Pediatrics Morbidity and Mortality at Basra General Hospital

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ABSTRACT

Background: The health burden and mortality caused by infectious diseases of children remain high word wide. Mortality and morbidity data are essential to identify the public health importance of different diseases and allocate resources appropriately.

Objective: This study was undertaken to describe the main causes of hospitalization and death among children in Basra.

Methods: A cross –sectional retrospective design was used to determine the main causes of hospitalization and death (a part from malignant diseases) among children in Basra. Medical records for patients admitted to the pediatric department in Basra General Hospital throughout 2013 were collected and analyzed for demographics, diagnosis, and outcome.

Results: Around 53.3% of the patients were under 13 months. More than half of the studied population was males (60%), with a male: female ratio was 1.5: 1. The most common cause of hospital admission was Gastroenteritis (48.9%), followed by Respiratory diseases (19.7%) and Urinary Tract Infection (15.1%).

The overall mortality rate was 1.4%, where 60.6 % of them are females and the complications of urinary tract infection were the most common cause.

Conclusion: Infectious diseases were the main cause of hospitalization among Basra children and might lead to death. A substantial proportion of this morbidity and mortality was probably attributable to preventable causes. Prospective surveillance using microbiological data is needed to delineate the organism-specific burdens.

معدل الاعتلال والوفيات بين الاطفال في مستشفى البصرة العام

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المُستلخص

الكلمات الدالة

ان عبء الامراض الانتقالية واثارها السلبية بين الاطفال لايزال يشكل تحديا لخدمات الصحة العامة في جميع انحاء العالم وان مؤشر معدل الاصابة بهذه الامراض ومعدل الوفيات الناتجة عنها, تسهم بشكل فعال في توجيه الموارد والجهود الصحية و الارتقاء بمستوى الخدمات الطبية.

الهدف: ان الهدف من الدراسة هو تحديد معدل واسباب وخصائص الاطفال الذين تم ادخالهم لمستشفى البصرة العام ومعدل الوفيات بينهم.

الطريقة: تم استخدام دراسة سكانية مقطعيه باثر رجعي للاطفال الذين تم ادخالهم الى مستشفى البصرة العام خلال العام 2013 لمعرفة الاسباب الرئيسية للدخول الى المستشفى و معدل الوفيات بينهم .ولقد تم اعتماد السجلات الرسمية في وحدة الاحصاء الخاصة بردهة اطفال مستشفى البصرة العام لهذه الفترة كمصدر للمعلومات وقد اشتملت على المتغيرات التالية(العمر والجنس ونوع المرض والحالة النهائية للمريض) وتم تحليلها بيانيا باستخدام اساليب الاحصاء الوصفي الى جانب جدول تحليل البيانات انوفا.

النتائج :لقد بينت الدراسة ان حوالي 53.3% من الاطفال اقل من 13 شهر من العمر.وان 60% منهم كانوا ذكور. وكان السبب الرئيسي للرقود في المستشفى هو التهابات الجهاز الهضمي حيث شكلت نسبة 48.9% و يتبعها امراض الجهاز التنفسي بنسة 19.7% و التهابات المجاري البولية بنسبة 15.1%. كما اظهرت الدراسة ان نسبة الوفيات كانت 1.4% و معظمهم من الاناث(60.6%).واحتلت التعقيدات الناتجة عن التهابات المجاري البولية النسبة الاكبر ضمن اسباب الوفيات .

الاستنتاج :ان الامراض الانتقالية هي السبب الرئيسي لدخول الاطفال الى المستشفى و قد ادت مضاعفاته الى حدوث وفيات بينهم.ان الوقاية من هذه الامراض قد تؤدي الى الحد بنسبة كبيرة من اسباب الدخول الى المستشفى والتقليل من الوفيات الناتجة عنها .لذلك فاننا نوصي بعمل دراسات مستقبلية باستخدام بيانات مختبرية متخصصة لمعرفة مسببات الامراض للوقاية منها.

Introduction

Infection is the common cause of morbidity and mortality worldwide1. The cause and severity of infection depend on variety of factors, including the virulence of infecting organism, the resistance of the individual in addition to the social factor and the availability of medical facilities 1. Children living in the developing countries are particularly vulnerable to the impacts of infectious disease 2.

In Iraq the mortality of children below 5 years is one of the highest in the Middle East region 3. The leading cause of death among this age group was found to be infectious diseases 81.2%, followed by sudden death 8.9%, accidents 3.3% and 6.6% congenital malformation. Gastroenteritis was the leading cause of death among infants 49.8%, followed by respiratory diseases 26.6% 3.

Much international consideration originally attentive on the military and political consequences of the Gulf crisis, little attention, however, has concentrated on the resident population of Iraq as a whole and with special consideration on Basra. The war generally has widespread environmental and psychological impacts that last for long specially affecting children under the age of five years 4.

There are also many Social and economic changes which provoked a phenomenon known as epidemiologic transition which leads to dramatic changes in the prevalence of infectious diseases, the nutritional condition and decrease availability of primary health facilities. Those transformations, associated with changes in the demographic pattern, caused alterations in the morbidity and mortality rates of the population 5.A part from malignant diseases which regarded as the main cause of death among children in Basra 6, infectious diseases still have great health impact on these age groups 7.

The high frequency of hospitalizations due to diseases considered to be preventable, reflect both a lack of appropriate care delivery to certain groups of the population, as well as their poor life and health conditions. Hospital admission has special importance as it comes to represent the portion of health system that consumes the greatest amount of resources. Moreover, the information about rates and causes of hospitalization consider as important indicators for the quality of health services. 8.

Methodology

Study population

This is a cross –sectional retrospective study of in-patients admitted to Basra General Hospital from the period of January 2013 to December 2013 .The inclusion criteria included age of 17 years or younger and admitted to the pediatric department during that period. The study was proved by the ethical committee at the hospital.

Data collection

The data used are available in the statistical department and the document based on the medical report that filled at the time of hospitalization .The data were arranged using the official software of the Ministry of Health and are available according to month and year .After the selection of all hospitalization of children in the pediatric department (2474), demographical characters were confirmed and hospitalization diagnosis and outcome were classified.

Definitions of the study variables

The variables of the study were:
1. Dependent variables which include Age category (infant ,preschool, school) and Patients Outcome(improved, die, transferred to another hospital, discharged at the parent's request)
2. Independent variables which include Gender (male, female), Age in Months, and Diseases (gastroenteritis, heart diseases, urinary tract infection, epilepsy, anemia, meningitis, respiratory diseases, others).

Statistical Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version (21) software. The overall mortality rate was calculated from the total number of the admitted patients. Descriptive statistic and MANOVA (Multivariate Analysis Of Variance) were performed. A P value < 0.05 was considered statistically significant.

Table (1): Descriptive statistics for independent variables

Independent Variables	Numbers	(%)	Mean	Missing
Age In Months			27.55	13
<13	1312	53.3		
13-24	434	17.6		
25-60	396	16.1		
> 60	319	13		
Total	2461	100.0		
Gender			1.39	3
Male	1504	60.9		
Female	967	39.1		
Total*	2471	100.0		
Diseases			22.44	18
Gastroenteritis	1203	48.9		
Heart Disease	45	1.9		
Urinary Tract Infection	370	15.1		
Epilepsy	134	5.5		
Anemia	103	4.2		
Meningitis	32	1.3		
Respiratory Diseases	485	19.7		
Other Diseases	84	3.4		
Total	2456*	100.0		

Source: spss results *the difference between the sample size (n=2474) and the total sample size mentioned in the table is due to missing data.

Table (2) Descriptive statistics for Dependent variable

Dependent variables	Number	(%)	Mean	missing
Age category			1.637	13
	1312	53.3		
Infant	434	17.6		
	1312	53.3		
	319	13		
Preschool	2461	100.0		
	730	29.7		
	1504	60.9		
School	967	39.1		
	419	17.0		
Total	2461	100.0		
Outcome			1.24	30
	45	1.9		
Improved	370	15.1		
	1952	79.8		
Discharge at the parent's request	103	4.2		
	427	17.5		
	485	19.7		
Die	84	3.4		
	33	1.4		
Transferred to another hospital	32	1.3		
Total	2444*	100.0		

Source: spss results *the difference between the sample size (n=2474) and the total sample size mentioned in the table is due to missing data.

Results

A total of 2474 patients admitted to the Pediatric Department during the time period from January to December 2013 were enrolled. The demographic and clinical characteristics of the study population are presented in Table (1) and (2). Around 53.3% of the patients were under 13 months. More than half of the studied population was males (60%), with a male: female ratio was 1.5: 1. The most common cause of hospital admission was Gastroenteritis

(48.9%), followed by Respiratory diseases (19.7%) and Urinary Tract Infection (15.1%).

The mean of age category was 1.63 with more than 53.3% were infants, 29.7 % were preschool and 17.0% were school age. The mean of outcome was 1.24. The overall mortality rate was 1.4%. Around 79.8 % of patients were improved, 17.5% were discharge at the parent's request while 1.3% were transferred to other hospital.

Table (3) Distribution of death by diseases, gender, and age category

Character	Numbers.	(%)
Disease		
Gastroenteritis	3	9.6
Heart diseases	7	22.5
Urinary tract infections	9	29.0
Anemia	1	3.2
Meningitis	2	6.6
Respiratory diseases	7	22.5
Others	2	6.6
Total	31	100.0
Gender		
Male	13	39.4
Female	20	60.6
Total	33	100.0
Age category		
Infant	21	65.6
Pre School Age	6	18.8
School age	5	15.6
Total	32	100.0

Source: spss results *the difference between the number of dead cases (n=33) and the total sample size mentioned in the table is due to missing data

Table (3) shows more than half of death occurred among infants (65.6%). Around (18.8%) were preschool age and (15.6%) were school age. Nearly (60.6 %) were females and the complications of urinary tract infection were the most common cause followed by heart diseases and respiratory diseases

Table (4) Multivariate Tests

Effect		Value	F	Hypothesis Df	Error Df	Sig.
Intercept	Pillai's Trace	.536	2295.116	1.000	1990.000	.000
	Wilks' Lambda	.464	2295.116A	1.000	1990.000	.000
	Hotelling's Trace	1.153	2295.116	1.000	1990.000	.000
	Roy's Largest Root	1.153	2295.116	1.000	1990.000	.000
Age In Month	Pillai's Trace	.037	1.575	48.000	1990.000	.008
	Wilks' Lambda	.963	1.575	48.000	1990.000	.008
	Hotelling's Trace	.038	1.575	48.000	1990.000	.008
	Roy's Largest Root	.038	1.575	48.000	1990.000	.008
Diseases	Pillai's Trace	.024	7.005	7.000	1990.000	.000
	Wilks' Lambda	.976	7.005	7.000	1990.000	.000
	Hotelling's Trace	.025	7.005	7.000	1990.000	.000
	Roy's Largest Root	.025	7.005	7.000	1990.000	.000
Gender	Pillai's Trace	.000	.098	1.000	1990.000	.754
	Wilks' Lambda	1.000	.098	1.000	1990.000	.754
	Hotelling's Trace	.000	.098	1.000	1990.000	.754
	Roy's Largest Root	.000	.098	1.000	1990.000	.754
Age In Month * Diseases	Pillai's Trace	.153	1.775	202.000	1990.000	.000
	Wilks' Lambda	.847	1.775	202.000	1990.000	.000
	Hotelling's Trace	.180	1.775	202.000	1990.000	.000
	Roy's Largest Root	.180	1.775	202.000	1990.000	.000
Age In Month* Gender	Pillai's Trace	.020	1.045	38.000	1990.000	.395
	Wilks' Lambda	.980	1.045	38.000	1990.000	.395
	Hotelling's Trace	.020	1.045	38.000	1990.000	.395
	Roy's Largest Root	.020	1.045	38.000	1990.000	.395
Diseases * Gender	Pillai's Trace	.005	1.409	7.000	1990.000	.197
	Wilks' Lambda	.995	1.409	7.000	1990.000	.197
	Hotelling's Trace	.005	1.409	7.000	1990.000	.197
	Roy's Largest Root	.005	1.409	7.000	1990.000	.197

Ageinmonth * Diseases * Gender	Pillai's Trace	.084	1.466	124.000	1990.000	.001
	Wilks' Lambda	.916	1.466	124.000	1990.000	.001
	Hotelling's Trace	.091	1.466	124.000	1990.000	.001
	Roy's Largest Root	.091	1.466A	124.000	1990.000	.001

Table (5) Tests of Between-Subjects Effects

| Source	Dependent Variable	Type Iii Sum Of Squares	Df	Mean Square	F	Sig.
Corrected Model	Age Category	1378.771	428	3.221	.	.
	Patient Outcome	186.684	428	.436	1.741	.000
Intercept	Age Category	1252.330	1	1252.330	.	.
	Patient Outcome	575.146	1	575.146	2295.116	.000
Intercept	Age Category	1252.330	1	1252.330	.	.
	Patient Outcome	575.146	1	575.146	2295.116	.000
Age In Month	Age Category	501.767	48	10.453	.	.
	Patient Outcome	18.948	48	.395	1.575	.008
Diseases	Age Category	.000	7	.000	.	.
	Patient Outcome	12.287	7	1.755	7.005	.000
Gender	Age Category	.000	1	.000	.	.
	Patient Outcome	.025	1	.025	.098	.754
Age In Month * Diseases	Age Category	.000	202	.000	.	.
	Patents Outcome	89.865	202	.445	1.775	.000
Age In Month* Gender	Age Category	.000	38	.000	.	.
	Patient Outcome	9.956	38	.262	1.045	.395
Diseases * Gender	Age Category	.000	7	.000	.	.
	Patient Outcome	2.472	7	.353	1.409	.197
Age In Month * Diseases * Gender	Age Category	.000	124	.000	.	.
	Patient Outcome	45.547	124	.367	1.466	.001
Error	Age Category	.000	1990	.000		
	Patient Outcome	498.685	1990	.251		
Total	Age Category	7868.000	2419			
	Patient Outcome	4396.000	2419			
Corrected Total	Age Category	1378.771	2418			
	Patient Outcome	685.369	2418			

Source: spss results

Tables (4) and (5) show the Multivariate Analysis Of Variance (MANOVA). The F values for the independent variables in the model which include Gender, Age in Months and Diseases shown in table (4).The impact of independent variables on the dependent variable (patients outcome and age category) shown in table (5)

SPSS gives us four different approaches to calculate F value for MANOVA. All of them are used to test whether the means of the groups are from the same sampling distribution or not. We can choose any of them for interpretation.

The Pillai's Trace is the most preferred approach for the F value as this is the least sensitive to the violation of the assumption of the covariance of matrices. In this case the Pillai's Trace for the independent variable (Disease) is 0.024 with F value of 7.005.This is significant at 5% level as the P value is 0.000. The Pillai's Trace for (Gender and Age in Months) and the F values are 0.037(1.57) and0.000 (0.098) respectively. This is not significant as the P value is more than 0.05.

Since the pillai's Trace in table (5) shows significant result. It can be said that the impact of disease on the combination of both dependent variables (age category and patient outcome) is significant (P value is 0.000). Further, test of combination effects also shows significant result so the impact of independent variables (age in month and disease) on dependent variables (age category and patient outcome) is significant because the P value is less than 0.05.

Figure (1) the main causes of hospitalization with respect to the age category.
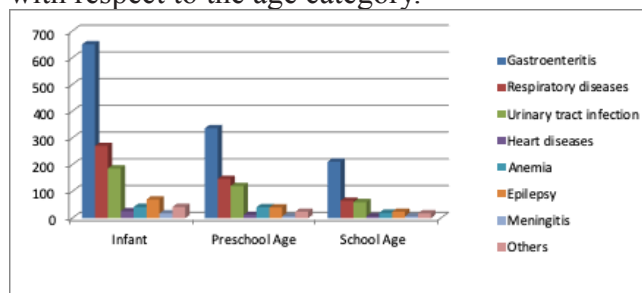
Source: spss results

Figure (1) shows the main causes of hospitalization with respect to the age category. Gastroenteritis was higher in infant than preschool and school age category.

Discussion

Much of the differences in the rate of child mortality and morbidity among communities are attributable to high rates of infectious illness 9. Children have habits that enable the propagation of diseases, they also have factors specific to their age such as an immature immune system, influencing towards infectious diseases 10

In the present study, Infectious diseases are recorded in children younger than 2 years, who are susceptible expected target age group with peak incidence in the age <13 months, and males have a significant higher rate than females these are similar to previous studies done in Basra 11,12.

The present study shows, Gastroenteritis was the first most frequent reason for hospitalization among infant than preschool and school age category. It accounting for 1203 (48.9%) of all admitted groups which is lower than the results of previous studies carried out in 1991in Hospitals in north of Iraq (Irbil, Kirkuk, and Sulaymaniyah) that shown the rates of gastroenteritis among admitted children used to be 91%, 78% and 84% respectively 13. The possible explanation of higher frequency of gastroenteritis in the previous studies is due to the fact that they had been take place before the introduction of Rota vaccine to the national immunization schedule in Iraq (2012).Globally; it was found that the main cause of hospitalizations and deaths among children is attributed to rotavirus infection 14.

A retrospective study conducted in two governmental hospitals of Tabuk city in KSA during the period from 2011 till 2015 found that gastroenteritis was the most common disease leading to hospitalization of children below the age of three years 15. Our study goes with these studies in blaming socioeconomic states as a main cause of hospitalization such as sanitation, nutrition, housing, and others that adversely promote infectious diseases

In the present study, Respiratory diseases are the second reason of hospitalization which represents 19.6% of admitted patients. Specific factors, such as the anatomical features of the respiratory system, along with life habits that predispose to exposure to infectious and irritating causes affecting the respiratory tract, clarify the vulnerability of the pediatric age group to respiratory diseases. In a previous study in Basra revealed a high incidence of respiratory diseases among young people, especially children < 5 years (40.4%) over the period September 1998 to March 2000 12. At the Rabat Children's Hospital, Morocco, out of 3537 hospitalized patients, 2493 (70.5%) had respiratory disease 16. An increase in the prevalence of respiratory diseases in the present study may be attributed to worsening air quality and climate conditions which agrees with previous studies.

In our study 15% of admission patients are due to genitourinary diseases. In developing countries, the national epidemiologic data on chronic kidney disease in the pediatric population is currently limited.17.The main factors that contribute to their occurrence are the anatomy of the genitalia and hygiene habits. In addition to that water pollution is a major global public health threat requiring greatly increased efforts in the areas of research and policy-making. Research on its health effects should be strengthened, particularly in relation to urinary tract infection. A more systematic approach to the development and evaluation of interventions is desirable, with clearer recognition of the interrelationships between poverty and dependence on polluting water 17.

In Iraq, Wartime damage to water treatment facilities has gone largely unrepaired. A fifth of urban households and more than half of rural households are without access to safe drinking water7.

Albuminuria is an early sign of possible damage to the kidney and is been used since the decade of the 1960s 18.I n Australia, a study reported the prevalence of albuminuria of 7.3% in Aboriginal and non-Aboriginal children. The socioeconomic level and geographical situation were discarded as risk factors, after a two-year follow up 19. From 2009–2011, in El Salvador, a study was carried on in 2115 children aged from 2–17 years, inhabitants in agricultural communities. The work reported prevalence of albuminuria up to 3.8 for both gender20.

The world made considerable progress in dropping child mortality in the past few decades.

Internationally, the under-five mortality rate dropped from 90 deaths per 1,000 live births in 1990 to 46 in 2013 21.The overall mortality rate in the pediatric ward during this study was 1.3 percent which compares with the overall age stander mortality rate (8.7%) in Basra in 2007 6 , and 15% in Tanzania in 2008 22. Targeted interventional programmers aimed at infectious diseases, coupled with a comprehensive primary health care system, would most likely result in much less morbidity and mortality for the children in Basra.

In the present study the effect of age (in month) and disease are significant association with patient's outcome. Measures to reduce mortality and morbidity through interventions directed to children younger than five years of age include: immune prevention actions, appropriate care provided to women during pregnancy and childbirth and to newborns, appropriate diagnosis and treatment and health promotion. Therefore, it is expected that the occurrence of hospitalizations due to avoidable causes will be controlled and in decline in cities with planed health care systems where outpatient care is appropriate and accessible to the population23.

The limitations of this study are related to the reliability of the information obtained and the system is filled in a decentralized way. However, in several localities the secondary data sources have been used to study hospitalization in large population including children.

Conclusion

Infectious diseases were the main cause of hospitalization among Basra children and might lead to death. A substantial proportion of this morbidity and mortality is probably attributable to preventable causes. Prospective surveillance using microbiological data is needed to delineate the organism-specific burdens.

Acknowledgement

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