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Assessing the Knowledge, Attitude and Practices among Health Workers on Rotavirus Diarrhoea Prevention in Rukiga District

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Abstract

Purpose: Rotavirus has been identified as the most common pathogen associated with severe diarrhoea. Rotavirus infection is the leading cause of diarrhea in children under five and it is highly contagious. It poses an exception to typical diarrheal disease management rules. While improved access to clean water and better sanitation and hygiene practices are vital to preventing most diarrheal diseases, they have done little to disrupt infection. The virus may cause severe, dehydrating diarrhea in young children and, in untreated cases, lead to death. The aim of this study is to determine the knowledge, attitude and practices regarding Rotavirus Prevention and its vaccination among medical workers in Rukiga district

Methodology: A total of 263 health workers were selected through random sampling. A structured and validated questionnaire was used. Questions about knowledge, attitude and practices were collected and verified on scale. Descriptive statistics were presented; multivariable regression analysis was done to determine the correlation of knowledge, attitude level, and practices with socio demographic variables such as age, sex and education. The p value≤0.05 considered was statistically significant.

Findings: 118(47.14%) had adequate knowledge, 164(66.138%) positive attitude and 102(41.1%) appropriate practices on the Rotavirus diarrhoea prevention. Knowledge, attitude level and practices were increased significantly with increasing age, sex and education. After controlling for variables in the multivariable regression model, age, sex and education were the significant factors in determining the scores on knowledge, attitude and practices. About the knowledge. Age (β=4.15, p<0.001), sex (β=3.012, p=0.001) and education level (β=14.04, p<0.038), then attitude, age (β=4.32, p<0.001), sex (β=0.015, p=0.003) and education level (β=0.021, p<0.001) while for practices, age (β=0.021, p<0.001). Similarly, sex (β=0.022, p<0.001), education level (β=0.136, p=0.006). Generally, there was inadequate knowledge, positive attitude and inappropriate practices amongst the respondents on Rotavirus diarrhoea prevention in Rukiga District.

Recommendations: Rukiga District needs to train, mentor and coach the health workers on prevention of Rotavirus including vaccination in order to have increased knowledge level, positive attitude and appropriate actions.

Keywords: *Knowledge, Attitude, Practices, Prevention, Rotavirus*

1.0 INTRODUCTION

Background

Rotavirus caused 111million cases of illness, 25 million clinic visits and two million hospitalizations annually 2005-2009. It was responsible for about 450,000 to 700,000 deaths annually. About 85% of deaths occur in Africa and almost every child suffered at least one infection before the age of 5 years. *Victoria Jiang , Baoming Jiang, Jacqueline Tate, Umesh D Parashar, Manish M Patel (2010)* Rotaviruses were classified into eight major groups (A-H). Group A Rotaviruses cause most infections seen in young children. Globally, G1, G2, G3, G4, G9 and G12 in combination with P8 or P4 constitute 88 % of the Rotavirus circulating strains. In Africa, other G/P type combinations such as G8P6, G8P8 and G12P are prevalent. The great diversity of Rotavirus strains in developing countries is believed to originate from interspecies transmission in societies where contact with animals is frequent. Rotavirus diarrhoea causes severe dehydration, leading to high mortality in developing countries. It was common in children attending day care, and living in households or neighborhoods whose younger ones suffered from diarrhoea with a known risk factor, suggesting the main spread via person-to-person transmission through the faeco-oral route.Santos F.S.,SousaJunior E.C. , Guerra S.F.S. , Lobo P.S. , PenhaJunior E.T. , Lima A.B.F., Vinent e C.B.G. , Chagas E.H.N., Justino M.C.A. , Linhares A.C. , Mattghijnssens J., Soares L.S. , Mascarenhas J.D.P (2019).

In a study by *Simon Aabalekuu (2019*) about 85% of deaths occurred in Africa and almost every child suffered at least one infection before the age of 3 years. In Uganda, diarrhoea is among the top four causes of morbidity in infants and young children, and was responsible for about 38% of the cases on average. According to *Katayi Mwila, Roma Chilengi, Michelo Simuyandi, Sallie R. Permar (2017)*, each child, on an average, in the developing world suffers from diarrheal diseases for more than three times a year. The Most common cause is Rotavirus.

Globally, efforts aimed at preventing diarrheal diseases among children under-five years of age through various interventions such as breastfeeding, hygiene and safe drinking water has not yielded the desired results. Under-five mortality continues to increase in the poorest regions especially among children in poor families. However, countries where vaccination was introduced, a decrease in -associated morbidity and mortality was observed *Bosomprah, S., Beach, Beres, (2016).*

However, studies by *Ezeofor and Scholastica .C (2018)* the knowledge, attitudes and practice of the parents to children affected vaccination programs. It was observed that misconception about immunization caused by the different sources of information like clinics, ignorance of parents on the importance of immunization, fear of side effects and safety concerns about the vaccines were obvious among parents. Although, there were no studies about this among health workers. It is clear that the more the healthworkers give correct information with right attitude to parents the better the response to vaccination.

In Africa, the prevalence of Rotavirus diarrhoea raised from 19% among children under age of 6 months to 39% among the 6-11 months, when complementary foods and other liquids were introduced. The prevalence remains high (31%) at age 12-23 months, which is the time when children begin to walk were at an increased risk of contamination from the environment, and declines thereafter *UBOS and ICF (2016).* In Uganda, diarrhoea is among the top four causes of morbidity in infants and young children. It was responsible for 33 % to 45 % of diarrhoea cases. In a cross-sectional study September 2012 to September 2013 carried out on stool samples and venous blood collected from 712 children (2-59 months) hospitalized with acute diarrhoea in four hospitals in central Uganda by *Keith Grimwood , Stephen B*

Lambert, Richard J Milne (2012) ,Rotavirus was detected in 263 (37 %).In 2009, the World Health Organization (WHO) recommended that all countries, and particularly those countries with high diarrhea mortality rates in children, introduce Rotavirus vaccines into their national immunization programs.

Overall, Rota Virus vaccines were licensed in over 130 countries and incorporated by 106 countries into their national immunization programs. All these Rotavirus vaccines, which were pre-qualified by the WHO included live attenuated oral vaccines given to children between 6 and 8 weeks of age. Rotarix was provided in two doses with a time lag of one month, while RotaTeq, Rotavac and Rotasiil are given in three doses. In countries where Rotavirus vaccination had been introduced, a decrease in -associated morbidity and mortality was observed *Santos F.S., Sousa Junior E.C., Guerra S.F.S., Lobo P.S., PenhaJunior E.T., Lima A.B.F., Vinente C.B.G., Chagas E.H.N., Justino M.C.A., Linhares A.C., Matthijnssens J.,Soares L.S., Mascarenhas J.D.P (2019).* Uganda introduced Rotavirus Vaccination into routine immunization in 2018.In June 2018, Rukiga District with support from Ministry of Health and United Nations Children Education Fund (UNICEF) started the new Rotavirus routine vaccination with 1870 children *$DHIS_{2,}$ 2018-(2019).*

There was limited data regarding Rotavirus diarrhoea prevention knowledge, attitudes and practices in Rukiga, Uganda but *Donna M.MacDougall et al.,2016* in Botswana elicited that prior to the program across all sites more physicians than nurses were aware of the national recommendation. In the post program survey, however, more nurses were aware of the national recommendation and their provincial universal vaccination program. Nurses had higher knowledge scores than physicians in the post program survey ($p < 0.001$). Parents of young infants were also more knowledgeable about Rotavirus and vaccine in the two areas where universal programs were in place.

Tafazzul Hyder Zaidi, MPH, Professor, Mubashir Zafar, FCPS, Assistant Professor, Rahat Naz, Assistant Professor,a Syed Shoeb Ahmed, Assistant Professor, Ishaa Saleem, Koonj Sundardas, MBBS, Aiman Aamir,a Misbah Yousuf,Rubab Zehra,and Tehreem Siraj (2021) in a knowledge attitude practices research on Rotavirus vaccination in Parkstan ,Medical students had appropriate knowledge about the rotavirus but attitude toward rotavirus vaccination was unsatisfactory. It was suggested that it should be a part of the curriculum of not just medical students but all students from high school to undergraduate level regardless of the course they were enrolled in and also be advertised by the government.

In addition, *Gofaone Jessica Mosweu(2018)* finding from the study showed that the mean score of care givers' attitudes was 14.33 (SD= 3,178) with 36 (43%) having good attitudes towards the prevention and treatment of diarrhoea while 48 (57%) had poor attitudes. 28(57%) of caregivers had good practices and (71%) had poor practices. *Nalubwama Sarah (2021),* Luwero Uganda concluded that the level of knowledge among respondents was good and the attitude of caregivers towards prevention and management of diarrhea was also positive. Despite the knowledge and attitude positive results, the practices of prevention and management of Rotavirus diarrhea were still poor for example use of ORS was at only 36.5%. Therefore, good knowledge and attitude, did not translate to good practice.

Ezeofor and Scholastica C (2018) in a Bushenyi District Uganda study revealed that 91.5% of the children had been immunized belonging to 94 parents who participated. 4.7% were not immunized while 3.8% were not fully-immunized. Different factors were advanced by the parents for not immunizing or not fully immunizing their children. These are related to knowledge, attitudes and practice of the parents. The following factors affect parent's attitude towards childhood immunization: education of parents, misconception about immunization caused by the different sources of information, ignorance of parents on the importance of immunization, fear of side effects and safety concerns about the vaccines. These

issues directly inform us that healthworkers needed to be assessed on the knowledge attitude and practices because they are the source information to parents.

Tagbo Beckie Nnenna, Ughasoro Maduka D2, Omotowo Ishola Babatunde, Eneh Chizoma Ihuarula4 and Uwaezuoke Ndubuisi Anyele (2013) on Knowledge of Rotavirus Disease among Health Care Providers and Their Acceptance of Rotavirus Vaccines in South-East, Nigeria concluded that health-care providers are likely to adopt rotavirus vaccines, especially if they are properly informed. Increasing awareness and involving pediatricians would be essential to a successful vaccination programme. These data, will guide pre-introduction advocacy efforts and help develop strategies to broaden vaccine coverage.

In Understanding Rotavirus Vaccine Efficacy and Effectiveness in Countries with High Child Mortality *Tintu Varghese, Gagandeep Kang and Andrew Duncan Steele* (*2022***)** confirmed that where healthcare is hard to access, prevention is the best way to protect children against diarrheal diseases. Although the efficacy of rotavirus vaccines is higher in low-mortality settings, the impact is greater in high-mortality countries because of the high disease burden. Effectiveness studies have demonstrated a reduction in diarrheal diseases and death, the protection offered even by incomplete vaccination series and heterotypic protection against diverse genotypes.

Nonetheless, concerns include low vaccination coverage in some countries, the waning of protection beyond the first year of life in some subsets of children, and the sustainability of the vaccination program without donor support. With two new WHO pre-qualified vaccines now available to strengthen the supply pipelines, the continued generation of effectiveness data with these new vaccines will help ensure further vaccine introductions such that children everywhere can benefit from rotavirus vaccination. In fact, a report in this supplement found that nationwide diarrhea mortality in Mexican children has been reduced by almost half following rotavirus vaccine implementation, and these declines have been sustained for 7 years after vaccine introduction**.** The researcher assessed the knowledge, attitudes and practices of health workers in preventing Rotavirus diarrhoea in Rukiga District.

Statement of the Problem

Diarrheal disease kills an estimated 2.2 million people each year including 0.45-0.75 million children under five years. Among infectious diseases, diarrhoea is ranked as the third leading cause of both mortality and morbidity in the world. Young children are especially vulnerable bearing 68% of the total burden of diarrhoea disease. Diarrheal disease is the foremost leading cause of under five deaths among the major childhood diseases in the developing world contributing to 35% of mortality in children under five *Lenters, L.M., Das, J.K. & Bhutta, Z.A. (2013)*

In 2018, Rotavirus vaccination was introduced into routine immunization in Uganda. June 2018, Rukiga District with support from Ministry of Health and United Nations Children Education Fund (UNICEF) started the new Rotavirus routine vaccination with 1870 children under five years. Before, the introduction of the rotavirus vaccination, training of health workers and VHT's was done. However, there was an increase of diarrhoea cases on despite social mobilization, radio talk shows on Rotavirus prevention that were done. Secondly, this was a new preventive intervention against diarrhoea caused by with limited research done in Rukiga District *(DIHS2 2018-2019).*

The Rukiga District DHIS 2020-2021 financial year showed, 4077 children were given the first dose but fewer children (3824) returned to receive the second one. About 253 children did not receive the second dose despite the availability of vaccines (14,392 doses) and mass mobilization. Non-receipt of the second dose was partial vaccination to rotavirus. Re-emergence of outbreaks was eminent. Therefore, there was

need to conduct a study in order to find out the health workers' knowledge, attitudes and practices towards preventing Rotavirus diarrhoea in Rukiga District.

Objective of the Study

Main Objective

To assess the knowledge, attitude, and practices of health workers on Rotavirus diarrhoea prevention in Rukiga District.

Specific Objectives

- To find out the level of knowledge on Rotavirus diarrhoea among Rukiga District Health `workers.
- To examine the attitude of health workers towards Rotavirus vaccination in Rukiga District.
- To identify the practices in preventing Rotavirus diarrhoea in Rukiga District.

Research Questions

What was the level of knowledge on Rotavirus Diarrhoea among Rukiga District Health Workers?

What was the attitude of health workers towards Rotavirus vaccination in Rukiga District?

What were the practices of Rotavirus preventing diarrhoea in Rukiga District?

2.0 LITERATURE REVIEW

The Knowledge Attitude Practice study theory divides the process of human behavior change into three steps: acquiring knowledge, generating attitudes, and forming practice, during which human health behaviours can also be effectively changed. *Jinlian Wang, Lu Chen, Mengying Yu, Jiangtao He (2020).*

In this chapter presented literature was reviewed. The chapter was structured according to the objectives of the study which were to assess level of knowledge, attitude and practice on Rotavirus diarrhoea Prevention among Rukiga District Health workers.

Knowledge of Rotavirus Diarrhoea

Tagbo Beckie Nnenna1, Ughasoro Maduka, Omotowo Ishola Babatunde, Eneh Chizoma Ihuarula4 and Uwaezuoke Ndubuisi Anyele, Omotowo Ishola Babatundel in South-East, Nigeria (2013) assessed knowledge of Rotavirus Disease among Health Care Providers and their Acceptance of Vaccines in South East, Nigeria. They found that most participants were aware of Rotavirus disease, especially as a high priority child health issue. However, only 27.5% considered disease to be a very serious disease while 63.7% knew that immunization is the most effective method of prevention. Sustained awareness to enhance uptake was the most frequently expressed need.

Rotavirus was first identified as a cause of diarrhoea in 1973.Rotavirus was the common cause of severe gastroenteritis in infants and children. 1996 to 2005, five strains of (G1–4, G9) accounted for 90% of isolates from children younger than 5 years in the United States. Of these, the G1 strain accounted for more than 75% of isolates. Rotavirus is very stable and may remain viable in the environment for weeks or months if not disinfected. Rotavirus is a double-stranded RNA virus belonging to the Reoviridae family *Christine Marie George, Jamie Perin, Karen J. Neiswender de Calani, W. Ray Norman, Henry Perry, Thomas P. Davis, Jr., and Erik D. Lindquist (2014).*

Rotaviruses are non-enveloped RNA viruses which are classified according to 2 surface proteins contained on the outer layer of the capsid the VP7 (glycoprotein or G protein) and the VP4. In Indonesia 2021 publications, the prevalence of RVA in South Sumatra (55.4%) and West Papua (54.0%) were

significantly higher than that in East Java (31.7%) as determined in our previous study. The prevalence in West Nusa Tenggara (42.6%) was the lowest among three regions, but higher than that in East Java. Interestingly, equine-like G3 rotavirus strains were found as predominant strains in South Sumatra in 2016 and in West Papua in 2017–2018.*Rury Mega Wahyuni, Takako Utsumi, Zayyin Dinana1, Laura Navika Yamani1,, Juniastuti1, Ishak Samuel Wuwuti, Elsa Fitriana, Emily Gunawan, Yujiao Liang, Fitratul Ramadhan, Soetjipto, Maria Inge Lusida and Ikuo Shoji (2021).*

Rotavirus is the leading cause of severe diarrhoea among children worldwide, killing ~600,000 children annually. The incidence of Rotaviruses is similar in developed and developing countries, suggesting that improved sanitation alone is not sufficient to prevent the infection. The prevalence of Rotaviruses specific strains varies by geographic area. The reservoir of Rotaviruses is the gastrointestinal tract and stool of infected humans. Although infection occurs in many non-human mammals, transmission of animal Rotaviruses to humans is believed to be rare and probably does not lead to clinical illness. Although immune deficient persons may shed for a prolonged period, a true carrier state has not been described *Mark A. Malek, Nadia Teleb, Remon Abu-Elyazeed, Mark S. Riddle, May El Sherif, A. Duncan Steele, Roger I. Glass, Joseph S. Bresee (2010).*

In a meta-analysis on Modeling environmentally mediated rotavirus transmission: The role of temperature and hydrologic factors suggested that rotavirus decay rates are positively associated with temperature ($n = 39$, $P << 0.001$). This association was stronger at higher temperatures (over 20 °C), consistent with tropical climate conditions. The model analysis demonstrated that water could disseminate rotavirus between the two communities for all modeled temperatures. While direct transmission was important for disease amplification within communities, waterborne transmission could also amplify transmission. In standing-water systems, the modeled increase in decay led to decreased disease, with every 1 °C increase in temperature leading to up to a 2.4% decrease in incidence.

These effect sizes were consistent with prior meta-analyses, suggesting that environmental transmission through water sources may partially explain the observed associations between temperature and rotavirus incidence. Waterborne rotavirus transmission was likely most important in cooler seasons and in communities that use slow-moving or stagnant water sources. Even when indirect transmission through water could not sustain outbreaks, it would seed outbreaks that are maintained by high direct transmission rates *Alicia N. M. Kraay h, Andrew F. Brower, Nan Lin, and Joseph N. S. Eisenberg, (2018).*

Rotavirus is highly communicable, transmission is by faecal-oral route, both through close person-to-person contact and by fomites (such as toys and other environmental surfaces contaminated by stool). Transmission of Rotavirus through contaminated water or food appears to be uncommon. The Rotavirus enters the body through the mouth. Viral replication occurs in the villous epithelium of the small intestine. Recent evidence indicated that up to two-thirds of children with severe gastroenteritis show the presence of antigen in serum (antigenemia). Infection may result in decreased intestinal absorption of sodium, glucose and water.There is reduced levels of intestinal lactase, alkaline phosphatase, sucrase activity, and may lead to isotonic diarrhoea *Aisleen Bennett, PhD ,Louisa Pollock, PhD, Naor Bar-Zeev, PhD,Joseph A Lewnard, PhD,Khuzwayo C Jere, PhD,Benjamin Lopman, PhD (2021) .*

The incubation period for Rotavirus diarrhea is short, usually less than 48 hours. The clinical manifestations of Rotavirus infection vary and depend on whether it is the first infection or reinfection .However, the median incubation period was 4.5 days (95% CI 3.9-5.2 days) for astrovirus where the rotavirus belonged in a systemic review *Rachel M Lee, Justin Lessler, Rose A Lee, Kara E Rudolph, Nicholas G Reich, Trish M Perl & Derek AT Cummings (2013).* Infected persons shed large

quantities of Rotaviruses in their stool beginning 2 days before the onset of diarrhoea and for up to 10 days after onset of symptoms. Rotaviruses may be detected in the stool of immune-deficient persons for more than 30 days after infection. Spread within families, institutions, hospitals, and child care settings are common *Mateusz Hasso-Agopsowicz, Chandresh Nanji Ladva, Benjamin Lopman, Colin Sanderson, Adam L Cohen, Jacqueline E Tate, Ximena Riveros, Ana Maria Henao-Restrepo, Andrew Clark (2019).*

Rotavirus infection in infants and young children can lead to severe diarrhoea which is passage of waterly stool three or more times in a day, dehydration, electrolyte imbalance, and metabolic acidosis. Children who are immune-compromised because of congenital immunodeficiency or because of bone marrow or solid organ transplantation may experience severe or prolonged gastroenteritis and may have evidence of abnormalities in multiple organ systems, particularly the kidney and liver *James Nyangao, Nicola Page, Mathew Esona, Ina Peenze, Zipporah Gatheru, Peter Tukei, A. Duncan Steele (2010).*

In *Jaspreet Gharial,Ahmed Laving and Fred Were (2017)* clinical manifestations study found out that Rotavirus positive children had moderate to severe dehydration (42.9 % vs 11 %, p-value = 0.01), vomiting as presenting symptom (92.2 % vs 68.8 %, p-value = 0.02) and absence of fever (38.1 % vs 68.6 %, p-value= 0.03) compared to non- group respectively. The odds ratio of Rotavirus diarrhoea was increased 10.8 fold (95% CI 1.2 to 97.4; p-value = 0.03) provided children had vomiting. Positive children were prone to develop hypokalemia (p-value= 0.04), acidosis (p-value < 0.001), loss of bicarbonate (p-value < 0.001) and higher blood urea nitrogen (p-value = 0.02) than non- group. Children with diarrhea had neutrophil and less WBC in stool sample compared to Non- acute diarrhea group. Therefore children admitted to the hospital, with moderate dehydration, absence of fever and vomiting as presenting symptoms were more prone to have Rotavirus infection.

Mateusz Hasso-Agopsowicz, Chandresh Nanji Ladva, Benjamin Lopman, Colin Sanderson, Adam L Cohen, Jacqueline E Tate, Ximena Riveros, Ana Maria Henao-Restrepo, Andrew Clark septemeber(2019) stated that the first Rotavirus infection after 3 months of age is generally the most severe. Infection may be asymptomatic, may cause self-limited watery diarrhea, or may result in severe dehydrating diarrhea with fever and vomiting. Up to one-third of infected children may have a temperature greater than 102°F (39°C). The gastrointestinal symptoms generally resolve in 3 to 7 days. The clinical features and stool characteristics of Rotavirus diarrhea are nonspecific, and similar illness may be caused by other pathogens. As a result, confirmation of a Rotavirus diarrheal illness as requires laboratory testing.

Benjamin D. Hallowell, PhD , Umesh D. Parashar, MD, Aaron Curns, MPH, Nicholas P. DeGroote, MPH, and Jacqueline E. Tate, PhD (2019) suggested that routine use of a rapid immunochromatographic test may enhance early detection of Rotavirus and guide clinical management. This will ultimately reduce the burden of the disease in children and prevent the irrational prescription of antibiotics. The most widely available method for confirmation of Rotavirus infection is detection of antigen in stool by enzyme-linked immunoassay (EIA). Several commercial test kits are available that detect an antigen common to human Rotaviruses. These kits are simple to use, inexpensive, and very sensitive. Other techniques (such as electron microscopy, reverse transcription polymerase chain reaction, nucleic acid hybridization, sequence analysis, and culture) are used primarily in research settings. Rotavirus antigen has also been identified in the serum of patients 3–7 days after disease onset, but at present, routine diagnostic testing was based primarily on testing of faecal specimens.

In study by *Melinda K Munos, Christa L Fischer Walker, Robert E Black* (2010) , 205 papers for abstraction, of which 157 were included in the meta-analyses of Oral Rehydration Salts outcomes and 12

were included in the meta-analyses of RHF outcomes, estimated that Oral Rehydration Salts prevented 93% of diarrhoea deaths. Oral Rehydration Salts was one of the most important medical advancements in the past 50 years that has saved millions of infant lives. Administration of Oral Rehydration Salts resulted in glucose-coupled sodium and water absorption in the small intestine replacing their losses. Oral rehydration therapy has been used safely and successfully to prevent and treat dehydration due to diarrheal pathogens in suffering infants and young children *Sue E. Crawford, Sasirekha Ramani, Jacqueline E. Tate, Umesh D. Parashar, Lennart Svensson, Marie Hagbom, Manuel A. Franco, Harry B. Greenberg, Miguel O'Ryan, Gagandeep Kang, Ulrich Desselberger & Mary K. Estes (2017).*

In addition, vaccines are the only public health prevention strategy likely to control Rotavirus disease. They were developed to mimic the immunity following natural infection that confers protection against severe gastroenteritis and consequently reduces the risk of hospitalization and death *Sarah Sheridan, Stephen Lambert and Keith Grimwood (2012).*

The first Rotavirus vaccines were derived from either bovine (cow) or rhesus (monkey) origin. In 1998, a rhesus-based tetravalent vaccine (RRV-TV, Rotashield) was licensed and recommended for routine immunization of U.S. infants. Formulation development was performed with the live, attenuated, human neonatal vaccine candidate (RV3-BB) for facilitating use in low- and middle- income countries including Uganda. The formulation was a liquid, 2-8°C stable vaccine, with no need for pre-neutralization of gastric acid prior to oral administration of a small-volume dose, and a low-cost *Brian Rha,Jacqueline E Tate,Eric Weintraub,Penina Haber,Catherine Yen,Manish Patel (2014).*

In an Italian study *Francesco Napolitano,Abdoulkader Ali Adou,Alessandra Vastola andItalo Francesco Angelillo (2019)* found that, the majority of participants (89%) agreed with the statement that the Rotavirus vaccine was not harmful. Among those who did not immunize their children, a large proportion reported that they would not be willing to obtain vaccination mainly because of lack of knowledge and side effects. This underlined the importance of health education. Insufficient knowledge about vaccination, concerns regarding the side effects and the lack of recommendation by the pediatrician were the most frequently cited barriers for not having immunized their children.

Holly Seale, Mei Neni Sitaresmi, Jarir Atthobari, Anita E. Heywood, Rajneesh Kaur, Raina C. MacIntyre, Yati Soenarto & Retna Siwi Padmawati in 2015 Indonesian study, health workers were asked about the strategies to prevent Rotavirus diarrhea such as eating healthy food, breastfeeding, living well, and adhering to good hygiene practices were proposed. Very few spoke about Rotavirus vaccination as a preventative strategy. Good enough, the general notion that prevention was better than treatment was voiced by some of the participants.

Attitude of Health Workers towards Rotavirus Vaccination

The Wellcome Global Monitor (2018) stated that 73% of people worldwide would trust a doctor or nurse more than any other source of health advice, including family, friends, religious leaders or famous people. Across the world, people with the lowest household income had less confidence in hospitals and healthcare systems. *Wasiu Olalekan Adebimpe &Oluwatosin Adediran Adeoye (2020)* in a study, 151(83.9%) were found to have good attitude to the cold chain management systems. Spending more than 5 years in profession, being a male, being a Community Health Officer were significant predictors of having a good practice of immunization logistic management system.

Holly Seale, Mei Neni Sitaresmi, Jarir Atthobari, Anita E. Heywood, Rajneesh Kaur, Raina C. MacIntyre, Yati Soenarto Retna Siwi (2015) in Indonesia observed that only 45 % of the health

professional respondents believed that the vaccine was efficacious. This was an important finding given the fact that the attitudes of health professionals were major factor associated with vaccine uptake. In order to promote the use of the Rotavirus vaccine, communication messages needed to be clearly defined and directed. *James A Church, Sandra Rukobo, Margaret Govha, Benjamin Lee, Marya P Carmolli, Bernard Chasekwa, Robert Ntozini, Kuda Mutasa, Monica M McNeal, Florence D Majo (2019)* in Zimbabwe, wrote that oral Rotavirus vaccines had lower efficacy in developing compared to developed countries. Therefore, poor water, sanitation, and hygiene (WASH) could contribute to reduced oral Rotavirus vaccine immunogenicity.

Akash Malik, Pradeep Haldar,b Arindam Ray, Anita Shet, Bhrigu Kapuria, Sheenu Bhadana,Mathuram Santosham, Raj Shankar Ghosh, Robert Steinglass, and Rakesh Kumar (2019) study in India introduced Rotavirus vaccine in a phased wise manner. In the first two phases the Rotavirus vaccine has been introduced in nine states of the country accounting for nearly 35% of the annual birth cohort of the country. From March 2016 to November 2017, approximately 13,260,000 vaccine doses were administered in the country. The vaccine was well accepted by both the health workers and parents/caregivers.

In randomized controlled trials with Rotateq by *M Salvadori, N Le Saux (2019),* the incidence of serious adverse events, including sudden infant death syndrome, were similar in the vaccine and placebo recipients. In post marketing surveillance in the United States, there has been no increased risk of hematochezia, meningitis, encephalitis, seizures, Kawasaki disease, myocarditis or Gram-negative sepsis. Recipients of the RotaTeq vaccine experienced a small but statistically significant increase in vomiting (15% versus 14%), diarrhea (24% versus 21%), nasopharyngitis (7% versus 6%), otitis media (15% versus 13%) and bronchospasm (1.1% versus 0.7%) when compared with control infants. These differences were not, however, believed to be clinically significant. Rotarix has also been evaluated for safety in 12 clinical trials involving 76,918 children. There had been no increased risk of serious adverse events. The incidence of fever, cough, diarrhea, vomiting and irritability did not differ between the vaccine and the placebo group.

A similar study *Rachel M Burke, Jacqueline E Tate, Carl D Kirkwood, A Duncan Steele, Umesh D Parashar (2019)* showed available vaccines did not show an association with intussusception during clinical trials, the rarity of this outcome makes it difficult to evaluate without extremely large numbers of participants. Lastly, *Margaretha Stenmarker, Carin Oldin, Marie Golsäter, Margareta Blennow, Karin Enskär, Mats P. Nilsson, Lina Schollin Ask* (2021) found that in 2016, the overall attitude to vaccination was positive (Stockholm, n = 519, 39%, versus Jönköping, n = 96, 10%).

Challenges before and after the introduction in both regions were particularly related on how one gave information about the vaccine's potential to increased risk of intussusception. John Gentsch, Renáta Dóró, Brigitta László, Vito Martella, Eyal Leshem, Umesh Parashar, Krisztián Bányai (2014),w ho found out that vaccination was the most effective preventive method. The same study nearly a fifth thought, it was good hygiene and treatment with oral rehydration therapy. 53.9% were conversant with current vaccines, but mainly concerned about their newness, yet 70.3% would vaccinate their children. Majority would recommend vaccination although it would increase if the vaccine was incorporated into the national immunization program and recommended by professional organizations

Practices by Health Work in Rotavirus Prevention

When deciding about vaccination against Rotavirus, parents are mostly driven by the out-of-pocket costs, Rotavirus vaccine effectiveness, protection duration, and frequency of severe side effects. The highest

vaccination coverage was expected for a Rotavirus vaccine with high effectiveness and protection duration that was implemented within the current National Immunization Program context (Parental preferences for rotavirus vaccination in young children: a discrete choice experiment. Jorien *Veldwijk, Mattijs S Lambooij , Patricia C J Bruijning-Verhagen , Henriette A Smit , G Ardine de Wit (2021).*

The lowest age for the 1st dose was 6 to 10 weeks. The minimum interval between doses of both vaccines was 4 weeks. The maximum age for any dose of either vaccine was 8 months 0 days. No Rotavirus vaccine should be administered to infants older than 8 months 0 days of age. This was an off-label recommendation for both vaccines, because the labeled maximum age for RV1 was 24 weeks, and the labeled maximum age for RV5 32 weeks *Joann F Gruber, Sylvia Becker-Dreps, Michael G Hudgens, M Alan Brookhart, James C Thomas, Michele Jonsson Funk (2018).*

ACIP recommends that the Rotavirus vaccine series should be completed with the same product whenever possible. However, vaccination should not be deferred if the product used for a prior dose or doses is not available or is not known. In this situation, the provider should continue or complete the series with the product that is available. If any dose in the series was RV5 (RotaTeq) or the vaccine brand used for any prior dose in the series is not known, a total of three doses of vaccine should be administer *Vesta Richardson, Joselito Hernandez-Pichardo, Manjari Quintanar-Solares, Marcelino Esparza-Aguilar, Brian Johnson, Cesar Misael Gomez-Altamirano, Umesh Parashar, Manish Patel (2010).*

Breastfeeding does not appear to diminish immune response to Rotavirus vaccine. Infants who are being breastfed should be vaccinated on schedule. Infants documented to have had gastroenteritis before receiving the full course of Rotavirus vaccinations should still begin or complete the 2- or 3-dose schedule following the age recommendations, because the initial infection may provide only partial protections against subsequent disease. *Ghion Shumetie , Molla Gedefaw , Adane Kebede , Terefe Derso (2018).*

Due to the fact that the timing of the first dose of Rotavirus vaccination is scheduled in children aged between six weeks and three months intussusception might be triggered. Congenital immune deficiency is often still undiagnosed at that time; we suggest general newborn screening should be introduced as soon as possible. However, in its absence, clinicians should be particularly careful about clinical symptoms potentially related to SCID, such as failure to thrive, persistent or recurrent infections, in order to avoid the administration of vaccine in this particular category of patients. Furthermore, persistent infection in a vaccinated child should always trigger an immunologic work-up. Therefore, while vaccination constitutes a risk for infants born with SCID, it is safe for the general population preventing more than 80% of severe cases of Rotavirus diarrhea in most countries *Maria Antonia De Francesco, Giovanni Ianiro,2 Marina Monini,Cesare Vezzoli, Richard Fabian Schumacher,Silvia Giliani,Giovanni Lorenzin,Francesca Gurrieri,and Arnaldo Caruso (2019).*

An evaluation on the safety of the pentavalent vaccine (PRV), RotaTeq vaccine among HIV-infected and HIV-exposed infants in Kenya by *Richard Omore, Jacqueline E. Tate,Ciara E. O'Reilly,Tracy Ayers,John Williamson,Feny Moke,Katie A. Schilling,Alex O. Awuor,Peter Jaron,John B. Ochieng,Joseph Oundo,Umesh D. Parashar,Michele B. Parsons(2016)* adverse events, were not associated with receipt of vaccine. Serious adverse events were not significantly more common among HIV-infected or HIV-exposed participants. PRV appears to be a safe intervention against gastroenteritis among infants in Kenya.

In one study, *Jean-Michel Roué, Emmanuel Nowak, Grégoire Le Gal, Thomas Lemaitre, Emmanuel Oger, Elise Poulhazan, Jean-Dominique Giroux, Armelle Garenne, Arnaud Gagneur (2014),* found that the

frequency of severe adverse effects (SAEs) was higher in term infants (8.1%) than in preterm infants (5.2%). This difference was not statistically significant (P = 0.09, chi-square test). Among the SAEs reported as possibly related with Rotavirus vaccine, the frequencies were similar in the two populations (1.8% for term infants and 1.9% for preterm infants. Two cases of bronchiolitis, one case of bronchopneumonia, and two cases of rhinitis were identified as SAEs in the premature infants. No cases of intussusception or of Kawasaki disease was reported in the premature infants. No diarrhea, fever, or other reactogenic symptoms were reported within the 6 weeks following the last dose among the prematurely born infants.

Withholding breastfeeding around the time of RV1 vaccine administration did not lead to increased anti-IgA seroconversion compared with that seen with a breastfeed at the time of vaccination. On the contrary, IgA seroconversion in infants immediately breastfed tended to be higher than in those withheld from a feeding. Findings suggested that breastfeeding should be continued. *Asad Ali, Abdul Momin Kazi,Margaret M. Cortese,Jessica A. Fleming,SungSil Moon,Umesh D. Parashar,Baoming Jiang,Monica M. McNeal,Duncan Steele,Zulfiqar Bhutta,Anita K. M. Zaidi (2015).*

Infants living in households with pregnant women should be vaccinated according to the same schedule. The majority of women of childbearing age have pre-existing immunity to Rotavirus, the risk for infection by the attenuated vaccine virus is considered to be very low. It is prudent for all members of the household to employ measures such as good hand washing after changing a diaper or otherwise coming in contact with the faeces of the vaccinated infant. *Daniel E. Velasquez,Umesh Parashar &Baoming Jiang (2017).*

Theresa K. Resch, Yuhuan Wang, Sung-Sil Moon, Jessica Joyce, Song Li, Mark Prausnitz & Baoming Jiang (2018) declared that mice was the first to show that parenterally administered IRV could induce mucosal immunity in the gut, in addition to strong serum antibody response, and was a promising candidate for Rotavirus vaccine in achieving global immunization.

New formulations of both ROTAVAC and ROTASIIL have also been prioritized by manufacturers and are expected to be considered for WHO prequalification. ROTAVAC 5D – a fully liquid, ready-to-use version of the WHO-prequalified liquid-frozen ROTAVAC – is available in single- and multi-dose vials with VVM7, and can be stored at 2–8°C for up to 24 months. It was commercially licensed in India in mid-2019; as discussed above, clinical trials for ROTAVAC 5D are completed and the vaccine will likely receive WHO prequalification status soon. A fully liquid formulation of ROTASIIL – which is currently available only as a lyophilized vaccine, requiring reconstitution – was launched in early 2020 and is undergoing clinical trials. Annika *Skansberg, Molly Sauer, Marissa Tan, Mathuram Santosham &Mary Carol Jennings (2020).*

Rotavirus Vaccines as biological medical preparations can easily lose their potency when they are not stored at the optimal temperature of +2°C to +8°C. As part of measures to ensure the potency of vaccines, a standardized cold chain system consisting of efficient and reliable equipment, trained staff, and distribution of vaccines is required. *Anthoniette Asamoah, Nancy Innocentia Ebu Enyan, Abigail Kusi-Amponsah Diji,and Charles Domfehn (2021).* In countries where Rotavirus vaccine has been introduced into the national immunization program, a significant impact has been noted on all-cause diarrhea and hospitalizations and, in some settings, on all-cause diarrhea mortality rates. Indirect protection of children age-ineligible for Rotavirus vaccine has also been observed. *Jacqueline E. Tate, Umesh D. Parashar (2021).*

Improved awareness regarding vaccination amongst public and scientific community and strengthening of public health system for better and timely immunisation coverage are important factors to maximize uptake of Rotavirus vaccine**.** *An Apte, S Roy, A Bavdekar, S Juvekar, S Hirve (2018).* WHO standards define an adverse heat event as occurring when vaccines experience a temperature above 8°C for a period of 10 hours or more. An adverse freezing event occurs when vaccines experience a temperature below −0.5°C for a period of 1 hour or more, reflecting the greater general sensitivity of vaccines to freezing than to heat events.

WHO guidelines recommend storing vaccines between 2°C and 8°C at all levels of the cold chain because exposure to heat or cold outside that range can adversely affect the immunological properties of the vaccines and thus reduce their potency. Administering compromised vaccines will not provide the intended immune response to protect the vaccinated client and that, in turn, can prevent countries from effectively reaching their coverage targets. As much as 37% of vaccines are exposed to temperatures below the recommended range in lower-income countries, making this a critical issue to address. *Martin Ndinakie Yakum, Jérôme Ateudjieu, Fida Ramsina Pélagie, Ebile Akoh Walter & Pierre Watcho (2015)*

Verónica Carrión Falcón, Yara Verónica Villalobos Porras , César Misael Gómez Altamirano , Umit Kartoglu (2014) observed that 92% of the time, temperatures during the storage and transport remained within the recommended temperature range of 2 °C to 8 °C, there were occasions where vaccines were exposed to temperatures below 2 °C and above 8 °C. Current practices for temperature monitoring at storage and distribution consist of situations where likelihood of exposures might increase. For example, almost in all cold chain equipment, the average temperature is found to be set below optimum 5 °C, and in many cases around 2 °C. In addition, temperature monitoring of the equipment currently is not found to be optimal.

The state and municipality level cold rooms have chart recorders but not in use. They monitor temperatures via sensor/display manually, three times a day. Vaccines are distributed via temperature-controlled truck which has an electronic sensor in the main cabin, however, temperatures are not logged automatically, and require manual operation to check and record. No temperature monitoring device is used when vaccines are transported in EPS boxes with regular trucks. Service level refrigerators have chart recorders, again not used. Temperature monitoring is done through electronic thermometer with no memory function.

Mercy Lutukai, Elizabeth A Bunde, Benjamin Hatch, Zoya Mohamed, Shahrzad Yavari , Ernest Some , Amos Chweya , Caroline Kania , Jesse C Ross , Carmit Keddem , Yasmin Chandani (2019) said that Monovalent live Rotavirus vaccine (RV1) is given orally in two doses a minimum 4 weeks apart. It is provided as a lyophilized powder that is reconstituted just before administration. Each reconstituted 1 ml dose of Rotavirus vaccine contains at least 10 median culture infective dose (CCID50) of live attenuated virus G1P1 and no preservative. It can be given after 6 weeks and not after 12 weeks and completed prior to 32 weeks. Recently FDA has extended the deadline of the first dose up to 14 weeks and 6 days. IAP recommends the first dose at 10 weeks and a second dose at 14 weeks due to interference with OPV. Pentavalent live vaccine (RV5) (Rotateq by MSD) is given orally in 3 doses at age 2, 4, and 6 months. The first dose should be given between age 6-12 weeks and subsequent at 4-8 weeks interval. The first dose can be extended up to 14 weeks and 6 days (recent FDA approval). All doses should be completed before 32 weeks. In case a dose is missed, it is not necessary to restart the course but it should be completed within the time frame.

Result from Timeliness of Childhood Vaccinations study by *Juliet N. Babirye, Ingunn M. S. Engebretsen,Frederick Makumbi,Lars T. Fadnes,,Henry Wamani, Thorkild Tylleskar and Fred Nuwaha*

(2013) in Kampala Uganda showed that about half of 821 children received all vaccines within the recommended time ranges (45.6%; 95% CI 39.8–51.2). Timely receipt of vaccinations was lowest for measles (67.5%; 95% CI 60.5–73.8) and highest for BCG vaccine (92.7%: 95% CI 88.1–95.6). For measles, 10.7% (95% CI 6.8–16.4) of the vaccinations were administered earlier than the recommended time.

Vaccinations that were not received within the recommended age ranges were associated with increasing number of children per woman (adjusted hazard ratio (AHR); 1.84, 95% CI 1.29–2.64), non-delivery at health facilities (AHR 1.58, 95% CI 1.02–2.46), being unmarried (AHR 1.49, 95% CI 1.15–1.94) or being in the lowest wealth quintile (AHR 1.38, 95% CI 1.11–1.72). A total of 425 respondents participated in this study. Over two-thirds of respondents 314 (73.9%) had good practice of cold chain management. Significant determinants of practice of cold chain were training ($p = 0.004$), presence of functional refrigerators ($p = 0.016$), NPI supervision ($p < 0.001$) and higher level of education ($p < 0.001$).

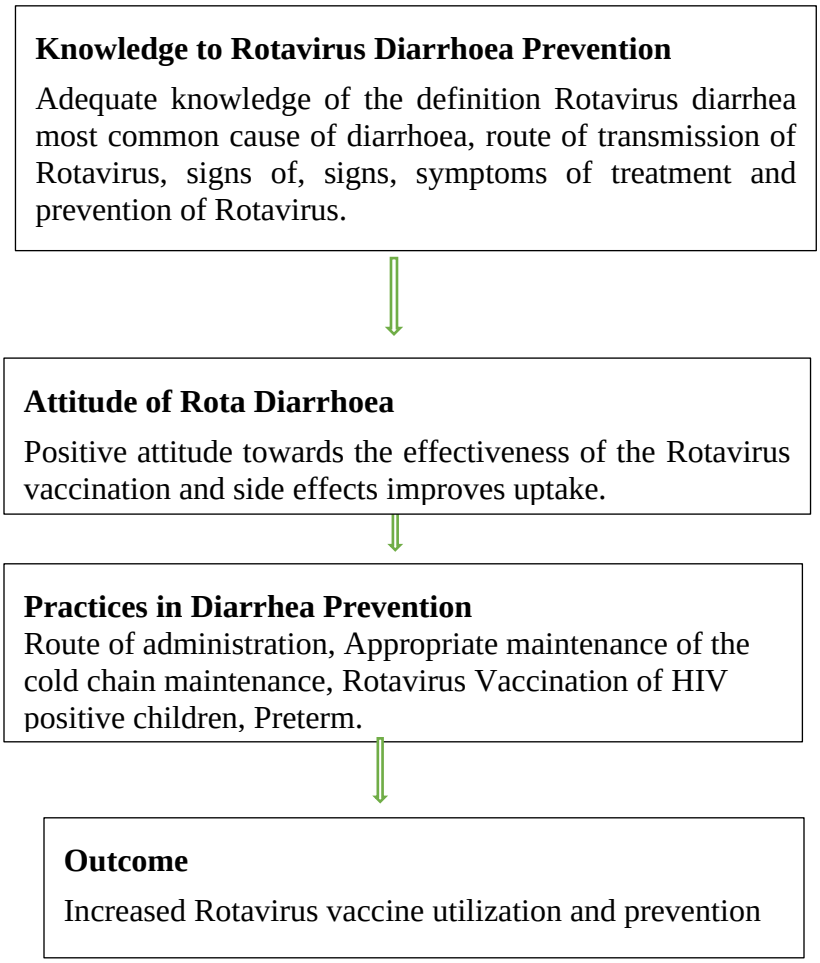
The literature review found that while VVM technology was well-known and appreciated among health workers, practices and perception differ between staff cadres and levels. In a study from Nigeria, VVM awareness was found to be higher among trained health workers compared to untrained staff at sub-national and health facility levels (e.g. vaccinators and volunteers). This same study reported that even if misconceptions about VVMs were common among untrained staff, these misconceptions could be addressed through additional training. *Pär Eriksson, Bradford D. Gessner, Philippe Jaillard, Christopher Morgan, Jean Bernard Le Gargasson (2017).*

In 2009, the WHO Strategic Advisory Group of Experts (SAGE) recommended the inclusion of Rotavirus. Rotavirus vaccines into the national immunization program of all countries, in particular those where diarrheal disease is a major health problem. Thus, 10 years after Rotavirus vaccine introduction has occurred in many countries, their public health impact has been demonstrated by reductions in -associated mortality and diarrheal hospitalizations in all socio-economic settings.

In low-income settings, the lower Rotavirus vaccine effectiveness and the early indications that vaccine protection is not enduring beyond the first year of life, pose ongoing challenges to sustainability of early vaccine successes. New live oral and non-replicating vaccine candidates continue to be developed with the aim to improve effectiveness in developing country settings, by enhancing vaccine coverage with new vaccines expanding the global supply, and by improving efficacy and safety of the vaccines. Only time will allow us to answer whether these new generation vaccines will improve vaccine effectiveness and impact for those who need vaccines the most. Carl *D. Kirkwood, Lyou-Fu Ma, Megan E. Carey, A. Duncan Steele (2019).*

Vaccine Vial Monitors (VVM) is used to estimate if a vaccine has been exposed to excessive hot temperatures. This endpoint measurement is useful in determining if a vaccine is safe to be administered to a patient, but it does not pinpoint where in the cold chain a vaccine was exposed to excessive heat. With the expansion and technological advancement of cold chain equipment temperature monitoring, it is now possible to remotely estimate VVM status as a vaccine moves through the cold chain.*K Zaman, Asma Binte Aziz,Md Yunus, Firdausi Qadri, Allen G Ross,and John D Clemens (2021).Gurmeet S. Sarla (2020*) stated that the presence of unused and expired medications in cabinets ,fridges, cupboards is a potential danger and can be harmful to humans, environment, and wildlife.

Conceptual Framework



3.0 METHODOLOGY

Study Design

A cross-sectional study design that employed quantitative research method approaches.

Study Area

The research was carried out in health facilities (2 HCIV's,6 HCIII's,25HCII's,42 drug shops of the newly created Rukiga District found in Western Uganda with a population of 105,039 and about 24,000 children less than five years with expected estimated 5000 deliveries in 192 villages,2 town concils,4 sub counties. The health workers working in drug shops were considered under the nearest health units. There are about 500 health workers including village health teams. The estimated distance from Kampala city and Mbarara City is 450 km and 150 km respectively (Map in appendix II).

Sampling Size

The study population was adult health workers including village health teams working in Rukiga District. The sample size was 263 respondents using Kish and Leslie, 1965 formula as shown below: $n=Z^2PQ/d^2$

n…… minimum sample size……..….263

d……..sampling/degree of error……..….5% (0.05)

Z…….confidence Interval……..…1.96

P……percentage of who have good attitude, knowledge and practices……..78% as discovered by *Mahmoud Nabavi et al., 2015.*

Q…….1-P

$n=1.96*0.78*(1-0.78)/(0.05)^2$

The non-response rate was about 6 % with 15 questionnaires returned. Thus, the sample size for this study was 248 respondents.

Sample Selection Technique

Simple random sampling was used to select the participants. A list of the 33 health facilities was provided by the District Health Officer. Health worker and Village Health Team found at health facility or home within 5km from the Health center in Rukiga District were interviewed. This was done for all health facilities within Rukiga District during support supervision visits.

Inclusion and Exclusion Criteria

Only the health workers and Village Health Teams were considered during the study in Rukiga. Non-health workers were not considered. Patients were not considered.

Data Collection Technique

Questionnaire, pens, pencils, was used in data collection. The data was collected manually using two trained research assistants. The questionnaire used was divided into four main parts. The first section was demographic characteristics of the respondents. The second part assessed the attitude knowledge of health workers on Rotavirus and prevention. The third part of the questionnaire was concerned with the vaccination and lastly the practices.

Demographic details of subjects included age, gender, education and employment status. Knowledge was assessed by seven questions. Each response put on scale, adequate ‘1’ and ‘0’ for inadequate. Attitude was assessed by two questions. Each answer was scored on a scale of ‘0’ negative and ‘1’ positive attitude respectively. Negative or positive was perceived by the researcher from the participants’ response. Practices in preventing Rotavirus diarrhoea was assessed by six questions each response given a score inappropriate‘0’ and appropriate ‘1’

Data Quality Control

Random sampling used in selecting the respondents thus only those found at the health facility participated in this research. Training of two research assistants on use of data collection tool and explaining on relevancy of unbiased data and the principal investigator was closely supervising the research assistants.

Data Processing/Analysis

Data collected from the questionnaires were inspected for errors and gaps. After inspection and editing, it was entered into excel version 12. Questions were coded and analyzed using STATA version 13.

Data Analysis of Quantitative Data

This involved processing of the data which was done at three levels using Statistics/Data analysis (STA TA) version 15.

Univariate Analysis

Univariate analysis incorporated the descriptive summary for each variable. To study characteristics of respondents, techniques for summarizing data for continuous variables were used and these included: Mean, variance and standard deviation while the frequencies and percentages were used for categorical variables.

Regression Model Analysis

Multivariate analysis was performed to assess which factor was associated with the knowledge, attitude and practices about more than the other. After scoring the knowledge, attitude and practices as per the responses from the health workers, the aggregated scores now measure on the numerical scale and therefore the suitable model to analyze such kind of criterion variable is the simple/multiple regression analysis. Thus, the multiple regressions was used because it attempts to control for possible confounding effect of independent variables on each other and thus finds the independent association for each predictor variable with the criterion variable. Statistical significance of the relationships was determined for the P-value ($P \leq 0.05$)

Ethical Considerations

The researcher obtained an introductory letter from Bishop Stuart University that was used when introducing himself to Rukiga District Health Office. The District Health Office granted him permission to conduct the research and give a feedback. During data collection, consent was obtained from respondents, confidentiality, privacy and anonymity was assured. A dissertation copy for Rukiga District Health Office was printed.

Study Limitations

The study was done in one district of Uganda on health workers and may not be generalized. Literature review on the real subject was scanty. The participants were too busy to accept attending to the researcher's questionnaire. COVID-19 effected the researcher thus prolonged the study.

4.0 FINDINGS

This was the analysis, presentation and interpretation of the findings of this study. The study assessed the knowledge, attitude, and practices among health workers on diarrhoea prevention among Rukiga District Health workers. Quantitative data was obtained from 248 respondents who were health workers. This chapter covers, demographic characteristics and analysis, presentation and interpretation of the findings on the main study variables basing on the order of the research objectives.

Response Rate

As an indicator of the comprehensiveness and rigour of study findings, a researcher checked the response rate *Jack E. Fincham, PhD (2008). Morton, Bandara, Robinson and Carr (2012)* defined response rate as the total number of participants who were interviewed divided by the total number who were eligible. In a related way, response rate is defined as the total number of completed interviews divided by the total number of participants with whom contact was made (or the number of all possible who were interviewed).

Response rate is an important factor in determining the quality of the study *Krishnan & Poulose (2016).*

The Response Rate for This Study is Indicated in Table 1

Table 1: Response Rate

Response	Frequency	Percentage
Returned questionnaires	248	94
Unreturned questionnaires	15	6
Total	**263**	**100**

Source: Primary Data

From the study, 248 out of 263 target respondents filled in and returned the questionnaire *contributing* to 94%. This was adequate for the study. According to *Mugenda and Mugenda (2003)*, a response rate of at least 70% is sufficient for a study.

Demographic Characteristics of the Respondents

Demographic characteristics studied included gender, age group, ownership, tribes, education levels and occupation. This information was thought to be necessary for the study because the ability of the respondents to provide required information was believed to depend on their background.

Health Facilities of Respondents n=33

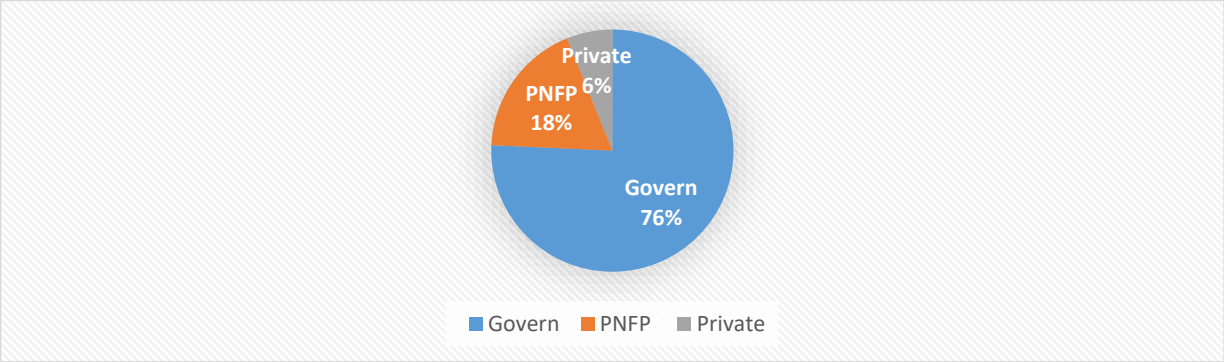


Figure 1: Health Facilities of Respondents

Source: Primary Data

The figure in 4.1 showed that 25(76%) respondents were from government health facilities,6 (18%) were from Private not for profit while 2(6%) were from private clinics. This means that data collected represented the whole cross section of all facilities in Rukiga District

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Sex of Respondents n=248

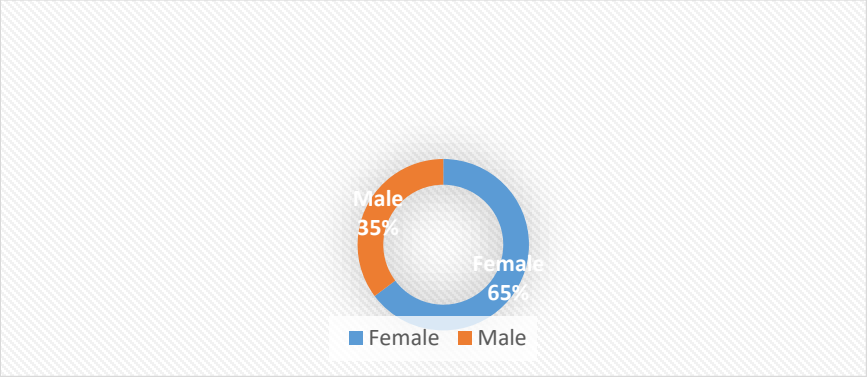

Figure 2: Sex of Respondents

Source: Primary data source

Figure 4.1 indicates that Females were 161(65%) and males were 87(35%). Whereas the majority of the respondents were females, the responses of both groups were captured obtaining views representative of both groups. Both groups of respondents actively participated in providing responses to the researcher. This implied that the study captured views for both men and women to inform the study.

Tribes of Rependent

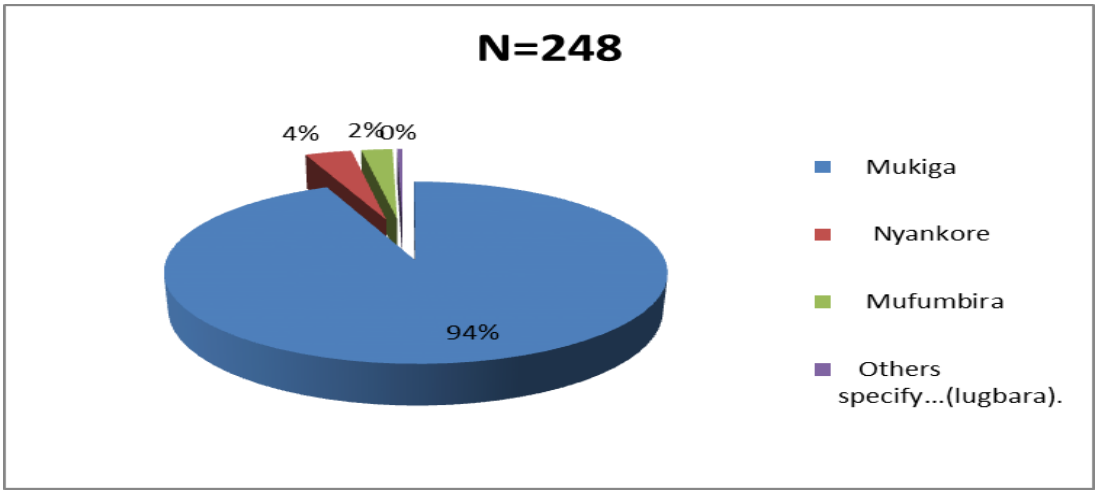

Figure 3: Tribes of Respondents

Source:Primary Data

From the findings in figure most respondents were Bakiga (233) 94% followed by Banyankore at 9(4%). Bafumbira were at4 (2%) but other tribes were Lugbara less than 2 (1%). This shows that the data collected was collected across cultures.

Age Group of Respondents n=248

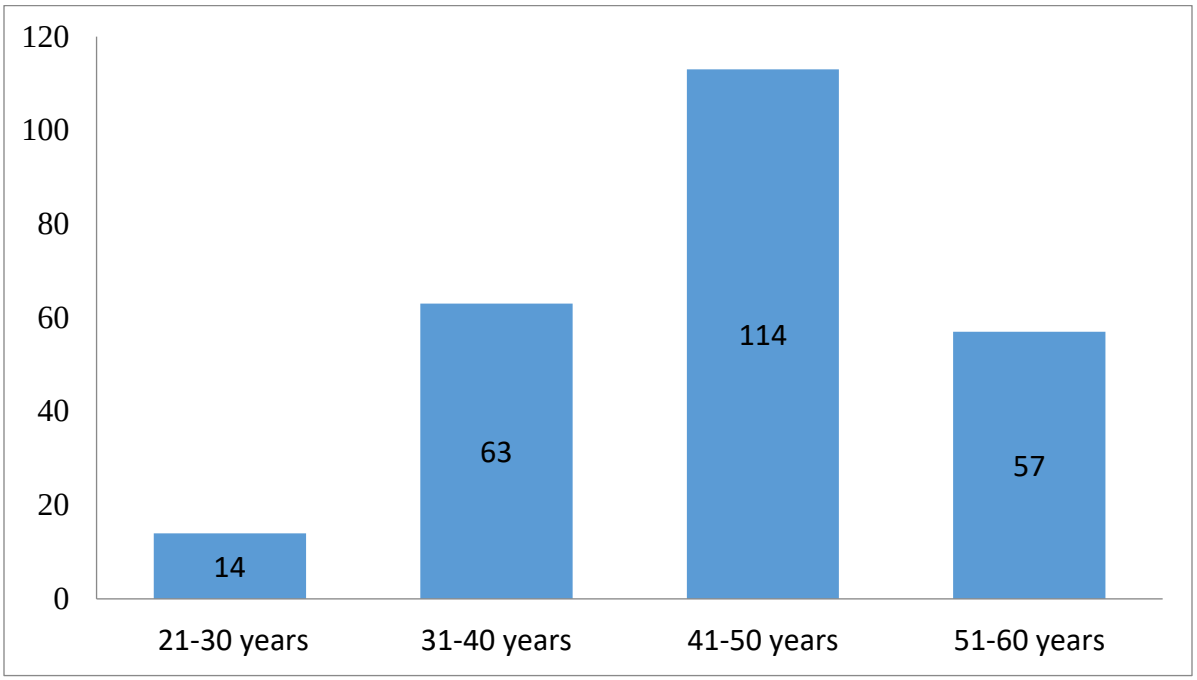

Figure 4: Age of Respondents
Source: Primary Data

The data in Figure 2 on age groups showed that larger number of the respondents 113 were between 41-50 years followed by those between 31-40 years that who were 63, then those between 51-60 years who were 57, those between 21-30 years were 14 health workers. These statistics show different age categories were represented in the study and this thus led to the obtaining of views representative of different age groups.

Education

Table 2: Education of Respondents n=248(Source: Primary data)

Education Level	Frequency	Percentage
O level	42	16.9
A level	12	4.8
Tertiary	185	74.6
Bachelor's degree	8	3.2
Masters	1	0.4
Total	**248**	**100.0**

From the findings in Table 2, most 42(16.9%) of the respondents indicated that they had attained O level of education, 12(4.8%) indicated that they had attained A level of education and 185(74.6%) of the respondents indicated that they had tertiary and 8(3.2%) had bachelor's degree while 1(0.4%) had masters as the level of education attained. This implied that the data was collected from well informed respondents and who had attained high level of education and were in a position of understanding and offering

information as requested to answer to the objectives of the study.

Participants' Health Facility n=248

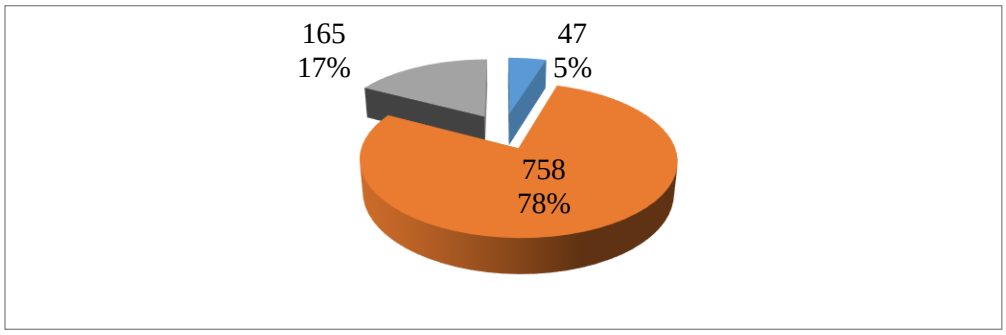

Figure 5: Participants' Health Center

Source: Primary Data Source

The figure showed the grade of health center grade according to Government structures. It was found out that (70)28% were HCIV, 47(19%) found at HCIII and 131(53%) were from HCII. This implied that the majority of health centers that participated in the study were HCII.

Occupation of the Respondents

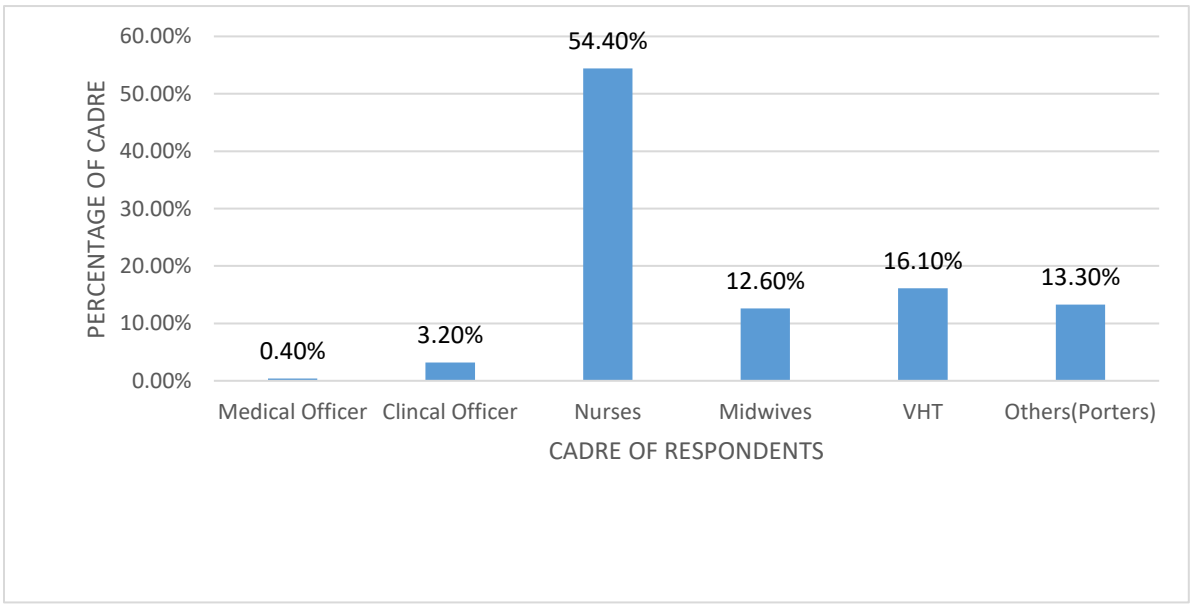

Figure 6: Occupation of Respondents n=248
Source: Primary Data

The figure 6 shows that the majority of the staff respondents were nurses at 135(54.4%), followed by VHT at 40(16.1%), midwives respondents were 31(12.6%). Clinical officers who participated at 8(3.2%) ,Porters at 32(13.3%) while medical officers were the list at 2(0.4%).This meant that data was collected

from big cross section of health workers in Rukiga District.

Knowledge Of Health Workers on Rotavirus Diarrhoea in Rukiga District

The main objective of the study was to assess level of knowledge on Rotavirus diarrhoea among Health workers in Rukiga District. The following section presents and interprets the opinions of health workers on the knowledge about Rotavirus diarrhoea.

Table 3: Knowledge of Rotavirus Diarrhoea

Characteristic	**n (%)**
Definition Rotavirus diarrhoea (n=248)	
Diarrhoea is passage of watery stools 3 or more times in 24 hours	112(45.16)
Diarrheal does not leads to body water and electrolyte excessive loss	31(12.50)
All the above	93 (37.50)
None of the above	12(4.84)
The route of transmission of Rotavirus (n=248)	
Airborne	37(14.92)
Faeco-oral	173(69.76)
Skin to skin contact	34(13.71)
Other specify	3(1.21)
The most common cause of diarrhoea in children under five years (n=248)	
Cholera	27(11.39)
Dysentery	15(6.33)
Rotavirus	177 (74.68)
Typhoid	2(0.84)
Others specify	16(6.75)
Symptoms of Rotavirus disease (n=248)	
Severe diarrhoea	101(41.22)
Fever more 39^{o} C	27(11.02)
All the above	94 (38.37)
None of the above	23 (9.39)
Signs of severe Rotavirus Disease (n=248)	
Severe dehydration	99(39.92)
Loss of consciousness	20(8.06)
Shock	33(13.31)
Convulsions	8 (3.23)
All the above	88(35.48)
Prevention of Rotavirus diarrheal diseases (n=248)	
Introduction of Rota vaccination 6 weeks and 10 weeks	103(41.53)
Improved Hygiene and sanitation practices alone are sufficient	35(14.11)
All the above	89 (35.89)
None of the above	21(8.47)
Treatment of Rotavirus vaccination (n=248)	
Supportive treatment (ORS + Zinc and Intravenous Fluids)	177(71.37)
Antibiotics	30 (12.10)
None of the above	38(15.32)
Others specify	3(1.21)
Overall Average knowledge level =Inadequate knowledge >50	130(52.86)
Adequate Knowledge<50 >	118(47.14)

On the whole less than half 118(47.14%) of the respondents had inadequate knowledge on the Rotavirus diarrhoea prevention. Less than half of the responding health workers 112(45.16%) defined diarrhea as

passage of watery stools 3 or more times in 24 hours and 31(12.50%). More than have of the respondents 173(69.76%) knew that Rotavirus was transmitted through the faeco-oral route. The rest 77(30.3%) were not sure of the route of transmission of Rotavirus.

The Majority 177(74.68%) knew that the most common cause of diarrhoea in children under five was Rotavirus. Some of the respondents 101 (41.22%) knew that symptoms of is severe diarrhoea 37(11.02%), fever of more than 39^{o}C, 94(38.37%) knew that both are fever and severe diarrhoea were symptom. Only 88 (35.48%) knew there that all the listed (severe dehydration 99(39.92%), loss of consciousness, shock and convulsions) applied to Severe Disease. Less than half 103 (41.53%) responded with introduction of Rotavirus vaccination and improved hygiene was the second last with 35(14.11). Although the majority 177(71.37%) of the respondents knew that the treatment was supportive the rest 71(28.63%) were not sure.

Attitude of Health Workers towards Rotavirus Vaccination

The second objective was set out to determine the attitude of health workers towards Rotavirus vaccination. The results were shown in the table below.

Table 4: Attitude of Health Workers towards Rotavirus Vaccination

Characteristic	**N (%)**
Rotavirus Vaccination (n=248)	
Rotavirus Vaccination is Effective method of prevention of Rotavirus disease	147(59.27)
Sanitation and Hygiene is more effective method than vaccination	56(22.58)
Does not reduces risk of diarrhoea in children less than 5 years	38(15.32)
Vaccine does not improve routine immunisation	7(2.83)
Side Effects (n=248)	
The side effects of Rotavirus are too severe to be tolerated	76(30.65)
Intussusception is a common side effect	67(27.02)
Side effects are not severe therefore tolerable	92(37.10)
Intussusception is not a common side effect	13(5.24)
Overall average level of attitude: Positive attitude(1)>50%	164(66.138%)
Negative attitude (0)<50%	4(33.87%)

On average, respondents that had positive attitude towards prevention of Rotavirus vaccination accounted for 164(66.138%). The majority of the respondents 147(59.27%) had positive attitude towards vaccination as an effective method of preventing Rotavirus disease. Sanitation score 56(22.58%) however of those said it had not reduced diarrhea were at 38(15.32%) and 7(2.83%) did not accept it improves route immunization. Concerning the side effects, less than half 76 (30.65%) said they were severe, intussusception as a common side effect scored 67(27.02%), those who thought intussusception was not a severe side effect were 13(5.24%) however the side effect are minimal therefore tolerable got 92(37.02).

Practices in Prevention of Rotavirus Diarrheal Disease

The third objective was to assess the practices in prevention of Rotavirus disease. The following table shows the results.

Table 5: Practices in Prevention of Health Workers towards Rotavirus

Characteristic	n(%)
Route of Vaccine Administration (N=248)S	
The first and second dose of the Rotavirus vaccine is given at 6weeks and 10weeks respectively	90(36.44)
Rotavirus vaccine is given as oral drops	117(47.37)
Rotavirus vaccine is given intramuscularly	27(10.93)
Rotavirus vaccine is given on the left deltoid	13(5.26)
Cold Chain Maintenance (N=248)	
Monitor temperatures once a day	19 (7.66)
No need to monitor the temperature	50(20.16)
Monitor temperature daily in the morning and evening	83(33.47)
Rotavirus vaccine must be keep between +2^{o}C to +8^{o}C	96(38.71)
Contraindication of Rota Vaccine (N=248)	
Rota vaccine can be administered to children with HIV	59(23.79)
Rota vaccine is contraindicated in children with HIV	31(12.50)
I don't Know	97(39.11)
All the above	61(24.59)
Immunization of Preterm Babies (N=248)	
Preterm babies should be administered with Rota vaccine	88(35.48)
Preterm babies should not be vaccinated with Rotavirus vaccine	97(39.11)
I don't know	54(21.77)
Others specify	9(3.63)
Immunization Schedule (N=248)	
Rotavirus Vaccine is given with other vaccines during routine immunization	175(70.56)
Rotavirus vaccine is given as a supplementary vaccine	21(8.47)
Rotavirus vaccine is given only during child days	26(10.48)
I don't know	26(10.48)
Others specify	
Precautions before Administering the Vaccine (N=248)	
Check the expiry date on the vaccine after vaccinating	84(33.87)
Check the colour of Vaccine Vial Monitor before administering the vaccine	132(53.23)
The vaccine is safe and no need to check the expiry date	26(10.48)
Others specify	6(2.42)
Average practices: Appropriate	102(41.1)
Inappropriate	146(58.9)

Generally, most of the respondents 146(58.9%) did not have their appropriate practices at their fingertips. Concerning the route of administration, most of the health health workers introduced the vaccine by orally drops 117(47.37%), Some of the health workers said first dose and second dose were given at 6weeks and 10 weeks respectively 90(36.44%). 27(10.93%) answered it was given intramuscularly and for the site only 13(5.26%), it was left deltoid. The cold chain maintenance practices included 50(20.16%) no need to monitor temperature, 96(38.71%) kept temperature between +2^{o}C to +8^{o}C, 83(33.47%) monitored temperature daily in the morning, afternoon and evening and need to monitor temperature at 19(7.66%). On the Contraindication of Rotavirus vaccine: 59(23.79%) could administer it to children living with HIV. Immunization of the preterm babies: 88(35.48) were okay with administering preterm babies with Rota Vaccine. Before administration, 132(53.23%) checked the vaccine vial monitor, 84(33.87%) checked the

expiry date of the vaccine.

Influence of Socio Demographic and Socio-Economic Variables on the Knowledge, Attititue and Practice

The researcher went ahead to show the demographic and social economic variables on Knowledge, attitude and practices using regression tables below.

Table 6: Results of the Regression Analysis

	Knowledge			Attitude			Practices		
Predictor	**Coefficient (β)**	**t-test**	**P>|t|-sig**	**Coefficient (β)**	**t-test**	**P>|t|-sig**	**Coefficient (β)**	**t-test**	**P>|t|-sig**
Age	4.15	4.47	0.000	0.020	4.32	0.000	0.021	4.15	0.000
Sex	3.012	3.47	0.001	0.015	2.98	0.003	0.022	4.95	0.000
Education level	14.04	2.14	0.038	0.021	3.98	0.000	0.136	2.80	0.006

The results reveal that age has a significant positive effect on knowledge (β=4.15, p<0.001). Similarly, sex (β=3.012, p=0.001), education level (β=14.04, p<0.038), all have direct significant effects on the knowledge regarding. Therefore age, sex and education level were significant predictor of knowledge regarding and its vaccination. Health worker's knowledge regarding and its vaccination were significantly improved with increasing age in Rukiga district.
As regards attitude, age has a significant positive impact on attitude regarding (β=4.32, p<0.001). Similarly, sex (β=0.015, p=0.003), education level (β=0.021, p<0.001), all have direct significant effects on the knowledge regarding. As regards practices, age has a significant positive influence on attitude regarding (β=0.021, p<0.001). Similarly, sex (β=0.022, p<0.001), education level (β=0.136, p=0.006), all have direct significant effects on the knowledge regarding diarrhoea prevention.

5.0 DISCUSSIONS, CONCLUSTIONS AND RECOMMENDATIONS

This chapter presented the summary, discussion, conclusions and the recommendations of the study. The chapter was structured according to the objectives of the study which were to assess level of knowledge, attitude and practice on diarrhoea among Rukiga District Health workers.

Discussion

The following were the discussion of the results in comparison with other research findings.

Knowledge on Rotavirus diarrhoea among Rukiga District Health Worker

This was the first objective. The study found out that less than half of the health workers 112(45.16%) defined Rotavirus diarrhea as passage of watery stools 3 or more times in 24 hours. Only 31(12.50%) of participants indicated that Rotavirus diarrhoea led to electrolytes imbalance. The results were in agreement with *James Nyangao et al., 2021* who wrote that infection in infants and young children could lead to severe diarrhoea which is a passage of watery stool three or more times in a day that led to dehydration, electrolyte imbalance, and metabolic acidosis. This resulted into abnormalities in multiple organ systems,

particularly the kidney and liver.

Jaspreet Gharial et al.,2021 in a study stated that Rotavirus positive children were prone to develop hypokalemia (p-value= 0.04), acidosis (p-value < 0.001), loss of bicarbonate (p-value < 0.001) and higher blood urea nitrogen (p-value = 0.02) .However, 31(12.5%) were not aware that the it led to body water and electrolyte excessive loss in disagreement with *James Nyangao et al., 2021 , Jaspreet Gharial (2017)*.This shows, there was non-uniformity in the knowledge of the health workers of Rukiga District concerning the definition and physical effects of Rotavirus Diarrhea. It could be due to knowledge decay following trainings and mentorship.

More than have of the respondents 173(69.76%) knew that Rotavirus was transmitted through the faeco-oral route. The results agreed with *Aisleen Bennett et al., 2021* who noted that transmission was by faecal-oral route, both through close person-to-person contact and by fomites. Transmission through contaminated water or food appeared to be uncommon. The virus entered the body through the mouth. Viral replication occurred in the villous epithelium of the small intestine. It was noted that, 77 (30.3%) mentioned the routes of transmission which was not in agreement with *Aisleen Bennett et al., 2021* such as air-borne and skin to skin and others not specified 3(1,12%).Most of the respondents 177(74.68%) knew that the most common cause of diarrhoea in children under five was Rotavirus.

The study was in line with *Christine Marie George et al., 2014* who revealed that Rotavirus was first identified as a cause of diarrhoea in 1973. It is the most common cause of severe gastroenteritis in infants and children. It caused nearly universal infection by age 5 years and was responsible for up to more than 1.1 million diarrheal deaths each year worldwide. Five strains of (G1–4, G9) accounted for 90% of isolates from children younger than 5 years in the United States between 1996 and 2005. Of these, the G1 strain accounted for more than 75% of isolates was very stable and would remain viable in the environment for weeks or months if not disinfected.

On the contrary , more than a quarter 71(25.32%) did not know the most common cause of diarrhoea in the under five years but mentioned cholera 27(11.39%),Dysentry15(6.33%),typhoid 2(0.84%) and disagreed with *Christine Marie George et al;2014*.Most of the respondents 101 (41.22%) knew that symptoms of Rotavirus were severe diarrhoea, 37(11.02%) fever of more than 39^{o}C.Less than a half of the respondents 94(38.37%) answered that both fever and severe diarrhoea were symptom although 23(9.39%) said none of the symptoms were true. These findings agreed with *Mateusz Hasso-Agopsowicz et al., 2019* who asserted that the incubation period for infection was short, usually less than 48 hours. The clinical manifestations of infection varied and depended on whether it was the first infection or reinfection. The first infection after 3 months of age was generally the most severe. Infection was asymptomatic, would cause self-limited watery diarrhoea, or would result in severe dehydrating diarrhoea with fever and vomiting. Up to one-third of infected children would have a temperature greater than 102°F (39°C). The gastrointestinal symptoms generally resolved in 3 to 7 days. The clinical features and stool characteristics of diarrhoea were nonspecific, and similar illness could be caused by other pathogens.

Concerning Rotavirus Severe Disease, only 88(35.48%) knew that all the listed applied to Severe Virus Disease, severe dehydration 99(39.92%), loss of consciousness 20(8%), shock 33(13.31%) and convulsions 8(3.23%).*Jaspreet Gharial et al.,2017* in a Kenya clinical manifestations study found that positive children had moderate to severe dehydration (42.9 % vs 11 %, p-value = 0.01), vomiting as presenting symptom (92.2 % vs 68.8 %, p-value = 0.02) and absence of fever (38.1 % vs 68.6 %, p-value= 0.03) . Positive children were prone to develop hypokalemia (p-value= 0.04), acidosis (p-value < 0.001), loss of bicarbonate (p-value < 0.001) and higher blood urea nitrogen (p-value = 0.02) than non- group.

Children with diarrhoea had neutrophilia and less WBC in stool sample compared. Therefore, children admitted to the hospital, with moderate dehydration, absence of fever and vomiting as presenting symptoms were more prone to have infection.

Less than half of the respondents 103 (41.53%) assessed concurred with *Keith Grimwood et al., 2012* that Rotavirus Vaccines were the only public health prevention strategy likely to control disease. They were developed to mimic the immunity following natural infection that confers protection against severe gastroenteritis and consequently reduces the risk of primary healthcare utilization, hospitalization and death. In addition, only 89 (35.89%) knew that improved hygiene and vaccination could prevent Rotavirus disease. Improved hygiene alone was the second last with 35 (14.11%). 21 (8.47%) did not even know the preventive measures of Rotavirus. In another study by *Holly Seale et al .,2015* health workers asked about the strategies to prevent diarrhoea such as eating healthy food, breastfeeding, living well and adhering to good hygiene practices were proposed. Very few spoke about vaccination as a preventative strategy. However, the general notion that prevention was better than treatment was voiced by some of the participants.

The findings revealed that the majority 177(71.37%) of the respondents knew that the treatment was supportive. However, more than one quarter 71(28.63%) were not aware thus proposing incidentally would give antibiotics 30(12.10%).Some of the respondents 38(15.32%) would neither give antibiotics nor supportive treatment. 3(1.21%) others specified herbs as a mode of treatment. This study concurred with *Munos et al.,2010* who stated that globally, oral rehydration therapy was used by 41% of children with diarrhea. This use had played an important role in reducing the number of deaths in children under the age of five.

In addition respondents concurred with *Sue E. Crawford et al., 2017* who stated that one of the most important medical advancements in the past 50 years saving millions of infant lives was that administration of ORS.Oral rehydration therapy has been used safely and successfully to prevent and treat dehydration due to diarrheal pathogens, including, in infants and young children.

Attitude of Health Workers towards Rotavirus Vaccination in Rukiga District

164(66.138%) had positive attitude towards Rotavirus vaccination. The *Welcome Global Monitor., 2018* stated that 73% of people worldwide would trust a doctor or nurse more than any other source of health advice, including family, friends, religious leaders or famous people. Across the world, people with the lowest household income had less confidence in hospitals and healthcare systems.

The results showed more that more than half 147(59.27%) of the respondents inclined to *Gentsch et al.,2014* who found out that vaccination was the most effective preventive method. The same study nearly a fifth thought, it was good hygiene and treatment with oral rehydration therapy. 53.9% were conversant with current vaccines, but mainly concerned about their newness, yet 70.3% would vaccinate their children. Majority would recommend vaccination although it would increase if the vaccine was incorporated into the national immunization programme and recommended by professional organizations.

The side effect would determine health worker's attitude towards vaccination. Therefore, more than a quarter of the respondents 76 (30.65%) said that Rotavirus vaccine side effects were too severe to be tolerable. In the same vain, 67(27.02%) said intussusception was not a severe side effect. Only 13(5.24%) admitted that the side effect were minimal therefore tolerable got 92(37.02%). *Margaretha Stenmarker et al.,2021* found that in 2016, the overall attitude to vaccination was positive (Stockholm, n = 519, 39%, versus Jönköping, n = 96, 10%). Challenges before and after the introduction of Rotavirus vaccine in both

regions were particularly related on how one gave information about the vaccine's potential to increased risk of intussusception or side effects.

Assess the Practices in Preventing Rotavirus Diarrhoea in Rukiga District

102(41.1%) did appropriate practices. Concerning the route of administration, most of the health workers introduced the vaccine by oral drops 117(47.37%). However, 27(10.93%) answered it was given intramuscularly on the deltoid 13(5.26%). In addition, 90(36.44%) of the respondents said first dose and second dose were given at 6weeks and 10 weeks respectively. This study showed that ,respondents who practiced correct route of administration (43.7%) and interval between doses (46.4%) were in agreement with *Mercy Lutukai et al .,2021* who asserted that American Advisory Committee on Immunization Practices recommended routine vaccination of all infants without a contraindication. The vaccine would be administered as a series of either two (at ages 2 and 4 months) or three (at ages 2, 4, and 6 months) oral doses, for RV1 and RV5, respectively. The vaccination series for both vaccines was started as early as 6 weeks of age. The minimum interval between doses was 4 weeks. Vaccine was given orally at the same visit as others are given at these ages.

During the interview, it was noted that 96 (38.71%) kept temperature between +2^{o}C to +8^{o}C, 83(33.47%) monitored temperature daily in the morning, afternoon and evening. However, 50(20.16%) indicated that there is no need to monitor temperature which was not agreeing with *Falcón, Verónica Carriónet al., 2020*. Checking temperature morning and evening would be the correct practice. *Falcón, Verónica Carrión et., al 2020*, although 92% of the time, temperatures during the storage and transport remained within the recommended temperature range of 2 °C to 8 °C, there were occasions where vaccines were exposed to temperatures below 2 °C and above 8 °C. Current practices for temperature monitoring at storage and distribution consist of situations where likelihood of exposures might increase. For example, almost in all cold chain equipment, the average temperature is found to be set below optimum 5 °C and in many cases around 2 °C. In addition, temperature monitoring of the equipment currently is not found to be optimal. For example, the state and municipality level cold rooms have chart recorders but not in use.

They monitor temperatures via temperature sensor/display manually, three times a day. Although discrepancies were found between manually recorded temperature data and the study data logger recordings, since it was not part of the study protocol, it will be addressed in a separate paper. Vaccines are distributed via temperature-controlled truck which has an electronic sensor in the main cabin, however, temperatures are not logged automatically, and require manual operation to check and record. No temperature monitoring device is used when vaccines are transported in EPS boxes with regular trucks. Service level refrigerators have chart recorders, again not used. As a result, temperature monitoring is done through electronic thermometer with no memory function.

The study findings indicated that 59(23.79%) could administer it to children living with HIV. Richard Omore et al,.2016 valuated the safety of the pentavalent vaccine (PRV), RotaTeq® vaccine among HIV-infected and HIV-exposed infants in Kenya. Adverse events, including serious adverse events, were not associated with receipt of vaccine. Serious adverse events were not significantly more common among HIV-infected or HIV-exposed participants. PRV appears to be a safe intervention against gastroenteritis among infants in Kenya. However, 31 (12.50%) indicated that it is contraindicated to children living with HIV. None the less 97(39.11%) did not know the contraindication to Rotavirus vaccination.

Less than half of the respondents, 88 (35.48%) were okay with administering preterm babies. *Jean-Michel Roué et.,al 2014* found the frequency of SAEs was higher in term infants (8.1%) than in preterm infants

(5.2%). This difference was not statistically significant (P = 0.09, chi-square test). Among the SAEs reported as possibly related with the vaccine, the frequencies were similar in the two populations (1.8% for term infants and 1.9% for preterm infants [P = 0.96, chi-square test]). Two cases of bronchiolitis, one case of bronchopneumonia, and two cases of rhinitis were identified as SAEs in the premature infants. No cases of intussusception nor of Kawasaki disease was reported in the premature infants. No diarrhea, fever, or other reactogenic symptoms were reported within the 6 weeks following the last dose among the prematurely born infants. The Rotavirus vaccination was recommended in preterm babies.

The majority of the client 175(70.56%) said they were administering the Rotavirus Vaccines routinely with other vaccines which was true in Uganda. These were in line with Carl D. Kirkwood et al., 2019 who stated that in 2009, the WHO Strategic Advisory Group of Experts (SAGE) recommended the inclusion of vaccines into the national immunization program of all countries, in particular those where diarrheal disease is a major health problem. However, 26(10.48%) did not know and 26 (10.48%) for others specify but never clarified.

The study found out that 132 (53.23%) checked the vaccine vial monitor in agreement with *Annika Skansberg et., al 2021* who stated that Vaccine Vial Monitors (VVM) are used to estimate if a vaccine had been exposed to excessive high temperatures. This endpoint measurement was useful in determining the safety of the vaccine before administration to clients. With the expansion and technological advancement of cold chain equipment temperature monitoring, it is now possible to remotely estimate VVM status as a vaccine moves through the cold chain. In a study by *Pär Eriksson et al.,2017* from Nigeria, VVM awareness was found to be higher among trained health workers compared to untrained staff at sub-national and health facility levels (e.g. vaccinators and volunteers). This same study reported that even if misconceptions about VVMs were common among untrained staff, these misconceptions could be addressed through additional training.

It was also noted that 84 (33.87%) checked the expiry date of the vaccine but 26 (10.48%) said it was safe and no need to check expiry date. 6(2.42%) for others specify said that they discard the expired vaccine. *Gurmeet S. Sarla.,2020* stated that the presence of unused and expired medications in cabinets, fridges, cupboards is a potential danger and can be harmful to humans, environment, and wildlife.

Conclusion

Knowledge on Rotavirus Diarrhoea among Rukiga District Health worker

On the whole, less than half had appropriate knowledge on Rotavirus diarrhoea prevention. Nonetheless, half of the respondents had knowledge about Rotavirus diarrhea which was defined as the passage of watery stools 3 or more times in 24 hours leading to dehydration and electrolyte loss. Majority of the respondents identified the most common cause of Diarrhoea for children less than five years of age as Rotavirus infection. More than half new some signs and symptoms of Rotavirus diarrhea. The study found out that less than half knew that Rotavirus Vaccination prevented diarrhoea. More than half said that supportive treatment (ORS + Zinc and Intravenous Fluids) was the gold standard in treatment of Diarrhoea.

Attitude of Health Workers towards Prevention of Rotavirus Vaccination in Rukiga District

On average more than half had positive attitude towards immunization. The study concluded that most respondents had a positive attitude. They asserted that the effective method for preventing Rotavirus was vaccination. This shows, positive attitude towards Rotavirus diarrhea prevention through vaccination of

children because the side effects were tolerable as demonstrated by most respondents.

Assess the practices in preventing Rotavirus diarrhea in Rukiga District

More than half did not have appropriate practices in Rotavirus Diarrhoea prevention. The research concluded that not all respondents practiced preventing Rotavirus diarrhea through vaccination by giving the first and second dose of the vaccine at 6weeks and 10weeks respectively through oral drops. Most heath workers were not sure of the route of administration for Rotavirus vaccination. More than half did not check the expiry date. Not all used the Vaccine Vial Monitor to ensure the integrity of the vaccine being given.

Overall, there were improper practices during prevention of Rotavirus through vaccination.It was an important good practice to keep vaccines within potent conditions using the Vaccine Vial Monitor, normal temperature range of +2 to +8^{o}C and checking the expiry date. However, not all the respondents concurred with these practices. Lastly, the study concluded that some respondents could administer Rotavirus vaccine to preterm and children living with HIV but more than half disagreed.

Recommendations

The researcher recommended a refresher training covering definition, cause, transmission, symptoms, signs, treatment and preventive practices of Rotavirus Diarrhoea in Rukiga District.

Follow up mentorships after trainings were recommended to keep updating healthworkers of the new or upcoming information about health events.

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