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Research Article

Incidence of Rotavirus Among Children with Diarrhoea Attending Hasiya Bayero Pediatric Hospital, Kano State, Nigeria

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Abstract

Rotavirus is the most common cause of diarrhoeal disease among infants and young children. It is a genus of double-stranded RNA viruses in the family Reoviridae. According to literatures, nearly every child in the world is infected with rotavirus at least once by the age of five. The study was carried out to determine the incidence of Rotavirus among children (0 - 5years) suffering from diarrhoea attending Hasiya Bayero Pediatric Hospital, Kano state. Two hundred and ninety-nine children within ages 0 - 5 years who were at Hasiya Bayero Pediatric Hospital, Kano, at the time of the study were enrolled in the study. Diarrhoea samples were obtained following parental consent and ethical approval from the medical research ethics committee of the hospital. The stool samples were collected aseptically in sterile commercial stool containers adequately labeled (patient ID and date of collection) and were transported in ice to the Center for Biotechnology Research, Bayero University Kano where they we restored at −200C until tested. The presence of Rotavirus was detected using RDT and ELISA (IgM) in the stool samples. Rotavirus (IgM) was detected in 22 of the 299 subjects giving an incidence of 7.4% using ELISA. The RDT kit detected Rotavirus in 45 of the 299 subjects giving an incidence of 15.1%. Female subjects had higher incidence (51.1%) compared to male subjects (48.9%). Subjects in age group 13-24 months old had the highest incidence of Rotavirus (5.0% and 3.7%) while subjects in age group 25 - 36 months old had the lowest percent positive (0.7% and 0.3%) for RDT and ELISA respectively. The socio-demographic variables associated with the incidence of Rotavirus in this study were mother's level of education, breastfeeding practices and method of water storage. ELISA test kit was found to be more specific and sensitive when compared with Rapid test kit used in this study in detecting Rotavirus. It is recommended that mothers should be educated through their anti-natal and post-natal clinics on the process of avoiding the infection through effective hygiene especially when babies are between 0-5years old especially 13 - 24 months and the detection of Rotavirus among diarrhoea patients should focus more on the use of ELISA instead of RDT.

Keywords: Rotavirus; Diarrhoea; Children

Abbreviations

ELISA: Enzyme Linked Immunosorbent Assay; RDT: Rapid Diagnostic Test; RNA: Ribonucleic Acid

Introduction

Rotavirus is the most common cause of diarrhoeal disease among infants and young children [1]. It is a genus of double-stranded RNA viruses in the family Reoviridae. Nearly every child in the world is infected with rotavirus at least once by the age of five [2]. Immunity develops with each infection, so subsequent infections are less severe; adults are rarely affected [3]. There are nine species of this virus, referred to as A, B, C, D, E, F, G, H and I. Rotavirus A, the most common species, causes more than 90% of Rotavirus infections in humans.

The virus is transmitted by the faecal-oral route. It infects and damages the cells that line the small intestine and causes gastroenteritis (which is often called "stomach flu" despite having no relation to influenza). Although Rotavirus was discovered in 1973 by Ruth Bishop and her colleagues by electron micrograph images [4] and accounts for approximately one third of hospitalizations for severe diarrhoea in infants and children [5]. In addition to its impact on human health, Rotavirus also infects animals, and is a pathogen of livestock [6].

In the United States, before initiation of the Rotavirus vaccination programme, Rotavirus caused about 2.7 million cases of severe gastroenteritis in children, almost 60,000 hospitalizations, and around 37 deaths each year [7]. Following Rotavirus vaccine introduction in the United States, hospitalization rates have fallen significantly [8,9]. Public health campaigns to combat Rotavirus focus on providing oral rehydration therapy for infected children and vaccination to prevent the disease [10]. The incidence and severity of Rotavirus infections has declined significantly in countries that

have added Rotavirus vaccine to their routine childhood immunization policies [11-13].

Statement of research problem

Rotavirus infections have been recognized as a common cause of acute gastroenteritis in humans and animals and are the most important cause of severe dehydrating diarrhoea in young children in both developed and developing countries [14,15]. Rotavirus is highly communicable, with a small infectious dose of less than 100 virus particles [16]. It is shed in the stool at high concentration and transmission is through faecal-oral route, either person-to-person or through fomites in the environment. Rotavirus is common, accounting for 35–60% of acute severe diarrhoea in children <5 years of age in countries without rotavirus vaccine, with the highest attributable percentage in infants [17]. Rotavirus diarrhoea is ubiquitous and, unlike bacterial diarrhoea, is not more prevalent in settings with poor water, sanitation and hygiene. Rotavirus has a case-fatality rate (CFR) of approximately 2.5% among children in developing countries who present to health facilities [17]. Rotavirus infection is not routinely diagnosed in most Nigerian hospitals probably due to the cost of the diagnosis and the clinical spectrum of signs and symptoms are similar to other gastroenteritis. Also, certain environmental, climatic, sanitary and behavioral factors are associated with the infection.

Justification

Due to lack of information on the epidemiology and genetic characteristics of the circulating human Retrovirus in most of the developing nations of which Nigeria is not an exception there is therefore need for researchers to intervene in finding lasting solution. This will be crucial to guide control and prevention strategies so as to ensure that Rotavirus infection is reduced.

The aim of this study was to determine the incidence of Rotavirus among children suffering from diarrhoea attending Hasiya Bayero Pediatric Hospital, Kano state.

The objectives of the research are:

1. To detect of Rotavirus among children suffering from diarrhoea by Rapid Diagnostic Test (RDT).
2. To determine the occurrence of Rotavirus Immunoglobulin M (IgM) among children suffering from diarrhoea.
3. To establish the relationship between socio-demographic factors and Rotavirus infection in children (0-5 years) with diarrhoea.

Materials and Methods

Study area

The study was conducted at the Center for Biotechnology Research, Bayero University Kano.

Study design

This cross sectional study included children under five years with diarrhea attending Hasiya Bayero Pediatric Hospital and the incidence of Rotavirus among diarrhoeic children was established.

Study population

Study population involved children under five years with diarrhoea at Hasiya Bayero Pediatric that had not taken antimicrobial drugs. Information regarding sex, age, onset of diarrhoea and other relevant clinical information were obtained. Diarrhoea case was defined as three or more liquid or semi-liquid stool defecation per day. Sex matched concurrent healthy children who had no diarrhoea complain during previous month and were not on antimicrobial drugs for 1 week were included in this study as control group.

Sample size determination

The prevalence of Rotavirus among children of 5 years and below with diarrhoea in Sokoto state has been hypothesized to be approximately 25.5% (Alkali., *et al*. 2016). To obtain the same prevalence with an error of 5% and 95% confidence level, the minimum estimated sample size was 292 using Open EPI V. 2.3 although 299 samples were collected.

Sample collection

Diarrhoea samples were collected from diarrhoeic children less than 5 years of age presented at the study hospital. The samples were obtained following parental consent and ethical approval from the medical research ethics committee of the hospital. The stool samples were collected aseptically in sterile commercial stool containers adequately labeled (patient ID and date of collection) and were transported in ice to the Center for Biotechnology Reasearch, Bayero University Kano where they we restored at −200C until tested.

Preparation of 10% stool suspension

The stored stool specimens were retrieved after freeze thawing and a 10% stool suspensions were prepared by pipetting 1.5mL of supply specimen preparation buffer (included in the kit).

Rapid diagnostic test (RDT)

Stool samples collected from diarrhoeic children were tested using Feacal Rotavirus Antigen Rapid Test Kit by which the cap of the specimen collection tubes were unscrewed and then the collection applicators were swabbed into the feacal specimens in 3 places to collect about 50mg of feaces. The caps were then tightened onto the specimen collection tubes and shook vigorously to mix the specimen with the extraction buffer. The pouches were brought to room temperature before opening as they were stored in a refrigerator at 20^0C and used within one hour. The specimen collection tubes were held upright, unscrewed and inverted and 2 drops of the extracted specimen was dropped onto the specimen wells of the test devices

the timer was started and the result was read after 10 minutes of dispensing the specimen. Where two distinct red lines appeared on the test device, one on the control line region (C) and one on the test line region (T) was recorded as positive (+). The intensity of the red line in the test line region varied from one test device to the other indicating the concentration of Rotavirus antigen in the specimen. Therefore, any shade of red color in the test line region was considered positive. Where one line appeared at the control line region (C) and no line at the test line region (T) was recorded as negative (-).

Detection of rotavirus antigen by IgM ELISA

Rotavirus antigens in stool samples were detected by a commercially available Rotavirus IgM ELISA kit according to the Rotavirus test instructions below:

- 20× wash solution was prepared by diluting with deionized water 1:20. All standards and samples were added in a micro strip plate before transferring to the Micro ELISA Strip plate.50µl positive control and 50µl negative control were separately added to the positive and negative well, 10µl testing samples were added, then 40µl sample diluents was added to testing sample wells. Nothing was added to the blank well.100µl of HRP-conjugate reagent was added to each well, covered with an adhesive strip and incubated for 60 minutes at 37°C. Each well was aspirated and washed; the process was repeated four times for a total of five washes. Washing was done by filling each well with wash solution (400µl) using a squirt bottle. Liquid was completely removed at each step to ensure good performance. After the last wash, remaining wash solution was removed by decanting. The plate was inverted and blotted against clean paper towels.50µl of chromogen solution A and50µl chromogen solution B were added to each well, gently mixed and incubated for 15 minutes at 37°C and protected from light. 50µl Stop Solution was added to each well. The color in the wells changed from blue to yellow. The optical density (O.D.) was read at 450 nm using a micro titer plate reader within 15 minutes.

Identification of rotavirus among children suffering from diarrhoea by rapid diagnostic Test (RDT)

Of the total number of 299 diarrhoea cases investigated the RDT detected a total of 45 or 15.1%. Table 1 below shows the distribution of the cases by age classification of the subjects.

Positive cases of Rotavirus were more common among the subjects who were between 1 and 12 months old. Of the 45 cases detected from the total 28 were within the age of 1 to 12 months. Subject who were between 13 to 24 months were next in the prevalent rate with 15 out of the 45 cases detected with the RDT. Only 2 cases were found among subjects within the age range of 25 to 36 months and no positive case was detected among subjects above 36 months. In the overall, the RDT detected 45 (15.1%) positive cases out of the 299 subjects suffering from diarrhoea that were involved in the study.

Age range of subjects	Positive		Negative		Total	
	Freq	%	Freq	%	Freq	%
1-12months	28	9.4	94	31.4	122	40.8
13-24months	15	5.0	113	37.8	128	42.8
25-36months	2	0.7	30	10.0	32	10.7
37-48months	0	0.0	12	4.0	12	4.0
47-60months	0	0.0	5	1.7	5	1.7
Total	45	15.1	254	84.9	299	100.0

Table 1: Distribution of Subjects by Incidence of Rotavirus with RDT.

Determination of occurrence of rotavirus immunoglobulin M (IgM) among children suffering from diarrhoea by enzyme linked immunosorbent assay (ELISA)

The positive cases detected with the Enzyme Linked Immunosorbent Assay among the total subjects involved in the investigation are distributed along the age grouping in table 2.

Age range of subjects	Positive		Negative		Total	
	Freq	%	Freq	%	Freq	%
1-12months	10	3.3	112	37.5	122	40.8
13-24months	11	3.7	117	39.1	128	42.8
25-36months	1	0.3	31	10.4	32	10.7
37-48months	0	0.0	12	4.0	12	4.0
47-60months	0	0.0	5	1.7	5	1.7
Total	22	7.4	277	92.6	299	100.0

Table 2: Distribution of Subjects by Incidence of Rotavirus with ELISA.

Of the total subjects involved in the study, the Enzyme Linked Immunosorbent Assay detected 22 positive cases (sample OD ≥ 0.243). For the ELISA detection, subjects within the 13 to 24 months' age range were more and were only followed by those below 13 months. Only one positive case was detected with ELISA among subjects who were between 25 and 36 months. No positive case was detected among subject who were above 36 months in age. In the overall, ELISA confirmed 7.4% of positive cases of Rotavirus among the subjects.

Relationship between socio-demographic factors and rotavirus infection in children (0-5 years) with diarrhoea

A test of association between incidence of Rotavirus among the subject with diarrhoea and the selected socio-demographic variables of the subjects is presented in table 3. The table shows the extent of association denoted with chi-square (X2) and level of significance (p-value).

Age of subjects	Positive		Negative		X^2	df	p-value
1-12months	28	23	94	77	12.018	4	0.017
13-24months	15	11.7	113	88.3			
25-36months	2	6.3	30	93.8			
37-48months	0	0	12	100			
47-60months	0	0	5	100			
Total	45	15.1	254	84.9			
Gender							
Male	22	13.8	138	86.3	.455	1	0.500
Female	23	16.5	116	83.5			
Total	45	15.1	254	84.9			
Mother's level of education							
No formal Education	4	11.4	31	88.6	8.743	3	0.033
Primary	15	10.1	134	89.9			
Secondary	20	23.8	64	76.2			
Tertiary	6	19.4	25	80.6			
Total	45	15.1	254	84.9			
Breast Feeding practices							
Exclusive Breast Feeding	31	21.4	114	78.6	10.383	2	0.006
Breast Feeding and bottle feeding	11	12.1	80	87.9			
Stopped Breast feeding	3	4.8	60	95.2			
Total	45	15.1	254	84.9			
Do you wash your hand after child defecation?							
Yes	34	13.8	213	86.2	1.834	1	0.176
No	11	21.2	41	78.8			
Total	45	15.1	254	84.9			
Source of drinking water							
Tap	33	15.2	184	84.8	0.876	3	0.831
Well	6	14.3	36	85.7			
River	1	33.3	2	66.7			
Others	5	13.5	32	86.5			
Total	45	15.1	254	84.9			
Method of water storage							
Open container	2	9.5	19	90.5	7.579	2	0.023
Jerry can with cover	28	21.5	102	78.5			
Drum with lid	15	10.1	133	89.9			
Total	45	15.1	254	84.9			
Do you treat your water before drinking?							
Yes	9	8.7	94	91.3	4.897	1	0.027
No	36	18.4	160	81.6			
Total	45	15.1	254	84.9			

Table 3: Test of Association between Incidence of Rotavirus and Socio-demographic Variables of the Mothers.

As revealed in table 3 below, there is a significant association between subjects' ages and the incidence of Rotavirus among the subjects. The observed level of significance is 0.017 ($p < 0.05$). As shown in the positive cases, subjects of lower ages were more disposed to positive cases of Rotavirus when they had diarrhoea than those who were above 36months in age. Gender of subjects was not significantly associated with the incidence of Rotavirus among the diarrhoea patients ($p > 0.05$). There was a significant association between incidence of Rotavirus among the subjects and their mothers' levels of education ($p < 0.05$). Mothers with higher educational levels tended to have subjects who were more predisposed towards positive cases of Rotavirus that those with mothers of lower educational levels.

The incidence of Rotavirus is significantly associated with the breastfeeding practices adopted by the mothers ($p < 0.05$). This observation could be associated with the younger ages of the subjects as observed in relation to the test of association between age and the positive cases above. Mothers who have stopped breastfeeding had lower positive cases of Rotavirus than those who were still breastfeeding their infants. There was no significant association between mothers who wash their hand after child defecation and the incidence of Rotavirus among the subjects ($p > 0.05$).

The source of drinking water was not significantly associated with the incidence of Rotavirus among the subjects ($p > 0.05$). There was significant association between the incidence of Rotavirus and the method used for water storage by the mothers ($p < 0.05$). Positive cases were more common among subjects whose mothers stored their water in Jerry cans with covers and those with drums and lids. Subjects whose mothers treated their drinking water were significantly lower in the incidence of Rotavirus than those whose drinking water was not treated ($p < 0.05$). This would imply that the type of water given to the child is significantly associated with the incidence of Rotavirus among the subjects. The observations here mean that ages of infants play a significant role in their subjectivity to Rotavirus infection when they have diarrhoea.

Table 4 shows the symptoms manifested by positive cases of Rotavirus detected with the RTA. The expected counts are enclosed in bracket along the observed frequencies in the table.

The table revealed that most positive cases of Rotavirus detected with the Rapid Test Assay were significantly associated with incidence of restlessness, stomach ache, dehydration and sunken eyes of those affected ($p < 0.05$). But some of the positive cases were not significantly associated with symptoms like fever and vomiting ($p > 0.05$).

Table 5 revealed that most positive cases of Rotavirus detected with the ELISA were significantly associated with incidence of

Signs and symptoms:	Variable options	Positive	Negative	Total	Chi-Square	p-value
Restlessness	No	28(12.6)	56(71.4)	84(84.0)	30.543[a]	0.000
	Yes	17(32.4)	198(182.6)	215(215.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		
Fever	No	16(13.7)	75(77.3)	91(91.0)	0.656[a]	0.418
	Yes	29(31.3)	179(176.7)	208(208.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		
Stomach ache	No	29(37.5)	220(211.5)	249(249.0)	13.492[a]	0.000
	Yes	16(7.5)	34(42.5)	50(50.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		
Dehydration	No	25(14.9)	74(84.1)	99(99.0)	12.050[a]	0.001
	Yes	20(30.1)	180(169.9)	200(200.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		
Sunken eyes	No	29(41.2)	245(232.8)	274(274.0)	51.128[a]	0.000
	Yes	16(3.8)	9(21.2)	25(25.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		
Vomiting	No	25(24.2)	136(136.8)	161(161.0)	0.062[a]	0.803
	Yes	20(20.8)	118(117.2)	138(138.0)		
	Total	45(45.0)	254(254.0)	299(299.0)		

Table 4: Association of Symptoms with Positive Cases of Rotavirus Detected by RDT.

Signs and Symptoms	Options	Positive	Negative	Total	Chi-Square	P-Value
Restlessness	No	13(6.2)	71(77.8)	84(84.0)	11.295[a]	0.001
	Yes	9(15.8)	206(199.2)	215(215.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Fever	No	7(6.7)	84(84.3)	91(91.0)	0.021[a]	0.884
	Yes	15(15.3)	193(192.7)	208(208.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Stomach ache	No	15(18.3)	234(230.7)	249(249.0)	3.886[a]	0.049
	Yes	7(3.7)	43(46.3)	50(50.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Dehydration	No	14(7.3)	85(91.7)	99(99.0)	9.992[a]	0.002
	Yes	8(14.7)	192(185.3)	200(200.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Sunken eyes	No	14(20.2)	260(253.8)	274(274.0)	24.303[a]	0.000
	Yes	8(1.8)	17(23.2)	25(25.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Vomiting	No	13(11.8)	148(149.2)	161(161.0)	0.263[a]	0.608
	Yes	9(10.2)	129(127.8)	138(138.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		

Table 5: Association of Symptoms with Rotavirus Positive Cases Detected with ELISA.

restlessness, stomach ache, dehydration and sunken eyes of those affected ($p < 0.05$). But some of the positive cases were not significant associated with symptoms like fever and vomiting ($p > 0.05$).

Relationship between Socio-demographic factors and rotavirus infection in children (0-5 years) with Diarrhea based on result from the enzyme linked immunosorbent assay (ELISA).

Table 6 shows the test of association between incidence of Rotavirus among the subject with diarrhea and the selected socio-demographic variables of the mothers by result obtained with the Enzyme Linked Immunosorbent Assay. The table showed extent of association denoted with chi-square (X2) and level of significance (p-value).

The test with ELISA did not reveal significant association between subjects' ages and the incidence of Rotavirus. The only socio-demographic Variables found to be significantly associated with the incidence of rotavirus were mothers' level of educational attainment and method of water storage used by the mothers ($p < 0.05$). Gender, breast feeding practices, washing of child's hand af-

Variables	Variable Options	Positive	Negative	Total	Chi-Square	P-Value
Gender	Male	10(11.8)	150(148.2)	160(160.0)	0.620[a]	0.431
	Female	12(10.2)	127(128.8)	139(139.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Breast Feeding	Exclusive Breast Feeding	13(10.7)	132(134.3)	145(145.0)	3.902[a]	0.142
	Breast Feeding and bottle feeding	8(6.7)	83(84.3)	91(91.0)		
	Stopped Breast feeding	1(4.6)	62(58.4)	63(63.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Do you wash hand for child after defecation?	Yes	4(3.5)	44(44.5)	48(48.0)	0.080[a]	0.778
	No	18(18.5)	233(232.5)	251(251.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Mother's level of education	No formal Education	1(2.6)	34(32.4)	35(35.0)	8.538[a]	0.036
	Primary	7(11.0)	142(138.0)	149(149.0)		
	Secondary	12(6.2)	72(77.8)	84(84.0)		
	Tertiary	2(2.3)	29(28.7)	31(31.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Do you wash your hand after child defecation?	Yes	17(18.2)	230(228.8)	247(247.0)	0.471[a]	0.493
	No	5(3.8)	47(48.2)	52(52.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Source of drinking water	Tap	15(16.0)	202(201.0)	217(217.0)	3.529[a]	0.317
	Well	4(3.1)	38(38.9)	42(42.0)		
	River	1(0.2)	2(2.8)	3(3.0)		
	Others	2(2.7)	35(34.3)	37(37.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Method of water storage	Open container	2(1.5)	19(19.5)	21(21.0)	6.916[a]	0.031
	Jerry can with cover	15(9.6)	115(120.4)	130(130.0)		
	Drum with lid	5(10.9)	143(137.1)	148(148.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Do you treat your water before drinking?	Yes	4(7.6)	99(95.4)	103(103.0)	2.783[a]	0.095
	No	18(14.4)	178(181.6)	196(196.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
What type of Toilet does child use?	Pit	2(0.4)	4(5.6)	6(6.0)	7.007[a]	0.072
	Open Toilet	2(1.8)	23(23.2)	25(25.0)		
	Water Closet	1(0.4)	5(5.6)	6(6.0)		
	Others	17(19.3)	245(242.7)	262(262.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		
Age	1-12months	10(9.0)	112(113.0)	122(122.0)	2.604[a]	0.626
	13-24months	11(9.4)	117(118.6)	128(128.0)		
	25-36months	1(2.4)	31(29.6)	32(32.0)		
	37-48months	0(0.9)	12(11.1)	12(12.0)		
	47-60months	0(0.4)	5(4.6)	5(5.0)		
	Total	22(22.0)	277(277.0)	299(299.0)		

Table 6: Test of Association Between Incidence of Rotavirus and Socio-demographic Variables of the Mothers.

ter defecation, Source of drinking water, treatment of water before drinking and type of toilet child used by the child were not found to be significantly associated with the incidence of Rotavirus among the subjects ($p > 0.05$).

Discussion of Results

This study assessed the incidence of Rotavirus among children suffering from diarrhoea and attending Hasiya Bayero Pediatric Hospital, Kano state. From the test analysis of the data collected for the study, Rapid Diagnostic Test (RDT) detected Rotavirus in 45 (15.1%) positive Rotavirus cases among 299 subjects involved in the study. Compared to the 22 (7.4%) detected with the Enzyme Linked Immunosorbent Assay (ELISA), the finding is that the RDT gave false positive result as ELISA is more specific and sensitive in its reactions which is in agreements with the study of Moutelikova., *et al* [18].

Among the infants related factor of incidence found in the study was that the ages of children were significantly associated with positivity of Rotavirus among diarrhoea patients. In this study, subjects below 36 months were prone to infection of the virus than those above the age limit. Among subject above 36 months, no positive case of Rotavirus was detected. This finding is in agreement with the study of Monica and David [19] who reported that human Rotavirus occurs most commonly between 6 and 24 months of age. It is also in line with Dennehy [1] who reported that Rotavirus is the most common cause of diarrhoea disease among infants and young children. This could be as a result of the reduced severity of Rotavirus in older children which could be due primarily to the immunity induced by previous Rotavirus infections. But gender of the subject was not found to be significantly associated with the positivity of the virus among the children suffering from diarrhoea.

Some of the socio-demographic variables related to the mothers of the subjects were found to be significantly associated with the incidence of Rotavirus positivity among infants suffering from diarrhea. Such variables included breastfeeding practices adopted by the mothers, the method used for water storage, whether mothers treated drinking water or not.

Other mother related socio-demographic variables like washing of children' hands after child defecation, source of drinking water, were not found to be significantly associated with the positivity rate of the virus among the subjects.

Conclusion

The rotavirus incidence among children involved in the study using the RDT was 15.1%. The incidence by ELISA was 7.4%. ELISA is more effective for identifying Rotavirus among children suffering from diarrhoea due to its specificity and sensitivity.

Incidence of Rotavirus infection among children suffering from diarrhoea is more prone to those within 1 to 3 years age bracket.

External factors significantly associated with incidence of Rotavirus among children include mothers' level of education, breastfeeding practices, the method used for water storage and whether mothers treated drinking water or not.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Detection or identification of Rotavirus among diarrhoea patients should focus more on the use of ELISA instead of RDT.

2. There is need to be educating the mothers through their Antinatal and Post-natal clinics on the processes of avoiding the infection through effective hygiene especially when babies are between 0 and 3year.

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