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Prevalence of Human Rotavirus infection among under Five years Old Children Attending Some Selected Healthcare Facilities Within the Bauchi Metropolis, Nigeria

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Abstract

Rotavirus infection remains a leading cause of illness and death among children under five worldwide, particularly in tropical and subtropical regions, including Nigeria. In Northeastern Nigeria, specifically Bauchi State, there is scarce information regarding the prevalence of enteric rotavirus. This study aimed to determine the prevalence of rotavirus in Bauchi State. A cross-sectional survey was conducted to identify children with symptoms related to rotavirus gastroenteritis, including watery diarrhoea, fever, vomiting, stomach pain and loss of appetite. Stool samples were aseptically collected from 200 children attending six selected healthcare facilities within the Bauchi metropolis. Rotavirus antigen was detected using an enzyme immunoassay kit. On the other hand, a standardized structured questionnaire was used to obtain additional information (socio-demographic factors, clinical symptoms and hospital location) from the parents/guardians of the children. In this study, the overall prevalence of rotavirus infection was 20.0%. The highest rate of rotavirus infection was in the 2 weeks to 2 months age group at 26.7%, and the lowest was in the 1 to 5 years group at 10.2%, although these differences were not statistically significant (P=0.119). Notably, rural residents had a higher infection rate (41.2%) compared to urban residents (4.3%), with a significant difference found (P=0.001). The study found a higher prevalence of rotavirus infection in children who don't attend daycare (45.5%) than those who do (3.4%, P=0.001). Among children under five, the highest prevalence was at ATBU Teaching Hospital Bauchi Nigeria (26.7%), and the lowest was at Family Planning Kofar Wase, Bauchi (21.7%). However, statistical tests showed no association between infection and location (P=0.244). The study has demonstrated a high prevalence of rotavirus infection in Bauchi State Nigeria, with a significant association between rotavirus infection and attendance at daycare facilities and rural residences. There is an urgent need to implement the rotavirus vaccine.

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1.0 Introduction

Rotavirus is a significant public health issue globally, especially for children under the age five. It is one of the leading causes of severe diarrhea in this age group and is classified as a double-stranded RNA virus within the Reoviridae family. Rotavirus is highly contagious and is primarily transmitted through the fecal-oral route (Banyai *et al.,* 2022).

Rotavirus contains a genome of 11 segments of double-stranded RNA that encode six structural (VP1–VP4, VP6, and VP7) and six non-structural (NSP1–NSP6) proteins (Esten and Kaplikian, 2006). The two outer capsid proteins, VP4 and VP7, define serotype P (protease-sensitive proteins VP4), encoded by gene segment 4 and G (glycoprotein VP7) encoded by the gene segment 7, 8, or 9, depending on the strain. Both proteins elicit neutralizing antibody responses and form the basis for classifying Group A rotavirus into P and G serotypes and genotypes (Esten and Kaplikian, 2006).

Rotavirus's infection is responsible for approximately 453,000 deaths and 2.4 million hospitalizations of young children each year globally (Howidi *et al.,* 20014). Rotaviruses continue to be a leading cause of morbidity and mortality in developing countries, accounting for approximately 400,000 to 600,000 deaths each year among infants and young children under the age of five (WHO, 2018).

In sub-Saharan Africa, recent estimates indicate that rotavirus infections are responsible for the deaths of around 110,000 to 150,000 children in this age group annually (Jain *et al.,* 2001; Glass *et al.,* 2005). While rotavirus infections occur globally, most fatalities linked to this virus are concentrated in developing nations, including Nigeria (Parashar *et al.,* 2014). The World Health Organization (WHO) estimates that rotavirus accounts for over 200,000 deaths annually, with the majority occurring in low- and middle-income countries, including Nigeria (WHO, 2023).

Rotavirus infection is responsible for approximately 33,000 deaths annually among children under five years of age in Nigeria (Parashar *et al.,* 2003).

Nigeria continues to be among the first five countries with greatest number of RV disease associated deaths per year. (Mohammed *et al.,* 2016). Recently, Nigeria was ranked third among the ten countries with the highest rotavirus-related deaths in this age group (Glass *et al.,* 2005). Rotavirus (RV) gastroenteritis was recorded to be responsible for about 215,000 deaths among children below the age of 5 years in 2013. It was also estimated that approximately half (49%), of these RV deaths occurred in four developing countries of which Nigeria was one (Tate *et al.,* 2016).

Despite the introduction of rotavirus vaccines into the national immunization programs of many countries, including Nigeria, the prevalence of rotavirus infections remains a concern. This is often attributed to vaccine coverage gaps, strain diversity, and environmental factors (Banyai *et al.,* 2022).

In North Eastern Nigeria, specifically in Bauchi, there is limited information regarding the epidemiology of enteric rotaviruses. Therefore, this study aims to determine the prevalence of human the rotavirus infection among children under five years old attending six selected healthcare facilities within Bauchi metropolis Nigeria. The data collected could also be valuable for estimating the future disease burden of rotavirus in Bauchi State and managing viral diarrhoea in Nigeria.

2. 0 Materials and Methods

2.1 Study Area

The study was conducted at six selected healthcare facilities in the pediatric department of Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Specialist General Hospital Bauchi, PHC Tirwun, Umar Isa Yuguda Kofar Ran Bauchi, Family Planning Kofar Wase Bauchi, and Women and Children Railway Bauchi. These facilities play a significant role in providing healthcare services to children throughout the state. However, Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) is particularly noteworthy, as it is the primary healthcare facility in the state, serving a population of 4.6 million. This public-sector hospital features a dedicated pediatric unit, which includes a ward specifically for diarrhea cases. It provides healthcare to over 2 million individuals from urban, peri-urban, and rural areas across the country and serves as a referral hospital for patients from the entire northeastern region of Nigeria.

2.2 Ethical Approval

Before commencing the study, we obtained ethical approval from the Ethics Review Board of Bauchi, State Ministry of Health (MOH/GEN/S/1409/1. This ensured that our research was conducted by established ethical guidelines and standards.

2.3 Study Design

The study utilized two approaches: the laboratory approach and the quantitative approach using a self-administered questionnaire. For the quantitative approach, a cross-sectional survey was carried out to identify children under the age of five with symptoms associated with rotavirus. Informed consent was obtained from the guardians of the patients to seek their participation in the study. A simple random technique was used to select the patients, who were then diagnosed in the laboratory to detect the pathogens responsible for the infections by collecting relevant samples from them.

2.4 Study Participants

The study involved participants who were patients at six designated healthcare facilities, specifically: Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Specialist General Hospital Bauchi, PHC Tirwun, Umar Isa Yuguda Kofar Ran Bauchi, Family Planning Kofar Wase Bauchi, and Women and Children Railway Bauchi, including both in-patients and out-patients. The inclusion criteria specified that participants had to be children under five years old who experienced three or more watery, non-bloody stools within 24 hours and had visited only the selected healthcare facilities. Those with non-infectious cases of bloody diarrhea were excluded based on the WHO case standard guidelines (WHO, 2002).

2.5 Sample Size Determination

The sample size was calculated using a single population proportion formula below. For a population larger than 10,000, the minimum sample size (n) is necessary.

$$N = \frac{Z^2 pq}{d^2}$$

Where d is the margin of error in predicting p, Zα/2 is the value associated with a 95% confidence level, p is the prevalence of rotavirus, and q (1-P) is the is the assumed proportion of rotavirus.

To compute the sample size: Z= 1.96, d = 5%= 0.05, p =14.5% = 0.145, q = 1-p = 1-0.145= 0.86

$$n = \frac{(1.96)^2 * 0.145. * 0.86}{(0.05)^2}$$
$$n = \frac{0.47904752}{0.0025}$$
$$n = 191.619008$$

A sample size minimum of 191.619008 was computed. In order to be free from bias in patient selection, the calculated sample size was adjusted to 200 as the study's baseline sample size.

2.6 Sample /Data Collection

Two hundred (200) stool samples were collected from children under 5 years of age who were either hospitalized, visited, or received IV rehydration treatment in the emergency pediatric wards of six selected healthcare facilities. These facilities included Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Specialist General Hospital Bauchi, PHC Tirwun, Umar Isa Yuguda Kofar Ran Bauchi, Family Planning Kofar Wase Bauchi, and Women and Children Railway Bauchi. One sample was collected per patient, encompassing both male and female children. A wide, clean-mouth plastic container was used for sample collection. The samples were immediately transported and stored at -20 °C for further analysis. In addition, demographic and clinical data were collected, including age, gender, residence, hospital admission date, diarrhea onset date, date of stool sample collection, and details about vomiting (duration and episodes per day), diarrhea (duration and episodes per day), and the patient's body temperature. Data on breast-feeding and rotavirus vaccination were also collected.

2.7 Detection of Rotavirus

Rotavirus was identified in the stool samples utilizing a commercially available enzyme immunoassay test kit, the NOVATEINBIO® Rotavirus ELISA test kit, manufactured in Switzerland. The testing process strictly adhered to the guidelines provided by the manufacturer.

2.8 Data analysis

Data obtained in this study were exported to the SPSS statistical software version 27 for analysis. The data was analyzed using the Chi-square test, and p-values less than 0.05 were considered statistically significant.

3.0 Results and Discussion

3.1 Detection of Rotavirus by Elisa and Prevalence According to Socio-Demographic Factor

The primary aim of this study was to assess the prevalence of human rotavirus associated with gastroenteritis in children under the age of five at Abubakar Tafawa Balewa University Teaching Hospital in Bauchi. Out of the 200 stool samples screened for group A rotavirus antigen using ELISA, 40 tested positive, and 160 tested negative for rotavirus (**Table 1**). The overall percentage prevalence of rotavirus infection was 20% in this study. The highest rotavirus infection rate was recorded among the 2-wks-2months age group (26.7%), followed by the 2-6months age group (26.4%), followed by the 6months-1yrs age group (17.0%). The age group from 1-5 years had the lowest infection rate (10.2%). However, the results showed no statistically significant differences in the prevalence of rotavirus among the age groups ($\chi 2$=5.854, df=2, P=0.119). A total of 75 males and 125 females were recruited in the study. Rotavirus infection was similar among males (20%) and females (20%). The observed differences in the prevalence of rotavirus infection according to sex were not statistically significant ($\chi 2$=0.00, df=1, P=1.00). Moreover, in terms of residence, the highest rotavirus infection was observed in rural residents (41.2%) than in urban (4.3%). However, a highly significant association was observed with residence ($\chi 2$=41.432, df=1, P=0.001).

Table 1: Socio-demographic factors and prevalence of rotavirus infection among under 5 years old children in Bauchi Town

Factors	No. of patients involved	No. Positive (%) rotavirus infection	χ^2	p-value
Age				
2-wks-2months	45	12 (26.7)	5.854	0.119
2-6months	53	14 (26.4)		
6months-1yrs	53	9 (17.0)		
1-5yrs	49	5 (10.2)		
Gender				
Male	75	15 (20.0)	0.0	1.000
Female	125	25 (20.0)		
Residence				
Rural	85	35 (41.2)	41.432	0.001
Urban	115	5 (4.3)		

3.2 Prevalence of Rotavirus Infection in Children with Respect to Clinical Symptoms

The results indicate that children with a fever show a higher prevalence of rotavirus infection (20%) compared to those without fever (9.1%). However, statistical tests reveal no significant association between fever and infection (p-value = 0.384). Additionally, a higher prevalence of rotavirus infection was found in children without diarrhea or vomiting (33.3%) when compared to those with diarrhea or vomiting (20.6%). Nonetheless, there is no significant association between diarrhea/vomiting and rotavirus infection (p-value = 0.491). Furthermore, a notable prevalence was observed in breastfed children (60%) and those not receiving rotavirus vaccination (23.1%) as compared to non-breastfed children (22.9%) and those receiving the vaccine (7.4%). The findings indicate no significant associations between rotavirus infection and breastfeeding or rotavirus vaccination, with (p-values of 0.082 and 0.160,) respectively. Lastly, the results show that children who do not attend daycare centers have a higher prevalence of rotavirus infection (45.5%) than those who do attend (3.4%). This difference is statistically significant, as the p-value is less than 0.05 (p = 0.001).

Table 2: Prevalence of rotavirus infection among under-5 children in relation to symptoms

Symptoms	No. of patients involved	No. Positive (%) rotavirus infection	χ^2	p-value
Fever				
Yes	39	8 (20.5)	0.758	0.384
No	11	1 (9.1)		
Diarrhea/vomiting				
Yes	34	7 (20.6)	0.465	0.491
No	6	2 (33.3)		
Breast feeding				
Yes	5	3 (60.0)	3.027	0.082
No	35	8 (22.9)		
Attending day care center				
Yes	29	1 (3.4%)	11.037	0.001
No	11	5 (45.5)		
Rotavirus vaccination				
Yes	27	2 (7.4)	1.970	0.160
No	13	3 (23.1)		

3.3 Prevalence of Rotavirus Infection According to Hospital Location

Of the 200 under-five children sampled from Bauchi, 60 (60/200; 30%) are from Specialist Gen. Hospital Bauchi, 45 (45/200; 22.5%) are from ATBU Teaching Hospital Bauchi, 32 (32/200; 16%) are from Umar Isa Yuguda Kofar Ran Bauchi, 23 (23/200; 11.5%) are from PHC Tirwun and Woman &children Railway Bauchi while Family planning Kofar wase Bauchi has the least 17 (17/200; 8.5%). The highest prevalence of rotavirus infection among children under five was detected among children attending (ATBU) Teaching Hospital Bauchi (12; 26.7%) followed by children attending Specialist Gen. Hospital Bauchi (15; 25%), while the list prevalence was observed among children attending Family planning Kofar wase, Bauchi (5;21.7%). However, statistical analysis revealed no association between infection and location ($\chi 2$ = 6.704: df = 5, p=0.244), as shown in Table 3.

Table 3: Prevalence of rotavirus infection among under-5 children in relation to Hospitals Location

Location	No. of patients (%)	No. of positive rotavirus (%)	χ^2	p-value
(ATBU) Teaching Hospital Bauchi	45 (22.5)	12 (26.7)	6.704	0.244
Specialist Gen. Hospital Bauchi	60 (30.0)	15 (25.0)		
(PHC) Tirwun	23 (11.5)	4 (17.4)		
Umar Isa Yuguda Kofar Ran Bauchi	32 (16.0)	3 (9.4)		
Family planning Kofar wase. Bauchi	17 (8.5)	1 (5.9)		
Woman &children Railway Bauchi	23 (11.5)	5 (21.7)		

4.0 Discussion

Rotavirus is a significant contributor to acute gastroenteritis among children under five, as our study illustrates. We observed a prevalence of rotavirus infection in Bauchi State at 20%. This finding aligns closely with the 22.3% recorded in Lagos (Ogunsanya *et al.,* 1994; Alabi *et al.,* 1998) and the 20.8% reported in Zaria (Mado *et al.,* 2022). However, our results contrast with those from other studies conducted in Nigeria. For instance, a prevalence of 37.5% was noted in Lagos (Audu *et al.,* 2002), 56.0% in Enugu (Tagbo *et al.,* 2014), 55.9% in Ilorin (Odimayo *et al.,* 2009), 46% in Enugu (Tagbo *et al.,* 2019), and 31.0% in Kaduna (Aliyu *et al.,* 2018). In Nigeria, various studies have indicated lower prevalence rates, including 14.3% in Ibadan (Adah *et al.,* 1997), 15.6% previously reported in Zaria (Pennap and Umoh, 2010), 11.0% in Jos (Nimzing *et al.,* 2000), and 13.8% in the same city (Junaid *et al.,* 2011). Additionally, an 18.0% prevalence was recorded in North-western Nigeria (Aminu *et al.,* 2010), 19.2% in Benin City (Iyoha and Abiodun, 2015), 15.1% in Sokoto (Garba *et al.,* 2023), and 18.1% in Yobe (Garba *et al.,* 2019). Prevalence rates from other African countries align closely with the findings in Bauchi State. For instance, Burkina Faso reported a prevalence rate of 22.73% (Djeneba *et al.,* 2007), while Zimbabwe, Tanzania, and Ethiopia had higher rates of 29%, 29%, and 30%, respectively (Mwenda *et al.,* 2010). Additionally, a study indicated that rotavirus was responsible for 12.6% of moderate-to-severe diarrhea cases in children in Kenya, Mali, and The Gambia (Keita *et al.,* 2023). The variations in prevalence rates may be attributed to differences in climate, environment, socioeconomic factors, cultural practices, diagnostic methods, as well as the timing and duration of sampling.

The age distribution of rotavirus infections particularly emphasizes the high rates among very young infants. Some studies corroborate our finding, which reported a higher prevalence of rotavirus infection among the 2-wks-2months age group (26.7%), followed by the 2-6months age group (26.4%), revealing significant insights into the epidemiology of rotavirus across different age groups. The highest incidence of rotavirus gastroenteritis is observed in infants under six months, with studies indicating that 34.2% of children in Central Africa experienced at least one infection by six months (Georges-Courbot *et al.,* 1988). Research from Philadelphia found that 13% of cases occurred in infants under three months, with the highest monthly incidence during the second month of life (Clark *et al.,* 2010). A study across Africa, Asia, and Europe noted that rotavirus infections peaked at younger ages in African children compared to their European counterparts, suggesting regional variations in infection rates (Steele *et al.,* 2016). While the studies emphasize the high incidence of rotavirus in very young infants, it is also important to consider that some research indicates a lower incidence in the first months of life due to maternal antibodies, suggesting a complex interplay of factors influencing infection rates (Mata *et al.,* 1983).

The prevalence of rotavirus infection shows considerable variation across different studies, particularly in terms of sex distribution. Our study found that infection rates were similar for males and females, with each group exhibiting a prevalence of 20% and no significant differences observed. Similarly, a study conducted on neonatal calves also reported no significant differences in rotavirus infection rates based on sex, which aligns with our findings (Wang *et al.,* 2022). Various statistical methods were utilized in these studies to analyze sex differences. For instance, the study on neonatal calves indicated no significant variations ($P < 0.05$) in infection rates between sexes (Wang *et al.,* 2022). In contrast, the study conducted in India, a male preponderance was observed with a male-to-female ratio of 1.5:1, indicating a higher prevalence in males (Kumar *et al.,* 2022). Another study reported that 62.97% of rotavirus-positive cases were male, suggesting a significant male bias in infection rates (Gupta *et al.,* 2021). While the initial statement suggests no significant sex-based differences in rotavirus infection, the broader literature indicates a tendency for higher prevalence in males, particularly in pediatric populations. This discrepancy highlights the need for further research to clarify these findings across different demographics and settings.

In terms of locations, our results indicated that the prevalence of rotavirus infections is notably higher in rural residents (41.2%) compared to urban residents (4.3%). Our finding is supported by a study in Nepal which found that 16.2% of children with diarrhea tested positive for rotavirus, with higher rates observed in rural settings compared to urban hospitals (Haruki & Sherchand, 2008). This disparity can be attributed to factors such as poor sanitation and hygiene practices in rural areas, which contribute to higher infection rates (Zhang *et al.,* 2011). In addition, lack of awareness and access to rotavirus vaccination among rural mothers has been linked to increased susceptibility in children (My*et al.,* 2022). However, the urban-rural divide in rotavirus prevalence highlights the need for targeted public health interventions in rural communities to improve hygiene and vaccination rates.

Our research indicates that children with fever have a higher prevalence of rotavirus infection compared to

those without fever. Numerous studies support this association. In our study, we reported a rotavirus infection prevalence of 20.0% in children with fever, compared to 9.1% in those without fever, although this difference was not statistically significant. Nonetheless, our findings are consistent with various other studies..For instance, a study conducted in Myanmar found that rotavirus was detected in 45.7% of hospitalized children with acute gastroenteritis, and fever was present in 65.8% of rotavirus cases, compared to 61.3% in non-rotavirus cases (Myat *et al.*, 2021). Similarly, a study in Iran showed that rotavirus infection occurred in 32.1% of symptomatic children, revealing a significant correlation between infection and clinical symptoms, including fever (Fallah *et al.*, 2023). Additionally, another study found that 87.03% of children with rotavirus infection displayed fever, highlighting a strong association between fever and rotavirus prevalence (Nazari *et al.*, 2023). While these studies consistently indicate a higher prevalence of rotavirus infection among febrile children, it is crucial to recognize that not all children with fever have rotavirus infections. Other pathogens may also contribute to febrile illnesses, underscoring the need for comprehensive diagnostic approaches in pediatric care.

The prevalence of rotavirus infection in children under five years old has been extensively studied, particularly in relation to diarrhea. Our research revealed a higher prevalence of rotavirus infection in children without diarrhea (33.3%) compared to those with diarrhea (20.6%) even though there is no statistical association between diarrhea and the infection This finding contrasts with other studies that reported a higher prevalence in children experiencing diarrhea. For example, a case-control study conducted in Nepal reported a 20.8% prevalence of rotavirus in children with diarrhea, highlighting the importance of ongoing surveillance of circulating strains (Shrestha *et al.*, 2024). Additionally, a study in Surabaya indicated that rotavirus was responsible for 31.98% of acute diarrhea cases in children under five, particularly affecting those aged 6-11 months (Bilah *et al.*, 2024). Meanwhile, research in Suzhou found that 35.7% of children with diarrhea tested positive for rotavirus, with the highest prevalence occurring in children under three years old (Shen *et al.*, 2022).

Report shows that breastfeeding significantly reduces the incidence of rotavirus and related illnesses, highlighting its importance in child health. However, this statement contradicts our study's findings, which reported a higher incidence of rotavirus infections among breastfed children (60%) compared to non-breastfed children (22.9%). Our results are not consistent with those of other studies. For example, one study found that exclusively breastfed infants had a lower incidence of rotavirus shedding and infections compared to formula-fed infants, with rates of 22% versus 43% for vaccine virus shedding (Bautista-Marquez *et al.*, 2016). Another analysis indicated that exclusive breastfeeding reduced the risk of diarrhea, a common consequence of rotavirus, by 3.28 times compared to non-breastfed children (Pratama *et al.*, 2023). Breastfeeding is known to enhance immune responses, as evidenced by lower rotavirus IgA titers in breastfed infants, suggesting decreased viral replication and shedding (Bautista-Marquez *et al.*, 2016). While breastfeeding is associated with reduced rotavirus infections, it is essential to consider that other factors, such as vaccination and maternal education, also play critical roles in child health outcomes. The interplay of these elements can significantly influence the overall incidence of rotavirus and related diseases in children.

Our study reported that the prevalence of rotavirus infection is significantly higher among unvaccinated children (23.1%) compared to vaccinated children (7.4%), with no significant association observed. However, our findings are inconsistent with other studies that highlight the importance of vaccination in reducing rotavirus-related morbidity. For instance, a survey conducted in Nigeria found that unvaccinated children had a rotavirus infection rate of 54.8%, while vaccinated children showed a significantly lower rate of 26.3% (Nash *et al.*, 2023). Similarly, in Uganda, the prevalence of rotavirus diarrhea was found to be three times lower in the post-vaccination period compared to the pre-vaccination period (Laker *et al.*, 2023; 2024). A 15-year follow-up study in Ukraine noted a high frequency of rotavirus hospitalizations among children under five, with only a slight decline over time. The absence of universal vaccination in this population contributed to sustained infection rates (Soloviov *et al.*, 2022).. While vaccination significantly reduces infection rates, factors such as environmental conditions and healthcare access also play critical roles in the overall burden of rotavirus infections. This suggests that a multifaceted approach is necessary for effective disease management.

The prevalence of rotavirus infection among children in daycare centers compared to those not attending such facilities has been a subject of research. Our findings indicate that children who do not attend daycare centers exhibit a significantly higher prevalence of rotavirus infection (45.5%) than those who do attend (3.4%). Our result aligns with the results from study in Sydney, Australia, which found a 3.6% positivity rate for rotavirus among children in child-

care centers, with higher rates in infants under 12 months (52%) compared to older children (26%) (Ferson *et al.*, 1997). The statistical significance of these findings is reinforced by p-values less than 0.05 in multiple studies, indicating a strong correlation between daycare attendance and lower rotavirus infection rates (Pickering *et al.*, 1987; Fau *et al.*, 2008). Conversely, some studies suggest that while daycare attendance may increase exposure to rotavirus, it also provides opportunities for developing immunity, potentially leading to lower severity of infections later in life (Enserink *et al.*, 2015).

Finally, the distribution of rotavirus among the selected healthcare facilities varies. Our study found a significant number of positive cases, with 25% in secondary health facilities and 26.7% in tertiary health facilities. Various studies underscore the burden of rotavirus infections in these environments. For example, a study conducted in Nigeria reported a rotavirus infection rate of 43% among children with acute diarrhea at a tertiary institution (Sanni *et al.*, 2022). Similarly, research at a tertiary care hospital in India identified a rotavirus positivity rate of 14.58%, highlighting its ongoing impact on pediatric health (Kumar *et al.*, 2022). Additionally, a study in two secondary care hospitals in Karnataka, India, found that 38.3% of children admitted with acute diarrhea tested positive for rotavirus (Shetty *et al.*, 2017). The high incidence of rotavirus in both secondary and tertiary facilities emphasizes the need for vaccination and public health initiatives to reduce the morbidity and mortality associated with this infection (Goel *et al.*, 2021). While the prevalence of rotavirus in healthcare settings is essential, it is equally important to consider the role of community health education and vaccination programs in mitigating the spread of rotavirus infections among children.

5.0 Conclusion

The study on the prevalence of human rotavirus among children under five years attending some selected hospitals in Bauchi, Nigeria, has shown a persistent and significant burden of rotavirus infection in this vulnerable population. The current study revealed a higher prevalence of rotavirus infection in the Bauchi metropolis. It was observed that children aged 2 weeks to 2 months were particularly affected by this infection. Additionally, the findings indicated that children who do not attend daycare were significantly impacted by rotavirus. Lastly, two major healthcare facilities including ATBUTHB and General Hospital Bauchi reported a greater number of rotavirus infections compared to other healthcare facilities. Addressing the burden of rotavirus requires continued public health efforts, including enhancing vaccination programs to improve coverage, monitoring strain variations to ensure vaccine efficacy, and strengthening public awareness campaigns on hygiene and sanitation practices. Hospital-based surveillance, like this study, provides valuable data that can inform targeted interventions and policy adjustments to mitigate rotavirus-associated morbidity and mortality in the region.

Ultimately, a multifaceted approach that integrates community engagement, robust vaccination campaigns, and improvements in water, sanitation, and hygiene (WASH) practices is essential to significantly reduce the impact of rotavirus gastroenteritis. Ongoing research and surveillance will be crucial in tracking progress and adapting strategies to the evolving epidemiological landscape.

Declarations

Ethics approval and consent to participate

Not Applicable.

Consent for publication

All authors have provided their consent for the submission of the manuscript. There is no relevant data or material to include.

Availability of data and material

Not Applicable.

Competing interests

The authors declare that they have no conflict of interest.

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