

Prevalence of rotavirus infection among hospitalised children under five years of age with acute diarrhoea in Mogadishu Somalia

Abstract

Introduction.

Rotavirus is a leading cause of severe diarrhea in children under five worldwide, resulting in significant morbidity and mortality, especially in low-income countries. It is highly contagious, transmitted through contaminated hands and objects, and commonly causes hospitalizations due to dehydration. Vaccination is the key preventive measure, as no specific treatment beyond rehydration exists. This study focuses on the burden of rotavirus among hospitalized children with acute watery diarrhea in Mogadishu, Somalia, aiming to provide insights for improved diagnosis, treatment, and prevention.

Method

This cross-sectional study investigates the prevalence of rotavirus infection among children under five hospitalized with acute watery diarrhea at Mogadishu Somali Türkiye Training and Research Hospital from April to June 2024. A sample of 167 participants was selected using simple random sampling. Data collection involved structured questionnaires for demographic and clinical details, and enzyme immunoassays for rotavirus detection in stool samples. Statistical analysis, including descriptive statistics and logistic regression, will be conducted using SPSS to calculate prevalence and identify predictors of infection. Ethical approval and informed consent were obtained.

Result.

The prevalence of rotavirus among children hospitalized with gastroenteritis was observed to be 33.5%. Analysis revealed notable associations with several risk factors: children whose primary drinking water source was bottled water exhibited an unadjusted prevalence ratio 2.415 times higher compared to those using tap water. Severe dehydration was significantly linked with a lower unadjusted prevalence ratio of 0.342 compared to mild dehydration. Furthermore, children who missed their vaccinations demonstrated an unadjusted prevalence ratio 6 times higher, indicating a statistically significant association.

Discussion

The study identified a 33.5% prevalence of rotavirus among children with gastroenteritis. It found that drinking bottled water significantly increases the risk of infection compared to tap water. Severe dehydration was less common in rotavirus-positive cases, while fever and vomiting were strongly associated with the infection. Missing the rotavirus vaccination emerged as a major risk factor, though being vaccinated did not significantly affect the risk. Interestingly, factors such as gender, residence, and socio-economic status did not show a significant association with rotavirus infection, suggesting that specific symptoms and vaccination status are more critical in understanding the prevalence and risk factors for rotavirus among these children.

Keywords: Rotavirus, infection, hospitalized children, under five years of age, acute watery diarrhea, Mogadishu, Somalia.

Introduction

Acute gastroenteritis is a prevalent infectious disease that affects hundreds of millions of people annually and ranks among the leading causes of death worldwide [1],[2]. Rotavirus is a non-enveloped virus belonging to the family Reoviridae. Its genome comprises 11 segments of double-stranded RNA. Classification of rotavirus into serotypes is based on the two surface capsid proteins: VP4 (P serotype) and VP7 (G serotype) [3], [4]. Globally, rotavirus infection stands as the foremost cause of severe diarrhea among children under five years old, resulting in an estimated 215,000 deaths annually in this age group. Additionally, it leads to millions of hospitalizations and clinic visits worldwide.[5],[6]. Rotavirus is the primary cause of diarrhea-related illness and death globally, particularly affecting children under the age of five [1] [2] [7] [8] [9] [10] [11]. Rotavirus (RV) is a highly contagious and easily transmitted infection, making it the foremost cause of diarrhea in children under 5 years of age globally [12],[5],[13], [14]. Rotaviruses are the leading cause of severe diarrhea in young children worldwide. According to World Health Organization (WHO) estimates from 2013, around 215,000 children under the age of five die annually due to rotavirus infections [15] [16]. Rotavirus infection can result in severe acute gastroenteritis that often requires hospitalization. Without timely treatment for dehydration, it can potentially lead to fatal outcomes. [1]. According to the annual report from the United Nations International Children's Emergency Fund (UNICEF), diarrhea is responsible for approximately 2,195 child deaths per day worldwide. This exceeds the combined mortality cases of AIDS, malaria, and measles [17]. The WHO recommends including rotavirus vaccines in all national immunization programs. This is especially prioritized in South and Southeast Asia and sub-Saharan Africa, where the majority of deaths from rotavirus occur [15] [18]. The region's high prevalence of diarrhea is largely attributed to factors such as inadequate access to safe drinking water, improper methods of human fecal waste disposal, densely populated and poorly constructed housing, and generally low hygiene standards [17]. Globally, the prevalence of rotavirus diarrhea among children under five years old ranges widely, from 6% to 56%. In India specifically, the reported incidence of rotavirus diarrhea varies even more significantly, ranging from 5% to 70% [19]. According to WHO estimates in 2004, over five million children under the age of 5 died from rotavirus infections. Approximately half of these deaths occurred in India, Nigeria, the Democratic Republic of the Congo, Ethiopia, China, and Pakistan [10]. Studies indicate that globally, there is a similar prevalence of rotavirus (RV) infection, ranging from 30% to 50% among hospitalized children with diarrhea. However, it's noteworthy that over 90% of children who suffer fatal RV infections reside in low-income countries [12]. In China, from 2015 to 2018, a prospective surveillance study on viral diarrhea among children under five years of age at a sentinel hospital in Anhui Province revealed that rotavirus A infections were the most prevalent (26.71%) among children with acute gastroenteritis. This marked a decline from the infection rate of 39.98% observed during 2008-2009 [2]. According to global and national estimates from WHO, the proportion of hospitalizations due to rotavirus diarrhea varies widely, ranging from 16% to 66%, with a median proportion of 38% [10]. Microorganisms that cause diarrhea are typically transmitted through contaminated water and food. There are three main groups of microorganisms known to cause diarrhea: viruses (such as rotaviruses, caliciviruses, astroviruses, and adenoviruses), bacteria (including diarrheagenic *E. coli*, *Shigella* species, *Salmonella* species, *Campylobacter jejuni*), and parasites (such as *Entamoeba histolytica* and *Giardia lamblia*). In Africa, viral agents are the primary causes of diarrhea. Rotavirus A (RVA) is particularly noted as a common and severe cause of diarrhea in infants and young children globally, accounting for more than 50% of cases of gastroenteritis in this age group [17]. Clinically, the initial symptoms of rotavirus (RV) infection typically include fever, nausea, and diarrhea. Subsequently, abdominal muscle cramps and recurrent episodes of watery diarrhea may occur, lasting anywhere from 3 to 8 days. Dehydration is a prominent complication and the leading cause of death related to RV infections, often more common than with bacterial infections [12], [20]. Currently, there is no specific treatment for rotavirus (RV) infection aside from fluid and electrolyte replacement therapy to prevent complications such as dehydration. Vaccination against rotavirus is strongly recommended to prevent the associated morbidity and mortality [12]. [1].[2],[6],[4].

Rotavirus infection is a significant health concern among hospitalized children under five years of age presenting with acute watery diarrhea at a tertiary hospital in Mogadishu, Somalia. Rotavirus is highly contagious and spreads easily from person to person through contaminated hands and objects. Unlike bacterial and parasitic causes of diarrhea, antimicrobial therapies are not effective against rotavirus infections [5]. The previous study reported a positivity rate of 17.8% for rotavirus infections [5]. Understanding and addressing the burden of rotavirus-related morbidity and mortality in this vulnerable population is crucial. The study aims to contribute valuable insights into the prevalence and clinical aspects of rotavirus infections in this vulnerable population, with the ultimate goal of informing better strategies for diagnosis, treatment, and prevention in Mogadishu, Somalia.

Methods.

This study employs a cross-sectional design to determine the prevalence of rotavirus infection among children under five years of age hospitalized with acute watery diarrhea in Mogadishu, Somalia. The study population comprises children admitted to the **Pediatric Department of Mogadishu Somali Türkiye Training and Research Hospital**, data was collected over period from April 2024 to June 2024. A total sample size was 167 participants were selected using a simple random sampling method. Data collection involves the use of structured questionnaires to gather demographic and clinical information, alongside laboratory tests such as enzyme immunoassays for detecting rotavirus in stool samples. The data collection procedure includes obtaining ethical approval and necessary permissions, enrolling eligible children after obtaining informed consent from parents or guardians, collecting demographic and clinical data through structured questionnaires, and collecting and testing stool samples for rotavirus. The results will be recorded and confidentiality will be maintained throughout the process. Data analysis will be conducted using statistical software such as SPSS. Descriptive statistics will summarize the demographic and clinical characteristics of the study population, while the prevalence of rotavirus infection will be calculated with a 95% confidence interval. Logistic regression analysis will identify independent predictors of rotavirus infection. This comprehensive approach ensures a robust understanding of the prevalence and predictors of rotavirus infection in the target population.

Result

Demographic characteristics

The study on rotavirus among children with gastroenteritis highlights that female children (58.7%) and those aged 12-23 months (39.5%) are most affected. Urban residents (55.7%) are the largest group, and a significant number of children consume bottled (30.5%) or unfiltered water (29.3%), which may be risk factors. Middle-income families constitute the majority (55.1%) of the cases. These findings suggest that gastroenteritis predominantly affects urban, young children from middle and low-income families, emphasizing the importance of addressing water quality and access to healthcare in these demographics. **(table 1).**

Table 1 demographic factors.

<i>Variables</i>	<i>Sub Variables</i>	<i>f</i>	<i>%</i>
Gender	male	69	41.3
	female	98	58.7
Residence	Rural	30	18.0
	Urban	93	55.7
	Rotative	9	5.4
	Camps	35	21.0
Age in months	0–5 months	23	13.8
	6–11 months	59	35.3
	12–23 months	66	39.5
	24–59 months	19	11.4
Primary Source of Drinking Water	Tap Water	42	25.1
	Filtered Water	25	15.0
	Bottled Water	51	30.5
	Un Filtered Water	49	29.3
Economic Status Of The Family	LOW Income	60	35.9
	Middle Income	92	55.1
	High Income	15	9.0

** Demographic factors*

Patient Symptom Assessment.

The study on gastroenteritis among children reveals that most cases involve moderate dehydration (56.9%), with some severe (27.5%) and mild (15.6%) cases. Elevated temperatures are seen in 35.9% of children, mostly between 37.6-38.6°C. Vomiting occurs in 34.1% of cases, typically lasting less than 3 days. Diarrhea lasts 3-5 days in 50.9% of children, with 17.4% experiencing it for over 5 days. The frequency of diarrhea is usually under 5 times per day (69.5%). These findings indicate that moderate dehydration and short-duration vomiting and diarrhea are common, with temperature and symptom severity varying among children. This data underscores the importance of timely intervention and tailored treatment to manage gastroenteritis symptoms and prevent severe dehydration. **(Table 2).**

Table 2 Patient Symptom Assessment.

<i>Variables</i>	<i>Sub Variables</i>	<i>f</i>	<i>%</i>
Dehydration	mild	26	15.6
	moderate	95	56.9
	severe	46	27.5
Temperature	yes	60	35.9
	no	107	64.1
If yes Temperature	<37.5	7	11.6
	37.6–38.6	45	75
	>38.7	8	13.3
Vomiting	yes	57	34.1
	No	110	65.9
If there is vomiting mark the duration	<3 days	49	86.0
	>3 days	8	14.0
Vomiting frequency per day	<5 per day	47	82.5
	>5 per day	10	17.5
Diarrhoea duration	<3 days	53	31.7
	3–5 days	85	50.9
	>5 days	29	17.4
Diarrhoea frequency per day	<5 per day	116	69.5
	>5 per day	51	30.5

**Patient Symptom Assessment.*

Prevalence and Risk Factors Rotavirus Among Gastroenteritis Children.

The study finds a rotavirus prevalence of 33.5% among children with gastroenteritis. (**chart 1**). Key risk factors include poor hygiene in bottle preparation (12.6%), lack of exclusive breastfeeding (50.9%), and the use of animal milk (35.3%). Hospitalization is needed for 41.9% of the children, with stays split between 1-4 days (48.6%) and 4-10 days (51.4%). The vaccination rate is low, with only 16.2% vaccinated. Bottle feeding is common (67.7%), and zinc is the most used treatment (57.5%), followed by antibiotics (37.1%). These findings underscore the critical role of proper feeding practices, vaccination, and hygiene in managing and preventing rotavirus infections. The high percentage of non-vaccinated children and the prevalent use of bottle feeding highlight areas needing public health intervention to reduce the incidence and severity of gastroenteritis. (**Table 3**).

Chart 1. Prevalence Rotavirus Among Gastroenteritis Children.

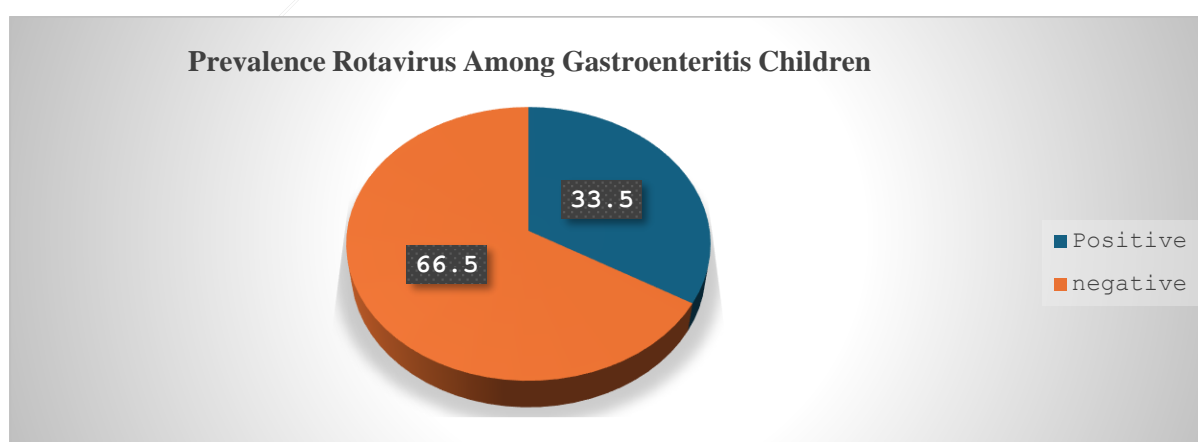


Table 3 Risk Factors Rotavirus Among Gastroenteritis Children.

<i>Variables</i>	<i>Sub Variables</i>	<i>f</i>	<i>%</i>
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Associated Risk Factor Of Rotavirus Among Gastroenteritis Children	Hygiene Practice Related to Bottle Preparation	21	12.6
	Lack Of Exclusive Breast Feeding	85	50.9
	Giving Child Animal Milk	59	35.3
	Others	2	1.2
Requirement Of Hospitalization	YES	70	41.9
	NO	97	58.1
IF YES Duration Of Hospital Stay.....	1 - 4 Days	34	48.6
	4 - 10days	36	51.4
Rota vaccine	vaccinated	27	16.2
	Not vaccinated	123	73.7
	Missed vaccine	17	10.2
Feeding Pattern	Bottle feeding	113	67.7
	Non bottle feeding	54	32.3
Treatment	Zinc	96	57.5
	Probiotics	9	5.4
	Antibiotics	62	37.1
<i>* Risk Factors Rotavirus Among Gastroenteritis Children.</i>			

Parental Education

The study reveals that 57.5% of mothers are illiterate, while fathers have a more diverse educational background, with 16.2% being illiterate, 40.1% having secondary education, and 34.1% holding higher education. These disparities in parental education levels suggest varying levels of awareness and access to healthcare information and practices, which can impact the management and prevention of gastroenteritis. **(Table 4).**

Table 4 Parental Education

<i>Variables</i>	<i>Sub Variables</i>	<i>f</i>	<i>%</i>
Mother education	Illiterate	96	57.5
	Primary	27	16.2
	Secondary	31	18.6
	Higher education	13	7.8
Father education	Illiterate	27	16.2
	Primary	16	9.6
	Secondary	67	40.1
	Higher education	57	34.1
<i>* Parental Education</i>			

Rotavirus Risk Factors in Children.

Primary source of drinking water: Compared to tap water, bottled water is significantly associated with an unadjusted prevalence ratio 2.415 times higher (95% CI: 1.007 - 5.793, $p=0.048$). This suggests that drinking bottled water is a risk factor for rotavirus compared to drinking tap water. The other water sources (filtered and unfiltered) did not show a significant association. Dehydration: Compared to mild dehydration, severe dehydration is significantly associated with an unadjusted prevalence ratio 0.342 times lower (95% CI: 0.124 - 0.945, $p=0.039$). This suggests that severe dehydration cases are less frequent in rotavirus positive patients than in negatives. However, moderate dehydration did not show a significant association. Fever: The presence of fever is significantly associated with an unadjusted prevalence ratio 2.201 times higher (95% CI: 1.133 - 4.273, $p=0.020$) compared to the absence of fever. This indicates that fever is a symptom frequently associated with rotavirus infection. Vomiting: The presence of vomiting is significantly associated with an unadjusted prevalence ratio 2.514 times higher (95% CI: 1.285 - 4.917, $p=0.007$) compared to the absence of vomiting. This suggests that vomiting is a characteristic symptom of rotavirus infection. Rotavirus vaccination: Compared to vaccinated children, those who were not vaccinated had an unadjusted prevalence ratio 1.543 times higher, but this difference was not statistically significant (95% CI: 0.662 - 3.594, $p=0.315$). However, those who missed their vaccination had an

unadjusted prevalence ratio 6.000 times higher, in a statistically significant manner (95% CI: 1.142 - 31.532, $p=0.034$). This indicates that missing the rotavirus vaccination is an important risk factor for contracting the infection. (**table 5**). Also The study investigated the association between gender, residence, age in months, economic status of the family, diarrhea duration, feeding pattern, parental education, and the presence of rotavirus among children with gastroenteritis. Surprisingly, the research found that these factors showed no significant association with the presence of rotavirus. (**table 5**).

Table 5: Unadjusted Rotavirus Risk Factors in Children.

Variable	Sub variable	Rotavirus		Unadjusted prevalence ratio (95% confidence interval).	P value
		Positive	negative		
Primary Source of Drinking Water	Tap Water	19(45.2%)	23(54.8%)	Reference	
	Filtered Water	7(28.0%)	18(72.0%)	2.124 (0.733 - 6.154)	0.165
	Bottled Water	13(25.5%)	38(74.5%)	2.415 (1.007 - 5.793)	0.048
	Un Filtered Water	17(34.7%)	32(65.3%)	1.555 (0.667 - 3.623)	0.306
Dehydration	mild	8(30.8%)	18(69.2%)	Reference	
	moderate	22(23.2%)	73(76.8%)	1.475 (0.565 - 3.850)	0.428
	severe	26(56.5%)	20(43.5%)	0.342 (0.124 - 0.945)	0.039
Temperature (fever)	yes	27(45.0%)	33(55.0%)	2.201 (1.133 - 4.273)	0.020
	no	29(27.1%)	78(72.9%)	Reference	
Vomiting	yes	27(47.4%)	30(52.6%)	2.514 (1.285 - 4.917)	0.007
	No	29(26.4%)	81(73.6%)	Reference	
Rota vaccine	vaccinated	12(44.4%)	15(55.6%)	Reference	
	Not vaccinated	42(34.1%)	81(65.9%)	1.543 (0.662 - 3.594)	0.315
	Missed vaccine	2(11.8%)	15(88.2%)	6.000 (1.142 - 31.532)	0.034

Table 6 Adjusted Risk Factors for Paediatric Rotavirus

Variable	Sub variable	Adjusted prevalence ratio. (95% confidence interval)	P value
Age in months	0–5 months	Reference	
	6–11 months	1.648 (0.443 - 6.131)	0.456
	12–23 months	4.706 (1.244 -17.801)	0.023
	24–59 months	3.099 (0.489 -19.635)	0.230
Primary Source of Drinking Water	Tap Water	Reference	
	Filtered Water	2.618 (0.631 -10.862)	0.185
	Bottled Water	3.885 (1.182 -12.770)	0.025
	Un Filtered Water	2.131 (0.666 - 6.819)	0.202
Dehydration	mild	Reference	
	moderate	1.741 (0.458 - 6.620)	0.416
	severe	0.222 (0.039 -1.265)	0.090
Temperature (fever)	yes	2.850 (1.064 - 7.631)	0.037
	no	Reference	
Rota vaccine	vaccinated	Reference	
	Not vaccinated	1.390 (0.445 - 4.335)	0.571
	Missed vaccine	8.686 (1.089 - 69.255)	0.041
Feeding Pattern	Bottle feeding	.844 (0.321 - 2.216)	0.731
	Non bottle feeding	Reference	

Discussion

The prevalence of rotavirus infection in this study was 33.5% among children with gastroenteritis, which is higher than previous findings in Mogadishu, where rates were 18.7% in males and 16.6% in females, with no statistically significant gender difference ($p=0.359$). Comparatively, a study in China reported a rotavirus A prevalence of 26.71% among children with acute gastroenteritis, while Iraq recorded a higher prevalence of 43.3%. Sri Lanka exhibited the highest rate, with 69.3% of children testing positive for rotavirus. Globally, the distribution of this strain varies, accounting for over 70% of infections in North America, Europe, and Australia, but only 30% in South America and Asia, and 23% in Africa. These variations highlight the significant geographic and regional differences in rotavirus prevalence, possibly influenced by factors such as vaccination coverage, sanitation, and healthcare infrastructure. The findings from Mogadishu contribute valuable insights into the local burden of rotavirus, emphasizing the need for targeted prevention and control strategies, particularly in regions with limited healthcare resources.[2],[5],[1],[6]. This study found that children who drank bottled water had a significantly higher risk of rotavirus infection, with an unadjusted prevalence ratio 2.415 times greater than those who consumed tap water. This suggests that bottled water, rather than tap water, may be a risk factor for rotavirus infection. Other water sources, such as filtered or unfiltered water, showed no significant association. Similar findings were reported in Burkina Faso, where breast-fed infants had a significantly lower risk of rotavirus infection compared to bottle-fed infants. These observations highlight the crucial role of both drinking water sources and feeding practices in rotavirus transmission. Ensuring access to safe drinking water and promoting breastfeeding may be key strategies in reducing rotavirus infections in children [5]. In this study, severe dehydration was significantly less common in rotavirus-positive cases compared to rotavirus-negative cases, with an unadjusted prevalence ratio of 0.342 (95% CI: 0.124 - 0.945, $p=0.039$). Moderate dehydration, however, showed no significant association with rotavirus infection. These findings differ from those reported in Sri Lanka, where most rotavirus-positive cases exhibited no dehydration or vomiting, and no significant differences in clinical characteristics were observed between rotavirus-positive and negative cases. This variation highlights that while severe dehydration may be less frequent in rotavirus-positive cases, clinical presentations, including dehydration and vomiting, can differ across populations. These discrepancies could be influenced by factors such as local healthcare practices, diagnostic criteria, and population-specific health conditions, suggesting the need for tailored approaches to managing rotavirus infections in different settings [5]. This study found a significant association between fever and rotavirus infection, with an unadjusted prevalence ratio of 2.201 (95% CI: 1.133 - 4.273, $p=0.020$), indicating that patients with fever are over twice as likely to have rotavirus compared to those without. Fever appears to be a common symptom of rotavirus infection, consistent with findings from Burkina Faso, where fever, alongside vomiting, was frequently observed in rotavirus cases, often leading to hospitalization. These results underscore the importance of fever as a key clinical symptom of rotavirus infection across different settings. The consistency of this symptom suggests that fever can be a reliable indicator of rotavirus, emphasizing the need for prompt diagnosis and management in affected individuals to prevent complications [5]. This study identified a significant association between vomiting and rotavirus infection, with an unadjusted prevalence ratio of 2.514 ($p=0.007$), indicating that patients who experience vomiting are more than twice as likely to have rotavirus compared to those who do not. This finding aligns with studies from various regions, such as Tanzania, where vomiting was also significantly linked to rotavirus infection. Similar associations have been reported in pre-vaccine studies from rural Western Kenya, Northwestern Angola, Accra, Ghana, urban Bangladesh, and Sudan. In India, 93.5% of rotavirus-positive children experienced vomiting along with loose stools, compared to 61.2% of rotavirus-negative children ($p < 0.05$). These consistent findings across diverse geographic settings confirm that vomiting is a hallmark symptom of rotavirus infection. The prevalence of vomiting in rotavirus cases highlights its diagnostic importance, reinforcing the need for healthcare providers to recognize vomiting as a key clinical feature of rotavirus, which can guide timely intervention and treatment [19],[7]. In this study, children who were not vaccinated had a 1.543 times higher risk of rotavirus infection compared to those who were vaccinated, though this difference was not statistically significant ($p=0.315$). However, children who missed their vaccinations had a significantly higher risk, with an unadjusted prevalence ratio of 6.000 ($p=0.034$), indicating a markedly increased likelihood of infection. These findings align with research from Tanzania, where rotavirus vaccination significantly reduced infection rates in children. Although the overall comparison between vaccinated and non-vaccinated groups was not statistically significant, the strong association between missed vaccinations and increased infection risk emphasizes the crucial role of timely and complete vaccination. These results reinforce the importance of ensuring full rotavirus vaccination coverage to effectively lower infection rates and prevent outbreaks, particularly in settings with high disease burden [7]. Also The study investigated the association between gender, residence, age in months, economic status of the family, diarrhea duration, feeding pattern, parental education, and the presence of rotavirus among children with gastroenteritis. Surprisingly, the research found that these factors showed no significant association with the presence of rotavirus.

Conclusion

The prevalence of rotavirus among children with gastroenteritis in our study was 33.5%. Our analysis revealed significant associations with certain risk factors: drinking bottled water, compared to tap water, showed a significantly higher risk of rotavirus infection (prevalence ratio 2.415, 95% CI: 1.007 - 5.793, $p=0.048$). Interestingly, while overall rotavirus vaccination status did not demonstrate a significant difference (prevalence ratio 1.543, 95% CI: 0.662 - 3.594, $p=0.315$), our findings underscored the importance of vaccination compliance. Children who missed their rotavirus vaccination had a significantly higher prevalence ratio (6.000, 95% CI: 1.142 - 31.532, $p=0.034$), highlighting the protective effect of vaccination against rotavirus infection in this population. These results emphasize the critical role of water source and vaccination status in managing and preventing rotavirus-associated gastroenteritis among children.

Consent

As per international standards, **parental written** consent has been collected and preserved by the author(s).

Ethical approval:

As a researcher investigating rotavirus infection among hospitalized children under five years of age with acute watery diarrhea at Mogadishu Somali Türkiye Training and Research Hospital, ethical approval from the hospital's Ethical Committee has been obtained. This approval ensures that the study adheres to rigorous ethical standards in conducting research involving human subjects.

Recommendation.

- **Promotion of Rotavirus Vaccination:** Given that missing the rotavirus vaccination significantly increases the risk of infection, healthcare providers should prioritize and promote timely vaccination schedules for all eligible children. This includes educating parents and caregivers about the importance of vaccination in preventing rotavirus-associated gastroenteritis.
- **Improvement of Drinking Water Quality:** Since consuming bottled water was associated with a higher prevalence of rotavirus compared to tap water, efforts should be directed towards ensuring access to safe drinking water sources, especially in urban and camp settings where bottled water consumption is prevalent. This may involve improving infrastructure for water treatment and distribution or providing access to affordable and safe alternatives.
- **Early Recognition and Management of Symptoms:** Given the association of fever and vomiting with increased rotavirus prevalence, healthcare providers should emphasize early recognition and prompt management of these symptoms, particularly in children presenting with acute gastroenteritis. This includes ensuring adequate hydration and timely medical intervention to reduce the severity and duration of illness.
- **Age-Specific Interventions:** Considering the heightened vulnerability of children aged 12–23 months to rotavirus infection, targeted interventions such as age-appropriate vaccination strategies and enhanced surveillance during peak rotavirus seasons could help mitigate the burden of disease in this age group.
- **Socioeconomic Considerations:** Recognizing that middle and low-income families are disproportionately affected, interventions should also address socioeconomic disparities in healthcare access and affordability of preventive measures. This may involve subsidies for vaccines, improved healthcare access in rural and rotative areas, and community education on hygiene and disease prevention.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models and text-to-image generators have been used during the writing or editing of this manuscript.

Reference.

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