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Original Research Article

Epidemiology of Rotavirus Infection in Children Less than Five Years in Omdurman Paediatric Hospital, Khartoum, Sudan

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Abstract

Objective: Our objective is to study epidemiology of rotavirus infection in children less than five years during one year in Omdurman Paediatric Hospital.

Materials and Methods: The study design was a setting-based study. The required data were obtained by reviewing records of a year in the hospital.

Results: The findings revealed that, the total cases of rotavirus infection was 1563, majority of cases occurred among age group 1-12 months 642(41%). About 899(57.5%) of cases were males while 664(42.5%) were females. High percentage 520(33.3%) of diagnosed children came from Umbda. Most of rotavirus cases occurred during April168 (10.7%) and May 158(10.1%), Mild dehydration was found in 1121(71.7%) of cases while 320(20.5%) of patients suffered from severe dehydration. Oral rehydration therapy (ORT) were given to 1120(71.7%) of patients as treatment, intravenous fluids (IVF) to 334(21.3%) and ORT & IVF to 109 (7%). A lot of cases 1110(71%) were improved after received the treatment, 9(0.6%) were died and the rest were still suffering from the clinical features.

Conclusion: The study concluded that rotavirus represents a public health problem among children less than five which and effective control measures are needed to minimize this problem.

Keywords: epidemiology, rotavirus, diarrhea, children, Sudan

1.Introduction

Rotavirus is member of the genus rotavirus, family Reoviridae, and it is important causative agent of acute gastroenteritis in children and in many young animal species worldwide [1]. There are five species of this virus, referred to as A, B, C, D, and E. Rotavirus A, the most common species, causes more than 90% of infections in humans [2].

It has been estimated that, rotavirus infections caused 25 million clinical cases, 2 million hospital admissions and about 611,000 deaths annually worldwide in children, most of them occurred in developing countries [3]. Magzoub *et al* (2013) mentioned that about 82% of rotavirus deaths occurred among children in the poorest countries [4]. The disease causes many symptoms mainly diarrhea, nausea, malaise, headache, abdominal cramping, fever and vomiting, however the infection can be symptomless sometimes [5].

The World Health Organization (WHO) has encouraged the introduction of a rotavirus vaccine into national immunization programs, particularly in poorer countries [6]. Pre-vaccine surveillance to estimate the burden of rotavirus disease, prevalent rotavirus genotypes, and association between rotavirus disease and intussusceptions helps in monitoring the impact of vaccination [7].

Poor quality of living mainly unclean drinking water leads to spread of rotavirus resulted in epidemics in many countries worldwide [8]. In Sudan, rotavirus has been considered as important causative agents of diarrhea among children less than five years, particularly among displaced children who

are living in camps around towns where there is unhealthy condition[9]. People in peripheral areas around Khartoum are still living in poor environment and depend on contaminated water and food. Therefore rotavirus infection is predicted to be more prevalent as well as other sanitation-related diseases unless improvement of water supply and sanitation takes place.

2. Materials and Methods

2.1. Study Area

The study was conducted in Omdurman pediatric hospital, the largest children's hospital in Sudan. Its capacity is up to 320 beds, receives a daily average of patients from 500 to 800. The hospital is located in central of Omdurman town and serving a large catchment area. People from peripheral area, where they are suffering from lack of essential health services, come to this hospital to treat their children from different diseases.

2.2. Study population

The study population includes children less than five years old who were attending Omdurman paediatric hospital and diagnosed as rotavirus suspected cases during one year.

2.3. Data collection Methods

Relevant data such as gender, age, residence, dehydration status, time of diagnosis, management, were collected from records of the one year from January to December.

3. Results

There were 1563 of rotavirus cases recorded during one year in Omdurman Paediatric Hospital. In table one, about 899(57.5%) of cases were males while 664(42.5%) were females. Table 2 shows that most of cases occurred among age group 1-12 months 642(41%), 13-24 months 558(35.7%), 2-5 years 359(23%), and lower age group < months (0.3%). Table 3 shows that most of patients live in Umbda 520(33.3%), 366(23.4%) of patients live in Omdurman, and 434(27.8%) lives in Karary.

Figure (1) shows that higher percentage of rotavirus cases occurred during April168 (10.7%) and May 158(10.1%), while October witnessed the lower percentage of cases 74(4%). About 1121(71.7%) were suffering from mild dehydration while 320(20.5%) of patients suffered from severe dehydration as displayed in table 4. In table 5, ORT was given to 1120(71.7%) of patients as treatment, IVF to 334(21.3%) and ORT & IVF to 109 (7%). After management, 1110(71%) were improved, 9(0.6%) were died and the rest were still suffering from the clinical features.

Table 1: Gender distribution of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Gender	No	%
Male	899	57.5%
Female	664	42.5%
Total	1563	100

Table 2: Age distribution of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Age	NO	%
< Months	4	0.3%
1-12 months	642	41%
13-24 months	558	35.7%
(25-59 months) 2-5 years	359	23%
Total	1563	100

Table (3): Place distribution of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Residence	NO	%
Omdurman Centre	366	23.4%
Karary	434	27.8%
Umbda	520	33.3%
Other	243	15.5%
Total	1563	100

Figure 1: Time distribution of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

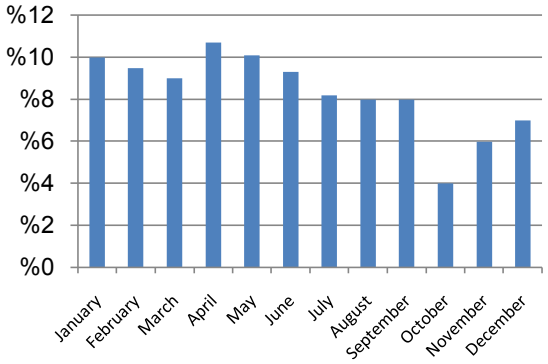

Table 4: Dehydration status of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Dehydration status	No	%
Severe	320	20.5%
Mild	1121	71.7
None	122	7.8%
Total	1563	100

Table 5: Management of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Type of management	No	%
ORT	1120	71.7%
IVF	334	21.3%
ORT & IVF	109	7%
Total	1563	100

Table 6: Management outcome of Rotavirus recorded cases during one year in Omdurman Paediatric Hospital. (n=1563)

Outcome	NO	%
Improved	1110	71%
Died	9	0.6%
Still suffering	444	28.4%
Total	1563	100

4. Discussion

Rotavirus is a reason for hospitalization. It is prevailing in areas where the sanitation and drinking water supply are unhygienic. Children usually are vulnerable group to many infectious diseases. They are being the first victims of any contamination of water and food. Our study was done about recorded cases of rotavirus among children less than five years. There were 1563 of rotavirus cases recorded during one year among children less than five in Omdurman Paediatric Hospital. Children are usually vulnerable; they are more exposed to the risk of rotavirus infection. In a study conducted in Ghana on prevalence of severe acute rotavirus gastroenteritis during two years of the study, 16,348 children younger than five years were hospitalized, and 13.1% (2147) of these cases were due to acute gastroenteritis [7].

Also the findings illustrated that male children were more infected with rotavirus than females; however there is no significance to biological or behavioral differences. Approximately, 57.5% of rotavirus cases were males. It is similar to data obtained from Iran that 57.8% of rotavirus cases were males [10]. In a study conducted in different hospitals in Sudan, Magzoub *et al* found that 65.3% of studied children were males [4]. In the present study most of cases (41%) occurred among age group 1-12 months, it is similar to data obtained in Oman that most of rotavirus positive cases were at 7-12 months of age [8]. Also Erin *et al* mentioned that 65%–85% of children hospitalized due to rotavirus disease in the first year of life [11].

It has been found that a lot of patients (33.3%) live in Umbda province where bad sanitation and unsafe drinking water are public health problems. These factors are usually associated with spread of rotavirus infection.

According to time distribution, most of rotavirus cases occurred during April168 (10.7%) and May 158(10.1%), it may attributed to the hot weather which usually induces increase needs for drinking water despite the scarcity of water and the high probability of contamination. However, Erin *et al* (2004) reported that rotavirus generally exhibited a winter seasonal peak in both temperate and tropical climates. While, Isidore *et al* in Burkina Faso mentioned that rotavirus-associated diarrhoea occurred mostly during the season from December to April (dry season) [12].

About 1121(71.7%) were suffering from mild dehydration while 320(20.5%) of patients suffered from severe dehydration which is one of serious complication resulted from rotavirus due to diarrhea. Siddique *et al* found that severe dehydration was detected in 16% [13]. Due to seriousness of the disease, patients usually are hospitalized to receive some drugs under medical supervision in the admission ward and according to the policies followed in the hospital. Most of patients were managed by oral rehydration therapy (ORT) and intravenous fluids (IVF) to replace the lost water that excreted with continuous diarrhea and vomiting. This measure is usually effective to treat rehydration but it is not intended as treatment of rotavirus. The results showed that oral rehydration therapy (ORT) and intravenous fluids led to high percentage of improvement among infected children.

5. Conclusion

Rotavirus represents a public health problem among children less than five. There were considerable number (1563) of recorded cases of rotavirus during one year in Omdurman Paediatric Hospital, males were more infected than females and majority of cases were children less than one year. High percentages of cases were found in April and May.

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