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DETERMINANTS OF DIARRHEAL DISEASE AMONG CHILDREN BELOW FIVE YEARS ATTENDING THE PEADIATRIC WARD AT MASAKA REGIONAL REFERRAL HOSPITAL, MASAKA DISTRICT. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Diarrhea is the passage of 3 or more loose or liquid stools per day. In Uganda, it is among the five leading causes of mortality, contributing to more than 140,000 deaths every year, accounting for 7.1% of all under-five mortalities. The purpose of the study was to ascertain the determinants of diarrhea among children below five years attending the pediatric ward at Masaka Regional Referral Hospital, Masaka district.

Methodology

A descriptive cross-sectional design employing quantitative data collection methods with a simple random sampling technique was adopted. A pretested researcher-administered questionnaire with predetermined responses was used to collect data among 40 caregivers of under-five-year-old children with diarrhea at Masaka RRH.

Results:

17(42.5%) of the participants were between the age of 15-24 years, 17(42.5%) had stopped in the primary level of formal education, and parents who had a history of diarrhea contributed 90% to the diarrhea cases among children below five years, failure to exclusively breastfeed children for the first six months of life contributed 68% and lack of a hand washing equipment with soap and water near the toilet facility contributed 70%, 29(72.5%) weaned their children using feeding bottles, and 26(65%) had a primary source of water as piped water

Conclusion

Caretakers with a history of diarrhea, non-exclusive breastfeeding, and poor hygiene were the determinants of diarrhea among children below five years.

Recommendations

Parents should keep proper hygiene, exclusively breastfeed their babies for the first six months, and ensure that all their children are completely immunized.

Keywords: *Determinants of diarrheal disease, Paediatric ward, children below five years, Masaka Reginal Referral Hospital.*
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Background.

Diarrhea is the passage of 3 or more loose or liquid stools per day (WHO, 2024). It is commonly a sign of an infection in the intestinal tract caused by different bacteria, viruses, and parasitic entities (Husein, 2017). It can be classified as acute watery diarrhea, which lasts several hours or days but usually less than 2 weeks, acute bloody diarrhea, also known as dysentery, which contains blood with or without mucus and persistent diarrhea with or without blood that lasts 14 days or longer (Debebe et al., 2024). It is more common when there is a lack of adequate sanitation and hygiene, safe water supply for drinking, cooking, and cleaning, improper feeding practices, and poor housing conditions (Moisa et al., 2021). Globally, diarrheal illnesses are the second leading cause of infant death, where 1.7 billion cases of pediatric diarrheal infections are recorded annually, with an estimated 525,000 under-five children deaths(Auma et al., 2024). More than 40% of the global burden of the disease falls on children below five years of age.(Mohammed & zungu, 2016). Regionally, Sub-Saharan Africa (SSA) accounts for 88% of under-five children deaths due to diarrheal diseases (Demissi et al., 2021).

In Africa, diarrheal diseases are the third leading cause of death in children below five years, estimated at 30 million

cases of severe diarrhea and 330,000 deaths (Reiner Jr et al., 2018). According to Melese et al. (2019), more than 82% of all under-five deaths are caused by diarrheal diseases. In Uganda, diarrhea is among the five leading causes of mortality, contributing to more than 140,000 deaths every year, accounting for 7.1% of all under-five mortalities.(Nantege et al., 2022). The UDHS of 2016 reported that the prevalence of diarrhea among children below five years in Uganda was 20% (Survey, 2016). In 2017, diarrheal disease deaths reached 6.41%, ranking the country 27th worldwide. Presently, diarrhea remains among the top causes of morbidity in the country, with rotavirus being responsible for about 40% of all cases (Omona et al., 2020).

Diarrheal disease is a leading cause of child mortality and morbidity in the world, mostly resulting from contaminated food and water sources (WHO, 2024). The majority of diarrheal diseases should be preventable through exclusive breastfeeding and implementing water sanitation and hygiene programs that aim at interrupting the fecal-oral transmission pathways. According to HMIS (054), from March to May 2024, out of the 962 admissions at the pediatric ward, Masaka RRH 256(26.61%) were diarrhea cases, 28(11%) got diarrhea complications like dehydration, and 41% of the total deaths at the ward were associated to diarrhea. If this is not addressed, there will be an increase in diarrheal disease morbidity and mortality, hence the purpose of the researcher to conduct a study on the determinants of diarrheal disease among children below five years at Masaka RRH.

Methodology.

Study design and rationale.

The study employed a descriptive cross-sectional design employing the quantitative method of data collection with a pretested questionnaire as a tool for data collection. The study design was chosen as it would help the researcher to convert the obtained data into quantifiable figures easy to analyze and also favored the short period for conducting the research.

Study setting and rationale.

The study was conducted at the pediatric ward (Ward 1) of Masaka Regional Referral Hospital. MRRH is a government-aided facility found in Masaka city, Masaka district in south-central Uganda with a 330-bed capacity. It is 132km south of Kampala, by road southwest of Mulago National Referral Hospital in Kampala, Uganda's capital and largest city. Having started in 1927 as a treatment center for World War veterans, it is still the referral hospital for the districts of Kalangala, Lyantonde, Masaka, Sembabule, Kalungu, Lwengo, Bukomansimbi, Kyotera, and Rakai. It is headed by the clinical staff SPNO for the nursing staff and the principal hospital administrator for the administration. It provides several health services including major outpatient, inpatient, mother and child health care, mental medical, maternity, surgical, eye nose, and throat care services. The study setting was chosen as it can easily be accessed given its proximity to the Masaka School of Comprehensive Nursing.

Study population

The study was conducted among all caretakers of children below five years admitted with diarrhea at the pediatric ward of MRRH.

Sample size determination.

A predetermined sample of 40 respondents was used in the study. This was by Keish and Lesley's rule (1965), where a sample of 30-200 can represent a study group if the distribution is even at 20-80%. This sample size approximately represented the whole study population and was well-fitting within the researcher's limited financial and time resources.

Sampling procedure and rationale.

A random sampling technique was used to select 40 caregivers of children below five years with diarrhea to give all the intended parties equal opportunities for participation. To obtain the required number, 80 pieces of papers were written on with numbers from 0 to 80 and placed in a box and only those who chose even numbers were included in the study as the study participants.

Inclusion and Exclusion Criteria

The study included caretakers of children below five years of age admitted with diarrheal disease in the pediatric ward at MRRH.

Definition of variables.

The independent variables included Socioeconomic factors, Behavioral factors, and Environmental factors.

The dependent variable of the study was "diarrheal disease among children below five years"

Research instruments

Data was collected using a standard researcher-administered questionnaire specifically prepared for this study. The questionnaire had both open and close-ended questions to elicit as much information as possible. It was written in English but the interviewer translated it into the local language for illiterate respondents. This tool was selected as it would make data collection easy and it would provide the necessary privacy in the process of data collection.

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Data collection procedures

The benefits of the research were explained to the respondents to obtain their consent. A questionnaire involving both semi-structured and close-ended questions was used to collect data from the respondents. A total of 40 respondents were interviewed in 8 days, five per day for not more than 15 minutes each. This method ensured completeness and accuracy of data collection and it was interviewer-interviewee directed because not all respondents were able to read and write and it concentrated more on collecting quantitative data about the objectives of the study.

Data management and analysis.

On completion of data collection, questionnaires were counted to ensure that the researcher had all 40 questionnaires with all questions answered. The researcher coded and edited the data to minimize errors and also ease data presentation and analysis to ensure the completeness of the data that was collected. Data was analyzed manually and then, using Excel, it was statistically presented in the form of graphs, statistical tables, and pie charts where applicable, followed by a brief description of significant relations.

Quality assurance

Pretested the instrument before the actual study to ensure the validity and reliability of the data to be collected.

Ethical approval.

An introductory letter was obtained by the researcher from the Principal of Masaka School of Comprehensive Nursing upon approval of the proposal which was then presented to the director MRRH and the in charge pediatric ward MRRH.

Informed consent

An informed consent was obtained from the participants, by explaining the purpose of the study. The respondents were assured of their right to or not to participate in the study, assured of confidentiality and thanked at the end of the session.

Results

Table 1: Distribution of socio-economic characteristics of respondents. N=40.

Variable	Frequency	Percentage (%)
Age of caregiver(years)		
Below 15	08	20.0
15-24	17	42.5
25-34	13	32.5
35-49	02	5
Sum	40	100
Sex of the child		
Male	24	60
Female	16	40
Age of the child		
Less than 1 year	06	15
1-2 years	14	35
2-3 years	12	30
3-4 years	05	12.5
4-5 years	03	7.5
Sum	40	100
Working status of caregiver		
Working	11	27.5
Not working	29	72.5
Highest level of education		
No	13	32.5
Primary	17	42.5
Secondary	06	15
Postsecondary	04	10
Sum	40	100
Total number of household members		
Less than 5	05	12.5
5	9	22.5

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6	12	30
More than 6	14	35
Sum	40	100
Children below five years		
Less than 2	03	7.5
2	07	17.5
More than 2	30	75
Sum	40	100
History of diarrhea by caretaker		
Yes	36	90
No	04	10

Table 1 shows that the majority of the respondents, 17(42.5%), were between the ages of 15-24 years, and the least respondents, 2(5%), were between 35-49 years. The majority, 24(60%), had male children who were sick, and the minority, 16(40%), had female children. Children to the majority of the respondents 14(35%) were between 2-3 years and children to the least respondents 3(7.5%) were between 4-5 years. The majority of the respondents, 29(72.5%), were not working, and the minority, 11(27.5%), were working. The highest number of respondents, 17(42.5%), had stopped at the primary level of formal education, and the least number, 4(10%), had attained a postsecondary level of education. The majority of the respondents, 14(35%), had more than 6 household members, and a minority, 5(12.5%), had less than 5 household members. The majority of the respondents, 30(75%), had more than two children below five years, and the minority, 3(7.5%), had less than two children below five years. Most of the respondents, 36(90%), had a history of diarrhea, and a minority, 4(10%), had no history of diarrhea.

Behavioral factors contributing to diarrheal disease among children below five years N=40.

Figure 1: Exclusive breastfeeding among respondents for children under six months

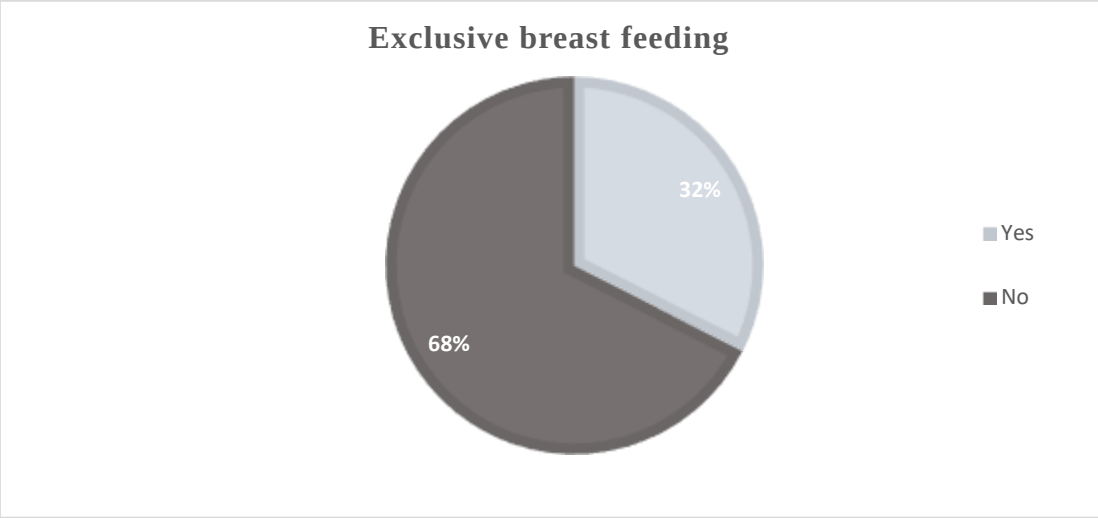

Figure1: shows that, most of the respondents 27(68%) reported that they never exclusively breastfeed their children up to six months and a few of the respondents 13(32%) reported that they exclusively breastfed their children up to six months.

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Figure 2: Respondents who give leftover food to children below five years

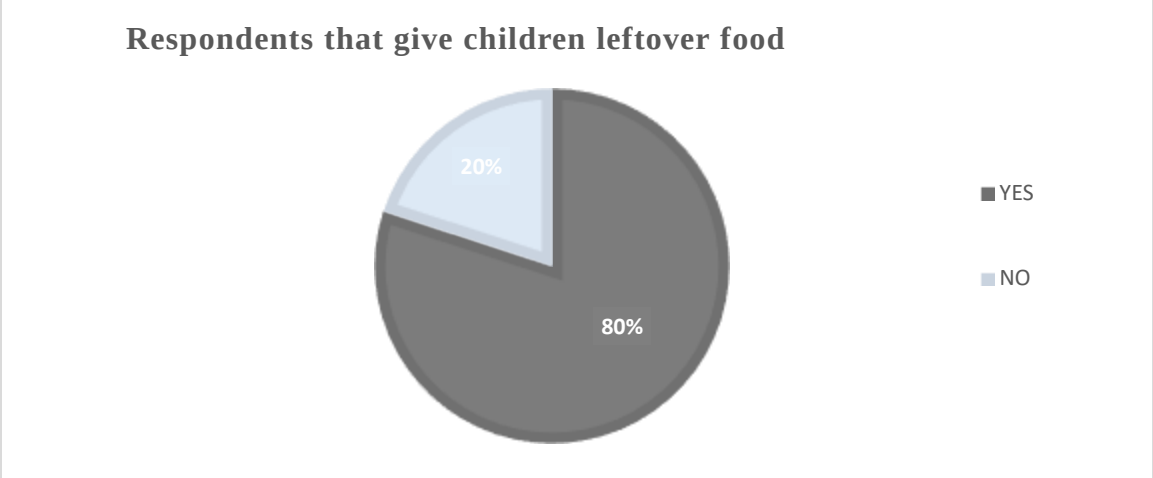

Figure 2 shows that the majority of the respondents, 32(80%), reported that they fed their children below five years leftover food, and a minority, 8(20%), reported that they never fed their children leftover food.

Figure 3: Shows the utensils that respondents used when weaning children. N=40

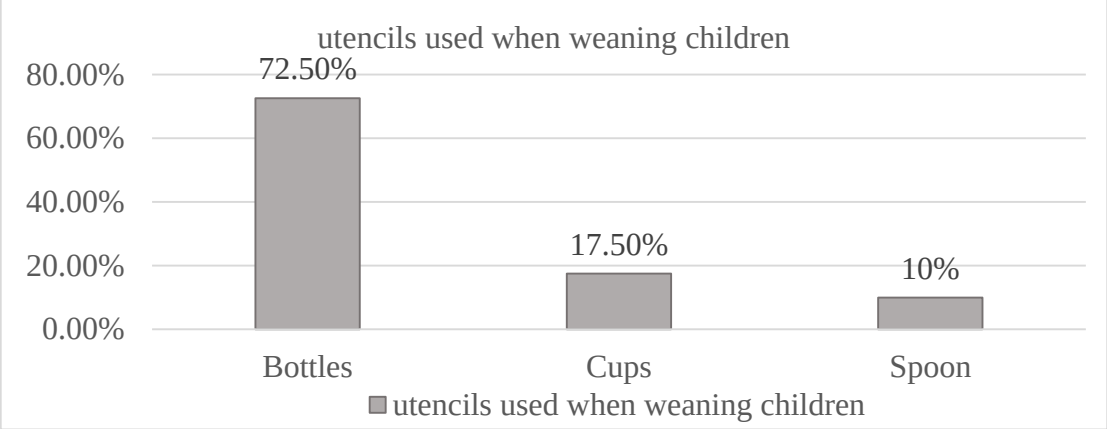

Figure 3: shows that, majority of the respondents 29(72.5%) weaned their children using feeding bottles and minority 4(10%) weaned their children using spoons.

Table 2: Shows the number of respondents who have washing equipment at home and how often they use it. N=40

Variable	Frequency		Percentage (%)
Do you have hand-washing equipment at home?	Yes	14	35
	No	26	65
	Total	40	100
If yes, how often do you use it?	Always	8	20
	Rarely	2	5
	Sometimes	4	10
	Never	26	65
	Total	40	100

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Table 2 shows that the majority of the respondents, 26(65%), had no hand-washing equipment, and a minority, 14(35%), had hand-washing equipment at home. The majority, 26(65%), never used hand washing equipment, and a minority, 2(5%) rarely used the hand washing equipment.

Figure 4: shows waste management by the respondents

Figure 4 shows that the majority of the respondents, 26(65%), managed their waste using other means, for example in the gardens or gullies, and a minority, 4(10%), disposed their waste in rubbish pits.

Environmental factors contributing to diarrhea among children below five years.

Table 3: The primary source of drinking water and if it's boiled, as well as the type of toilet and its hygiene by respondents. N=40.

Variables	Response	Frequency	Percentage (%)
What is the primary source of water to your household?	Piped water	26	65
	Well water	9	22.5
	Others	5	12.5
	Total	40	100
Is drinking water boiled before use?	Yes	31	77.5
	NO	9	22.5
	Total	40	100
What type of toilet facility is used at your household?	Flush toilet	6	15
	Bushes	0	0
	Pit latrine	34	85
	Others	0	0
	Total	40	100
How often is the toilet facility cleaned?	Daily	5	12.5
	Weekly	11	27.5
	Monthly	17	42.5
	Rarely	7	17.5
	Total	40	100
Is there hand-washing equipment with soap and water near the toilet facility?	Yes	12	30
	No	28	70
	Total	40	100

Table 3 indicates that the majority of the respondents, 26(65%), had their primary source of water as piped water, and a minority 5(12.5%) used other sources such as bore holes and rain water as the primary source of water. The majority of the respondents, 31(77.5%), boiled their drinking water before use, and a minority, 9(22.5%), did not boil their drinking water before use. The majority of the respondents, 34(85), used pit latrines, and none of the respondents used bushes or other means to dispose of fecal matter. The majority of the respondents, 17(42.5%), rarely cleaned their toilet facility, and a minority, 5(12.5%), cleaned their toilet facility daily. The majority of the respondents, 28(70%), had no washing equipment with soap and water near the toilet facility, and a minority, 12(30%), had hand-washing equipment with water and soap near the toilet facility.

Table 4: Shows house properties of respondents N=40.

Variable	Response	Frequency	Percentage (%)
What type of roofing does your house have	Grass thatched	3	7.5
	Iron sheets	37	92.5
	Total	40	100
What is the floor of your house made of?	Cement	29	72.5
	Mud	11	27.5
	Total	40	100

Table 4 shows that the majority of respondents, 37(92.5%), reported that they stayed in houses with iron sheet roofing and the minority 3 (7.5%) lived in grass thatched houses. The majority of respondents, 29(72.5%), lived in houses with cement floors, and the minority, 11(27.5%), had floors of mud.

Discussion of study findings.

Socio-economic determinants of respondents.

In the study majority (42.5%) of the respondents were between 15-24 years. This could be because young mothers lack experience in childcare and feeding compared to older mothers. These results are in line with the study carried out in Uganda where children with caregivers aged 15-24 years and 25-34 were more likely to report diarrheal disease, compared to those with caregivers aged 35-49 years (Ssekandi et al., 2023).

Furthermore, diarrhea mainly affected children of nonworking caregivers (72.5%). This could probably be due to poor living conditions, which contribute to high rates of gastrointestinal infections. Results are contrary to the research conducted in Northern Nigeria, where children of working mothers were 11% more likely to have diarrhea compared to those whose mothers were not working (Husein, 2017)

The study further revealed that diarrhea majorly affected children whose caregivers stopped at the primary level of education (42.5%). This is probably because such mothers may have limited knowledge about proper hygiene and nutrition, leading to increased cases of diarrhea. These results correlate with the research conducted in India, where participants whose mothers had attained higher levels of education had 9% decreased odds of diarrhea compared to those who had no formal education (Paul, 2020).

Furthermore, diarrhea mainly affected children from families with more than two children below five years (75%). This is probably because more children can lead to crowded living conditions increasing the spread of infections. These results correlate with the research conducted in Bondhere district in Somalia where over 80% of the caregivers had over two children below the age of 5 years. (Turyarye et al., 2020)

The study revealed that children whose mothers had a history of diarrhea (90%) were more vulnerable to the disease. This is probably because mothers who contract diarrhea can easily spread it to their children. Results are in line with the study carried out in southern Ethiopia, where children whose mothers had a history of diarrhea were 3 times more vulnerable than children whose mothers didn't have a history of diarrhea (Gambura et al., 2016).

Behavioral determinants.

The study revealed that most children (68%) were not exclusively breast fed which probably predisposed them to diarrhea as food compliments are more susceptible to contamination. This is in line with a study conducted in Nyamanzi Refugee Camp where non-exclusive breast feeding was one of the factors that contributed to diarrhea among under-fives (Izale, 2015).

The study further revealed that the majority of respondents (80%) fed their children on leftover food, hence increasing vulnerability to diarrhea since leftover food is usually contaminated. These results correlate with the research conducted in Northeast Ethiopia, where children who consumed left-over food were at high risk of developing diarrhea (Delelegn et al., 2020)

In the study most caretakers (72.5%) used feeding bottles to give supplementary feeds to their children exposing them to diarrhea. This is probably because feeding bottles are harder to clean thoroughly and harbor pathogens that cause diarrhea. These results agree with (Anteneh et al., 2017),where diarrhea was much higher among children who received bottle methods of complementary feeding, compared to those who received cup methods of feeding.

In the study, most respondents (65%) disposed of waste around their homestead, for example, in sacks and gardens, which probably resulted in food contamination due to poor sanitation, increasing the chances of their children developing diarrhea. These results match with the research carried out in Hoima, which showed that mothers/caregivers who threw household garbage in the open were more likely to have children with diarrhea (Mugisha, 2024).

Environmental characteristics

The study showed that most of the respondents (70%) lacked hand-washing equipment with soap and water near the toilet facility. This increased the risk of diarrhea among their children, probably due to contamination of food and water by unwashed hands. This is in line with the study carried out in the Gondar zone, where the risk of diarrhea developing in children who had a hand-washing facility was 48% lower compared to their counterparts without a hand-washing facility (Getachew et al., 2018)

The study revealed that the majority (65%) of the caregivers used piped water at home as it is readily provided in Uganda. Diarrhea still manifests in their children probably because of poor hygiene practices, such as unclean containers that can contaminate the water. These results contradict research conducted in West Ethiopia, where the occurrence of diarrhea among children was more common among families using water from an unimproved source compared to those using water from an improved source (Bekele et al., 2021)

Conclusion.

Various socio-economic, environmental and behavioral factors that lead to diarrheal disease among the under-fives were identified and need to be addressed. These include non-exclusive breast feeding, mother's age and education level, mother's history of diarrhea, methods of weaning, number of under-five children and lack of a hand washing. Higher risk of diarrhea was observed among young mothers, non-exclusive breast feeding and poor hygiene.

Recommendations.

To the parent/ guardian**:** Parents should exclusively breastfeed their babies for the first six months, maintain proper hygiene through frequent hand washing, proper food handling and ensure their children take clean and safe water. They should also ensure that all their children are completely immunized.

To healthcare providers: Healthcare providers should implement robust surveillance systems to monitor diarrheal diseases, especially among children. The IMNCI approach of assessing and preventing diarrhea should strongly be adhered to by healthcare providers and they should implement strict infection prevention and control measures to prevent the spread of diarrhea.

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List of abbreviations.

BMI **:** Body Mass Index
IMNCI : Integrated Management of Neonatal and Childhood Illnesses
MRRH : Masaka Regional Referral Hospital
ORS : Oral Rehydration Salt/Solution
SPNO : Senior Principal Nursing Officer
SSA: Sub-Saharan Africa
UDHS : Uganda Demographic Health Survey
WHO : World Health Organisation

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This study was not funded.

Conflict of interest.

The authors declare no conflict of interest.

Availability of data.

Data used in this study is available upon request from the corresponding author.

Authors contribution.

DK designed the study, conducted data collection, cleaned and analyzed data and draft the manuscript and BD supervised all stages of the study from conceptualization of the topic to manuscript writing.

Authors biography.

Daphine Kirabo is a student with a diploma in comprehensive nursing at the Masaka School of Comprehensive Nursing.

Beatrice Driciru is a research supervisor at the Masaka School of Comprehensive Nursing.

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