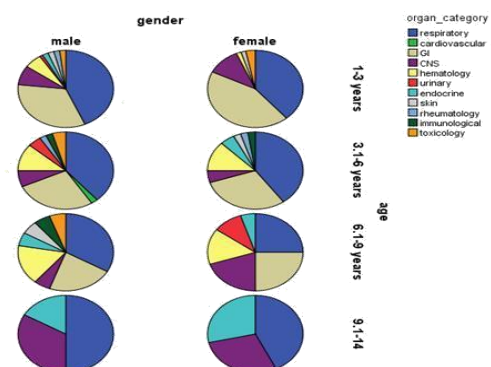

Figure 2: Percentages of cases by the affected system according to different age groups in both males and females. For all age groups, respiratory diseases were the most common cause of hospitalisation

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On the other hand, depending on specific diseases by diagnosis at admission it was strangely seen that a non-respiratory cause is the leading aetiology for hospitalisation among all paediatric groups especially those below three years of age.

Acute gastroenteritis was the most common cause of admission with a frequency of 82 cases out of the 325 sample cases making a percent of 25.2% of the total, making a burden on the government and ministry of health as the mean length of stay in hospital was 1.5 that is more than two days. Convulsion due to epilepsy or febrile convulsion recorded the highest of all neurological presentations causing hospitalisation in children with a percent of 7.7% of all admitted cases.
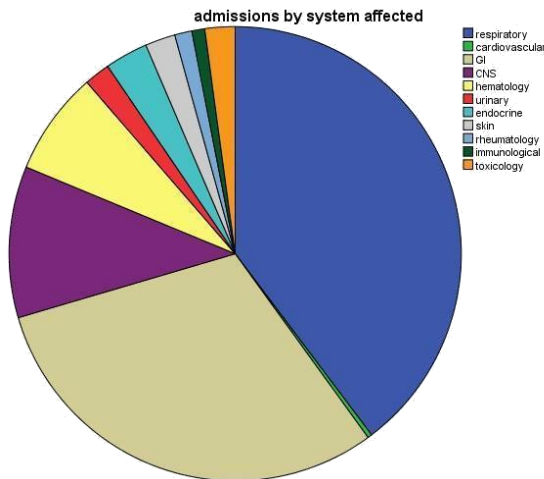
Figure 3: Number of admissions by the affected system. Respiratory diseases is number one as a reason for hospitalisation in all paediatric age groups, followed by gastrointestinal disorders, neurological then haematological abnormalities and diseases (P < 0.001)

Rheumatologic diseases even though counting for a low percent out of the total (1.2%) but it is still associated with the high burden as 40% of cases the duration of stay in hospital is 3-5 days.
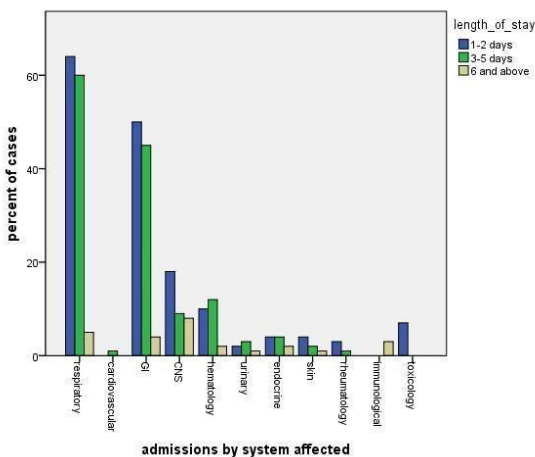
Figure 4: Length of stay in hospital by the system affected

Endocrine disorders especially diabetes mellitus (E10.1) is contributing to about 10% of hospitalisations in late childhood and adolescent age group (P < 0.002), (Pearson Chi-square = 0.001).

The median duration of admissions was three days, and 42% of the children were admitted for three to five days. Children, less than six years of age were about two times more likely to stay more than two days than the other age groups (p < 0.001). The recurrence rate was noted only among 24.3% of all the cases, out of which 48% were between 1-3 years old, (p-value < 0.000). The recurrence rate was highest among respiratory indications for hospitalisations (30.2% of all respiratory admissions). Urinary tract system disorders and haematological indications also contributed to a significant rate of recurrence (P < 0.033).
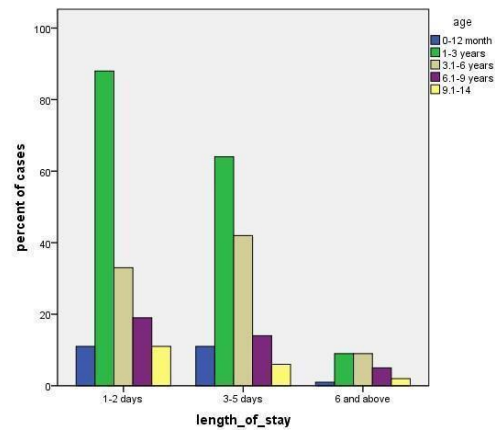
Figure 5: Studying burden of diseases by measuring length of stay among different age groups regarding

Respiratory diseases remain Worldwide the most associated with morbidity in all age groups, despite mortality rate from respiratory diseases reduced greatly over the time [3, 5].

Discussion

During the last decades, medical recordings have increased dramatically leading to more awareness of the diseases commonly affecting paediatric age groups opening a wide entrance to the prevention of possible complications and decrease its incidence.

Respiratory diseases remain a major cause of morbidity and mortality in children especially among those below the age of five years old [1]. Even though Global under-five mortality rate dropped 53% since 1990, the World Health Organization (WHO) estimates that approximately 5.9 million children under age five

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died in 2015 [20], 16 000 every day, and respiratory infections especially pneumonia, contributes about 13% [5] of the total number of deaths.

Gastroenterological diseases are the second most common cause of morbidity in toddlerhood. Few is known about the burden of the common paediatric diseases in Tabuk and those associated with high percent of repeated hospitalisation.

Determination of the burden of the most common paediatric diseases causing hospitalisation will help ascertain their collective impact on the health system to develop preventive measures.

In this study, it was shown that respiratory diseases is associated with high morbidity and contributes to a large number of admissions in Tabuk governmental hospitals with burden impact due to a high percent of repeated admissions and long duration of hospitalisation. Even though the outcome of respiratory diseases was good and labelled improving or regular discharge, but still in need to increase the efforts to reduce the number of admissions and readmissions.

GI diseases also contribute to large impact just after respiratory illnesses especially for those below the age of five years. Acute gastroenteritis recorded as the single most common disease indicates admission more often among the toddlers.

The introduction of specific vaccinations like Rota virus vaccine made a great reduction in the mortality rate due to Rota gastroenteritis as it was the most cause for severing gastroenteritis in children and lead to death in those below the age of one year. Despite improving trends in mortality rates, diarrhoea accounted for a median of 21% of all deaths of children aged less than five years in developing areas and countries, being responsible for 2.5 million deaths per year [25].

Limitations and obstacles: Difficulty in reaching the files and extracting the data from the notes represented one of the limitations of the study. Regarding the investigations were done and especially cultures, the lack of information on its results sometimes or if it is done or not as all are paper- limited and not computerised also was an obstacle and somehow affected our assessment of the aetiology and outcome of the disease admission.

In conclusion, respiratory diseases constitute a significant burden of childhood illnesses in Tabuk City. Asthma exacerbation is on the top of the list. Preventive measures, more attention to public education and strict follow-up of patients affected are important to reduce the burden and decrease the numbers of hospitalisations.

Acute gastroenteritis is the single most common cause for admissions and efforts are required to reduce the impact and burden as part of the steps towards the achievement of the Saudi ministry of health (SMOH) Goal. Even though Rota vaccine is added to the national Saudi program of vaccination schedule, other causes should be looked for, and preventive measures are important as part of public education.

Future studies that determine the prevalence of the most important causative agents of acute gastroenteritis by applying PCR stool test is recommended to find out the epidemiological changes in the aetiology of acute gastroenteritis among Rota vaccinated children in Tabuk, KSA.

Acknowledgment

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