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Original Research Article

Seroprevalence of Rotavirus among Selected Group of Sudanese Children

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Abstract: Rota virus is the second causes of diarrhea among childrenIn Sudan [2]. The current study was conduct to detect rotavirus gastroenteritis among vaccinated children ***Methodolgy*:** A total of59 diarrheal samples was collected from children with acute diarrhea admittedto Mohammed AL Amin Hamid paediatric Hospital throw period from October to November 2019, ELISA was dine to detect Rota virus antigen. ***Result*:** Out of 59 samples 84.7% was vaccinated were 15.3% was unvaccinated.in total of 50 vaccinated children 30% is re-infected with rota virus with acute to chronic illness and show positive antigen with ELISA. ***Conclusions***: vaccinated children is infected with rota virus and symptoms is occurs samples for virus antigen was record positive result in ELISA this may related to other genotype or serotype or mutation**.**

Keywords: Seroprevalence, Rotavirus, Children, Sudan**.**

INTRODUCTION

Rotavirus infection is the most common cause of acute gastroenteritis globally in children under 5years of age and is responsible for approximately 5% of all child deaths yearly [1]. In Sudan rotavirus was the second causes of diarrhea among children [2].

Rotaviruses are non-enveloped RNA viruses There are five species of this virus termed as A, B, C, D and E. Rotavirus [3]. Human serotypes group A rotavirus (RV) is the major etiologic agent of viral gastroenteritis and is responsible for 29 to 45% of hospitalizations worldwide [4]. The outer capsid layer of rotavirus consists of two structural proteins and they were VP4 and VP7. Based on the VP7 and VP4 gene sequences rotaviruses are classified into the (G) and (P) respectively. At present 27 G genotypes and 35 P genotypes have been discriminated so far [5].

The monovalent rotavirus vaccine (Rotarix® GSK Biologicals, Rixensart) was introduced into the most populous state (Khartoum) in Sudan on July 2011 [6]. Two rotavirus vaccines, Rotarix, a monovalent human rotavirus vaccine and RotaTeq, a pentavalent bovine-human reasserting vaccine have been licensed for use in several countries With evidence of their high efficacy and safety in Americas, Europe, Australia and also in low income countries, World Health Organization (WHO) has recommended their inclusion in primary immunization programs globally [7].

In 2006, RotaTeq, a live, oral, human-bovine reasserting rotavirus vaccine produced by Merck and Company (Whitehouse Station, New Jersey) was recommended by the Advisory Committee on Immunization Practices (ACIP) for routine vaccination of U.S. infants. Three doses of this vaccine are recommended to be administered at 2, 4, and 6 months of age, concurrently with other vaccines given at this age. 2 RotaTeq contains 5 reasserting rotaviruses developed from human and bovine parent rotavirus strains that express human outer capsid proteins of 5

common circulating strains (G1, G2, G3, G4, and P [8] [subgroup P1A [8].

In 2008, ACIP recommended that Rotarix (produced by GlaxoSmithKline Biological, Rixensart, Belgium), be used for routine vaccination of U.S. infants. This live vaccine contains the attenuated monovalent G1, P [8] human rotavirus strain and is recommended by the manufacturer to be orally administered in 2 doses to infants at 2 and 4 months of age. In a large clinical trial of more than 63,000 infants from 11 Latin American countries, Rotarix was found to be safe and highly immunogenic. During the first year after vaccination, the efficacy (as defined by the Vesikari 20-point scoring system) of 2 doses of Rotarix against hospitalization due to severe rotavirus was 85% and 100% against more severe rotavirus gastroenteritis [8].

Gastroenteritis due to rotavirus is characterized by vomiting, fever and watery diarrhea, and occasionally leads to severe dehydration and death. Man is the only reservoir of infection and transmission occurs by the faecal–oral route [4].

A total of 755 stool samples were collected from Sudanese children with less than 5 years of age presenting with acute gastroenteritis during the period from April to September 2010. Enzyme-linked immunosorbent assay (ELISA) was used to Detection of Rotavirus antigens. Out of the 755 stool samples from children with acute gastroenteritis, 121 were positive for rotavirus [9].

In other study a total of 365 children aged 3–24 months presenting with acute diarrhea at Kenya hospital were recruited from August 2016 to April 2017. Majority of the children (96.7%) had received rotavirus vaccinations. The overall rotavirus prevalence was 14.5% and was higher among 17–24 months at 19.5%. A half of the children had severe acute diarrhea and there were some differences in severity by child/mother characteristics [1].

Rotavirus disease is the single most important cause of severe gastroenteritis in children throughout the world. Basic epidemiological data concerning rotaviruses among infants and childrenare necessary for health planners and care providers in Sudan. Several Sudanese researchers study the frequency of rotavirus among children but This is the first study in Sudan that achieve to study the Responsiveness of rotavirus vaccine.

OBJECTIVES

General Objective

Study the Responsiveness of rotavirus vaccine (Rotarix® GSK Biologicals, Rixensart) among children in Mohammed AL Amin Hammed pediatric Hospital from October to November 2019.

Specific Objective

To assess the Frequency of Rotavirus gastroenteritis in Children Vaccinated Against Rotavirus in Mohammed AL Amin Hammed pediatric Hospital from October to November 2019.

To justify why children get acute gastroenteritis after they receive vaccine.

MATERIALS AND METHODS

Study Design

This iscross sectionalstudy.

Study area

This study is conducted in Mohammed AL Amin Hamid paediatric Hospital during the year 2019.

Study populati

Children (less than 5 years) vaccinated against rotavirus with acute diarrhea In mohammed al amin pediatric hospital.

Sample Collection

Fecal sample was collected from children (less than 5 years) vaccinated against rotavirus with acute diarrhea in mohammed alamin hamed pediatric hospital.

Sample size:

Samples collect from October to November 2019.

Sample type: Diarrheal specimen was collect.

Inclusion criteria

Children vaccinated against rotavirus (less than 5 years) with acute diarrhea

Data collection

Data collect by using questionnaire

Ethical consideration

Proposal was Approval from university, Khartoum state ministry of health research department, and Mohammed AL Amin Hamid paediatric Hospital.
Research purpose and objectives will be explained to participant in clear simple words.
Participant has right to volantry informed consent.
Participant has right towithdrow at any time without any deprivarion.
Participant has right toharm (privacy and confidentiality by using coded questionair)
Participant has right to benefit from the research knowledge and skills.

Procedure

1. Open the foil pouch, remove the required number of microplate strips and place into a microplate strip holder. Use one well for the Negative Control and one well for the Positive Control. If using less than 8 wells break off

2. Add 2 drops (or 100 µl) of each diluted specimen, Negative Control or Positive Control to the separate microwells. At least one Negative Control and one Positive Control should be included in each batch of tests.
3. After addition of all specimens and controls, add 2 drops (or 100 µl) of Conjugate to each microwell.
4. Cover the plate and incubate the microwells at 20-30°C for 60 ± 5 minutes.
5. Shake out or aspirate the contents of the wells. Wash by completely filling each well with diluted Wash Buffer (~350-400 µl per well). Shake out or aspirate all fluid from wells after each wash. Wash a total of 5 times. After the last wash remove contents and strike plate on clean paper towels or aspirate. If using an automated washer, this should be programmed to complete 5 wash cycles. Washers must be correctly calibrated to ensure complete filling and emptying of microwells between each wash. After the final wash, the plate should be inverted and tapped on absorbent paper to remove the last traces of wash buffer.
6. Add 2 drops (or 100 µl) of Substrate to each microwell.
7. Cover the plate and incubate the microwells at 20-30°C for 10 minutes.
8. Stop the Substrate reaction by adding 2 drops (or 100 µl) of Stop Solution to each microwell. Ensure thorough mixing of the microwells before reading the results. The coloured product is stable for up to 30 minutes after addition of Stop Solution.
9. Read spectrophotometrically at 450 nm.

Spectrophotometric Determination

The microwells should be read photometrically within 30minutes of addition of the Stop Solution. Mix the contents of the microwells and read theabsorbance of each microwell using a spectrophotometerset at 450 nm. Ensure the bottoms of the microwells areclean before reading. The reader should be blanked on airbefore the plate is scanned. If the spectrophotometer allows for the use of a reference wavelength (at 620 to 650 nm), dual wavelength reading should be performed. Calculate thecut-off value by adding 0.200 absorbance units to the Negative Control value, or mean value when more than one Negative Control is included. The Negative Control value, or mean of the Negative Controlvalues, should be less than 0.150 absorbance units. The Positive Control value must be greater than 0.500 absorbanceunits.

Interpretation of the test results

Positive: clinical sample absorbance value > the cutoff value.

Negative: clinical sample absorbance value < the cutoff value. Equivocal: clinical sample absorbance value within 0.010 absorbance units of the cut-off value. These samples should be retested or the patient resampled.

RESULT

Frequencies of vaccinated children and unvaccinated:

Out of Fifty nine diarrhea sample collected from children who admitted to Mohammed AL Amin Hamid paediatric Hospital 84.7% was vaccinated were 15.3% was unvaccinated.

Child status	Frequency
Vaccinated	**50 (84.7%)**
Unvaccinated	**9 (15.3%)**
Total	**59 (100%)**

Out of 50 vaccinated children ELISA result was confirmed 15 positive results, where 6 positive samples are out of 9 unvaccinated children.

	ELISA result		Total
	Positive	Negative	
Vaccinated	**15(30%)**	**35 (70%)**	**50**
Unvaccinated	**6 (66.7%)**	**3 (33.3%)**	**9**
Total	**21**	**38**	**59**

Morbidity and Mortality

All patient was symptomatic with acute diarrhea, only on unvaccinated child has died due to dehydration.

	Symptoms	Death	Total
	Symptomatic		
Vaccinated	**50**	**0**	50
Unvaccinated	**9**	**1**	9
Total	**59**	**1**	59

4. DISCUSSION

Diarrheal disease is considered to be the most important cause of infant morbidity in SudanAbbas MM, Eldin BN *et al*., 2016, conducta cross sectional hospital based study of rotavirus prevalence in Sudan, and the results show that the prevalence of Rota virus is increase early which (16%) in this study in 2017 and (30%) in the current study [9].

Pérez-Ortín, R., Santiso-Bellón, C., Vila-Vicent, S *et al*., 2019 was conducted study in Spain to study rotavirus symptomatic infection among unvaccinated and vaccinated children which conclude that the vaccinated and unvaccinated had infected by rotavirus which support our study result [10].

CONCLUSIONS

This study is Sudanese study conducting in mohammed alamin hamed pediatric hospital found (84.7%) of children under 5 years is vaccinated against rot virus and (15.3%) is unvaccinated, in total of 50 vaccinated children 30% is re-infected with rota virus with acute to chronic illness and show positive antigen with ELISA, Which indicate for other genotype or

mutation among virus. Death is recorded among one unvaccinated children with positive ELISA result.

RECOMMENDATION

Further researches based on genetic and sequencing for detect other genotype or mutation in Rota virus in Sudan.

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