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ORIGINAL ARTICLE

Descriptive Epidemiology of Home-Based Management of Diarrhea in Children Under Five Years: The Case of Northern Ghana

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Abstract

Introduction: Diarrheal disease remains a major cause of morbidity and mortality among children under five years of age in Northern Ghana. This study aims to provide a descriptive epidemiological overview of home-based management of diarrhea in Northern Ghana.

Methodology: An institutional based retrospective cross-sectional study design was employed in the study. Data was taken from August 8, 2022 to September 7, 2022 at the child welfare clinic using koboCollect toolbox. Data was extracted from the koboCollect toolbox into Microsoft excel, cleaned and later imported into IBM SPSS statistics version 22 (SPSS) for analysis. Descriptive statistics were conducted and a model of chi square test was used to test association between demographic variables and knowledge of home-based management of diarrhea under five years. Findings were presented in tables and graphs.

Results: Majority of the study participants demonstrated good knowledge on home-based management of under five years children diarrhea 244 (68.7%). Majority of the children in this study were neonate (0-29 days) 161 (42.8%), other age groups included 30-59 days 148 (41.7%), 60-89 days 20 (5.6%) and those who were 90+ days 26 (7.3%). A significant number of the study participants indicated that washing hands before eating helps to prevent diarrhea under five 342 (92.3) and those who said no were 13 (3.7%). Majority of the study participants resort to drugs stores as their first line of treatment 142 (40%). There was significant association between marital status 17.12 ($P < 0.001$), educational level 42.6 ($P < 0.0001$), religion 37.48 ($p < 0.0001$), occupation 20.61 ($P < 0.0001$), employment type 20.01 ($P < 0.0001$) place of residence 6.85 ($P < 0.009$) and knowledge of under-five diarrheal community level management at 95% confidence level.

Conclusion: Study provides valuable insights into the descriptive epidemiology of home-based management of diarrhea among children under five years in Northern Ghana. The findings have implications for public health interventions aimed at reducing the burden of diarrhea and improving child health outcomes in the region.

Keywords

Epidemiology, Home-based, Management, Diarrhoea, Under five years

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Background

Diarrhea is the second leading cause of under-five years morbidity and mortality particularly in developing countries like Ghana [1]. Though, there is disparities in the level of the dimensions of knowledge of home-based diarrheal management, the home-based diarrheal management knowledge of the women of under five children is relatively good. Diarrhoea is the first cause of illness and second when it comes to under five mortality [2].

Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual. The diarrheal disease is both a preventable and treatable disease. Diarrhea is one of the leading causes of morbidity and mortality in children under the age of 5 all over the world, particularly in underdeveloped countries where there is a lack of knowledge and practice in the management of diarrheal disease [3]. This dehydration due to loss of fluids and electrolytes is thought to be the cause of 60%-70% of diarrhea-related deaths in children under the age of five. For effective diarrhea case management, the Integrated Management of Childhood Illness (IMCI) guidelines recommend using ORS in conjunction with continuing eating [4]. The management of diarrhea disease in children under the age of 5 at home is quite common among caregivers. Oral rehydration salt is rarely utilized in practice by caregivers at home for diarrhea management in children under the age of 5, despite its widespread acceptance for lowering dehydration caused by diarrhea [5,6]. The high burden of diarrhoea under five has also call for the use of water, sanitation and hygiene (WASH) [7].

Concerning the overall knowledge of signs and symptom diarrhoea has been under researched but is being highly practiced [8]. In Another study, some few participants were able state signs of diarrhoea; becoming weak, sunken eye, and poor feeding as a sign and symptom of dehydration [9]. More than half of the respondents had good practice toward home-based management of diarrhea in children under the age of five years. Attending high education, having a high income, and being mothers in child relationships were found to have a significant association with home-based management of diarrhea in children under the age of five among caregivers [10]. Strengthening health education and knowledge among caregivers on diarrhea management, including the proper use of ORS, home-based fluid preparation, diarrhea prevention, and the signs of dehydration [4].

There is a lot of home-based management practice of diarrhea in children under 5-years-old. Caregivers' educational status, being mothers of the child, and monthly income were the identified predictors [5]. There is high prevalence of diarrheal disease among children in developing countries and Ghana is not an exception [11].

Study area

Tamale West Hospital was opened on April, 1998 as a polyclinic. It was upgraded to the status of a district hospital in the same year. It is currently a referral hospital for the Tamale Metro sub-district health centers. The Tamale West hospital serves as a re-feral Centre for clinics and nearby districts like, Tolon/Kumbungu central Gonja and Savelegu/Nanton all in the Northern Region of Ghana. It provides 24 hours' service and renders services including medical services, ANC services, PMTC, and Laboratory and X-ray Services, Ultra Sound Service, Eye Clinic, Gynecological Services, National Health Insurance Scheme Service and surgical services.

Study design

This study was a cross-sectional survey, that employed quantitative method to establish knowledge of mothers of children under five-years-old regarding diarrhoea in Tamale, attitude of mothers of children under five-years-old towards diarrhoea in Tamale, prevention practices and home management of diarrhoea of mothers of children under five-years-old in Tamale and to identify the factors associated with the prevention practices and home management of diarrhoea among mothers of children under five-years-old in Tamale. Data were sequentially or simultaneously collected to have a better understating of scientific studies [12].

Study population

The study population comprised of all women attending child welfare clinic (CWC) services in Tamale West Hospital.

Inclusion and exclusion criteria

Inclusion criteria: Care givers aged 18 years and above who child welfare clinic (CWC) services in Tamale West Hospital. Caregivers who have brought their child (0-5 years) for routine immunization and growth monitoring and registered in that clinic the child should have had an episode of diarrhea in the last three months prior to the date of data collection.

Exclusion criteria: Pregnant women who are sick and require admission would be excluded and as well as those fail to take upon been given an information of consent. The caregivers who were ill and those with children who were severely ill at the time of data collection were excluded from the study.

Sample size determination

The sample size is the actual number of pregnant women who would be interviewed to generate findings for the study. It was computed based on prevalence of knowledge level (65.2%) [13] at 95% confidence level. The sample size of the study was obtained using Cochrane formula [14] formula.

Sample size determination (N): (Cochran, 1977) formula [15]

$$N = \frac{z^2 pq}{m^2}$$

Where; N = sample size, z = standard normal distribution = 1.96, m = margin of error = 0.05, p = prevalence of knowledge level 65.2%. Gave a sample size of 349. Given 5% non-respondents rate thus 5% of 349 = 17.45 = 17. Hence the total number of respondents required = 349 + 17 = 366

Sampling technique/procedure

Simple random sampling approach was used to select study participants. During the period of data collection, the researchers visited the hospital and enroll all eligible mothers who have attended CWC services. This means that women who attended CWC and met the inclusion criteria and are available in the hospital was included in the study until the sample size of 366 was achieved.

Data collection instruments

A structured questionnaire was developed by the researchers after careful review of relevant literature [16-22]. The tool was developed by the researchers themselves to reflect the objective under study. The instrument contained four sections including demographic characteristic of respondent, knowledge of mothers of children under five-years-old regarding diarrhoea in Tamale, attitude of mothers of children under five-years-old towards diarrhoea in Tamale, prevention practices and home management of diarrhoea of mothers of children under five-years-old in Tamale and to identify the factors associated with the prevention practices and home management of diarrhoea among mothers of children under five years old in Tamale. Questions were close ended and worded in English. The data were then taken using kobocollect tool box.

Data management

A quantitative approach was used to analyze data using the Statistical Package for the Social Sciences software version 22 (SPSS). Data was extracted from the KoboCollect toolboxes into Microsoft excel, cleaned and later imported into SPSS for analysis. Descriptive statistical methods were used to analyze the data. Frequency, percentages and bar charts were used to analyze demographic data. Chi-square was to determine the relationship between demographic characteristics of respondent and knowledge.

Results

Bio-data of the children

Majority of the children in this study were neonate (0-29 days) representing 161 (42.8%), other age groups included 30-59 days representing 148 (41.7%), 60-89 days representing 20 (5.6%), whiles were 90+ days 26 (7.3%). Among the 355 mothers recruited for this study, there was 294 (82.8%) representing majority of them who had their children immunization status up to date, whiles a least number of them had their children status not up to date representing 61 (17.2%). Most of the children had a birth weight between 2.5-3.5 kg representing 175 (49.3%), followed by a weight of above 3.5 kg representing 115 (32.4%). About 47 (13.2%) of them had a birth weight of under 2.5 kg and a least number of them couldn't tell their children weight at birth representing 18 (5.1%). This is illustrated in Table 1.

Table 1: Bio-data of the children.

Bio-variable	Frequency	Percentage
Age (days)		
Birth-29 days	161	42.8
30-59 days	148	41.7
60-89 days	20	5.6
90 days+	26	7.3
Weight at birth		
2.5-3.5 kg	175	49.3
Above 3.5 kg	115	32.4
Below 2.5 kg	47	13.2
Don't know	18	5.1
Month of initiation of ANC		
Don't know	12	3.4
First trimester	237	66.8
Second trimester	100	28.2
Third trimester	6	1.7
Immunization status		
Yes	294	82.8
No	61	17.2
Total	355	100

Education on indigenous management of under-five diarrhea

Majority of the study participants indicated that they have received education on homebased management of under five years children diarrhea representing 244 (68.7%) and those have not received education on home-based management of diarrhea is 111 (31.3%). This is illustrated in Figure 1.

Knowledge on the nature of diarrhea

Majority of the study participants were able to identify what diarrhea is representing 200 (56.3%). However, those who said diarrhea is a loose stools more than two times in a day and a normal stool and two times in day were 121 (34.1%) and 34 (9.6%) respectively. This is illustrated in Figure 2.

Knowledge on diarrhea prevention

A significant number of the study participants

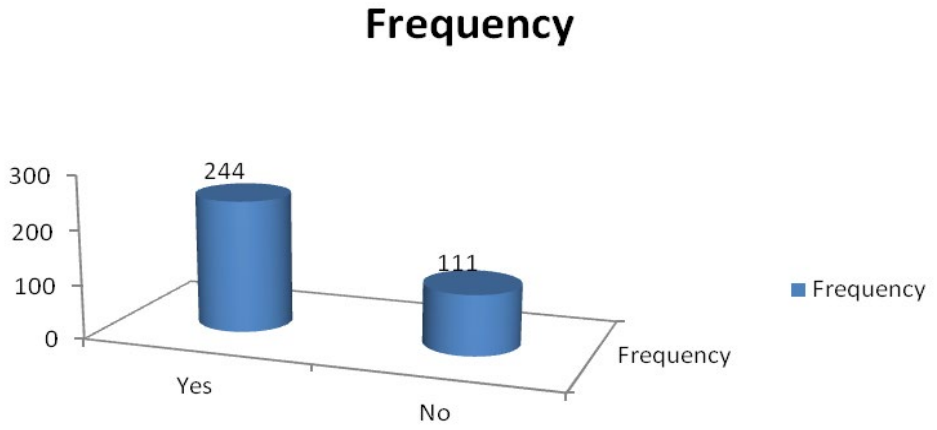

Figure 1: Education on indigenous management of under-five diarrhea.

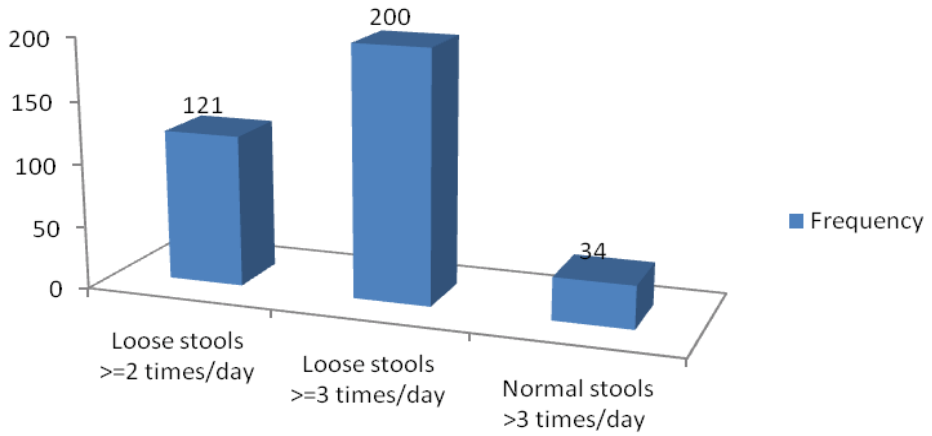

Figure 2: Knowledge on causes of diarrhea.

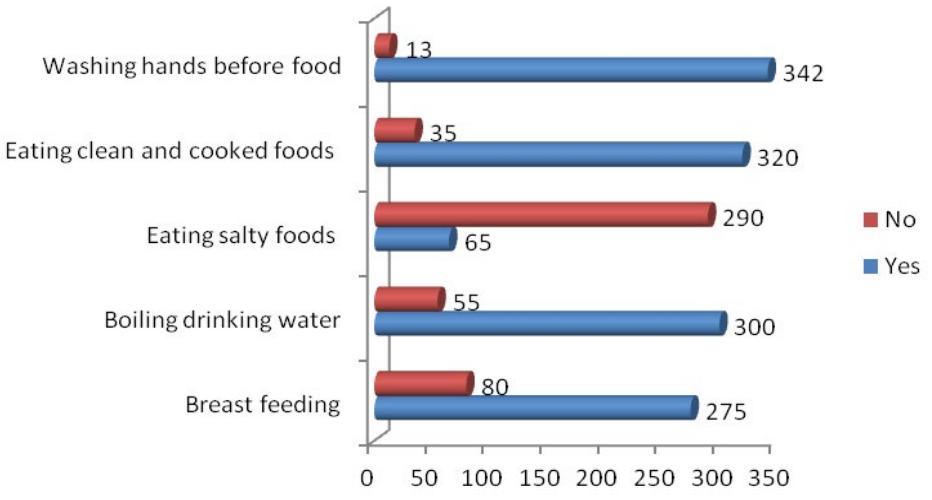

Figure 3: Knowledge on diarrhea prevention under five years.

indicated that washing hands before eating helps prevent diarrhea under five representing 342 (92.3%) and those who said no were 13 (3.7%). Those who said eating with clean hands and cooked food helps to prevent diarrhea were 320 (90.1%) and those who said no were 35 (9.9%). Those who said yes and no to eating salty food as means of diarrhea prevention were 65 (18.3%) and 290 (81.7%) respectively. This is illustrated in Figure 3.

Knowledge on reconstituting oral rehydration salts

Majority of the study participants indicate that 500 mls of water is used to reconstitute one sachet of oral rehydration salts representing 132 (37.2%). Those who said 250 mls of water, 750 mls of water, 1000 mls and of water is used to reconstitute one sachet of oral

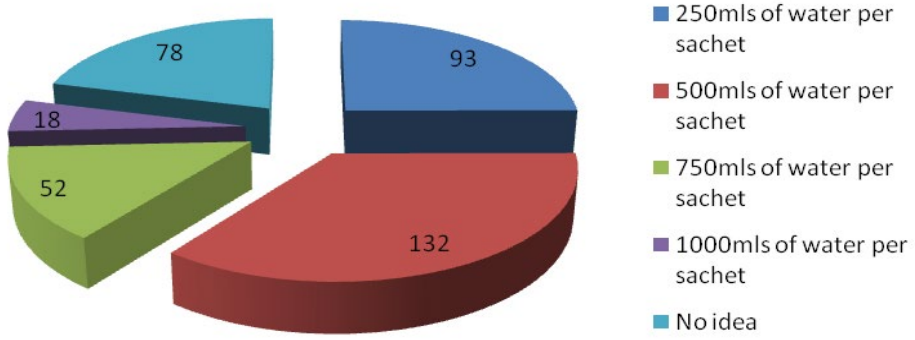

Figure 4: Knowledge on reconstituting oral rehydration salts.

Table 2: Attitudes of mothers of under five children on diarrhea.

Attitude variable	Yes		No		
	Frequency	Percentage	Frequency	Percentage	Total
Eating clean food is not important	300	85	55	15	355 (100)
Giving ORS during diarrhoea	310	87	45	13	355 (100)
Antibiotics are needed for all children with diarrhoea	218	61	137	39	355 (100)
Breastfeeding should be continued during diarrhoea	124	35	231	65	355 (100)
Water intake should be reduced if a child is having diarrhoea	213	60	142	40	355 (100)
Using only boiled water for drinking is time consuming and impractical	80	23	275	77	355 (100)
Give regular home-made foods along with ORS	88	25	267	75	355 (100)

rehydration salt were 93 (26.2%), 52 (14.6%) 18 (5.1%) and 78 (23%) respectively. This is illustrated in Figure 4.

Attitudes of mothers of under children's years on diarrhea towards diarrhoea management

Majority of the participants said eating clean food is not important representing 300 (85%) and who is important were 55 (15%). Those who said Giving ORS during diarrhea were 310 (87%) and those who said no antibiotics are needed are 45 (13%). Majority of the research participants 218 (61%) said antibiotics are needed for all children with diarrhea and those who said antibiotics are not needed for all children with diarrhea were 137 (39%). Those who said breastfeeding should be continued during diarrhoea were 124 (35%) and those who said breast feeding should be stopped were 231 (65%). This is illustrated in Table 2.

Practices adapted to prevent Diarrhea care givers

Majority of the study participants 230 (65%) practice Hand wash before cooking, eating/after defecation and only 125 (35%) said they do not practice hand washing. Those filtering or boiling drinking water before use and those who do not were 310 (87%) and 45 (13%) respectively. Those who adopted regular cleaning of drinking water vessels were 273 (77%). This is illustrated in Table 3.

Home based management of diarrhea under five years

Majority of the study participants use ORS and zinc tablet to manage diarrhea under 5 representing 198 (55.8%). Those who use only ORS, antibiotics, zinc tablet only and ORS as well as home-based fluid were 74 (20.8%), 46 (13%), 28 (7.9%) and 47 (13.2%) respectively. This is illustrated in Figure 5.

Association between demographic factors and knowledge of under-5 years home based diarrhea management

A model of cross tabulation was carried out between demographic characteristics knowledge of home-based management of diarrhea under five years to determine its relationship at 95% confidence level and a p-value < 0.05. The relationship between age and knowledge of home base management of under-fives diarrhea

Table 3: Practices adapted to prevent Diarrhoea care givers.

Variable	Yes		No		Total frequency (%)
	Frequency	Percentage	Frequency	Percentage	
Hand wash before cooking, eating/after defecation	230	65	125	35	355 (100)
Closing the lids of drinking water sources	92	26	263	74	355 (100)
Avoiding dipping hand in vessel	39	11	316	89	355 (100)
Filtering/boiling drinking water before use	310	87	45	13	355 (100)
Regular cleaning of drinking water vessels	273	77	82	23	355 (100)
Washing fruits and vegetables before use	312	88	43	12	355 (100)
Washing hands before feeding the child	340	96	15	4	355 (100)
Proper disposal of disposable	230	65	125	35	355 (100)

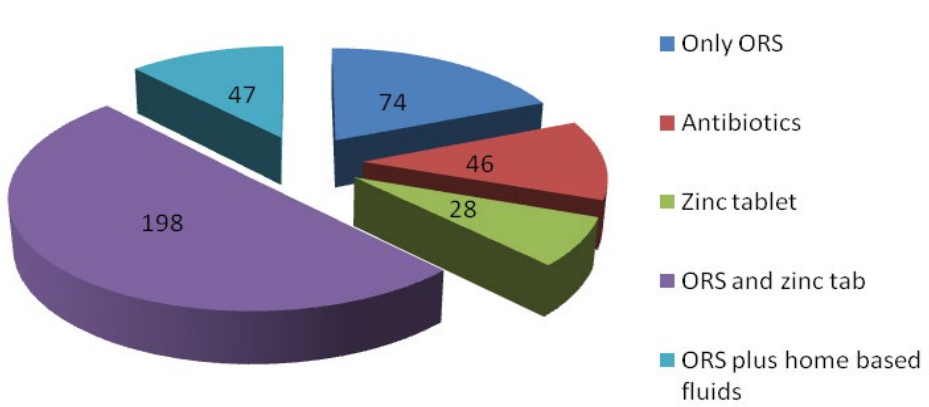

Figure 5: Home based management of diarrhea under five years.

Table 4: Demographic factors and knowledge of under 5 years home based diarrhea management.

Demographic variable	Frequency	Percentage	Test statistics χ^2 ($p < 0.05$)
Age (years)			
15-19	56	15.8	36.88 (0.000)***
20-29	147	41.4	
30-39	96	27.0	
40+	56	15.5	
Marital status			
Divorced	40	11.3	17.12 (0.001)***
Married	252	71.0	
Single	24	6.8	
Widowed	39	11.0	
Educational level			
No Formal Education	40	11.3	37.48 (0.000)***
Primary Education	111	31.3	
Junior High Education	125	35.2	
Senior High/vocational	47	13.2	
Tertiary	32	9.0	

Religion			
Christian	87	24.5	
Islam	159	44.8	
Pagan	47	13.2	61.74 (0.000)***
Traditional	62	17.5	
Occupation			
Artisans (tailor, weavers, hair dresser)	158	44.5	
Professional (teacher, nurse)	77	21.7	
Trading	120	33.8	
Place of residence			20.61 (0.000)***
Rural	236	66.5	
Urban	119	33.5	6.85 (0.009)**
Total	355	100	

*: Insignificant; **: Significant; ***: Very significant

was very significant with chi-square (p-value) of 36.88 ($p < 0.0001$). Moreover, there was a very significant association between marital status, educational level, religion, occupation, employment type and place of residence and knowledge with chi-square (p-value) of 17.12 ($P < 0.001$), 42.6 ($P < 0.0001$) 37.48 ($p < 0.0001$) 20.61 ($P < 0.0001$), 20.01 (0.000) and 6.85 ($P < 0.009$) respectively. This is illustrated in Table 4.

Discussion of Findings

The findings of this study on the descriptive epidemiology of indigenous management of diarrhea among children under five years in Northern Ghana provide important insights into the current practices and challenges faced in the region. The high burden of diarrhea among children under five years in Northern Ghana is consistent with previous studies conducted in similar settings [23] where they found the high burden of diarrhoea under five years. Diarrheal disease remains a significant health issue, contributing to substantial morbidity and mortality in this vulnerable age group. Home-based management of diarrhea is commonly practiced among caregivers in Ghana, aligning with the global recommendation to treat uncomplicated cases at home [23,24]. The use of oral rehydration therapy (ORT) and zinc supplementation, key components of diarrhea management, were reported in the study. These findings are consistent with the national guidelines for the management of diarrhea by Ghana Health Service [25], which has made emphasis on the use of oral rehydration salts and zinc supplementation. The utilization of ORT and zinc supplementation is encouraging as these interventions have been proven to reduce the duration and severity of diarrhea similar to [26] where they found the that oral rehydration therapy and the use of zinc supplement is key in managing non-infectious diarrheal disease.

The study also reveals variations in the utilization and effectiveness of home-based management practices across different communities and socio-demographic groups similar to the findings of [1]. Socioeconomic factors such as caregiver education level, household income, and access to healthcare services have a significant influence on the implementation and success of home-based management similar findings have been reported in other studies, highlighting the importance of addressing social determinants of health in diarrhea management [27-29].

Cultural beliefs and perceptions about diarrhea and its treatment emerged as important factors shaping caregivers' behaviors and decisions. Cultural practices, traditional beliefs, and alternative remedies were reported to influence caregivers' choices regarding home-based management. These findings align with previous research highlighting the role of cultural factors in health-seeking behaviors [7].

Conclusion

The research shed light on the prevailing management practices within these communities. This emphasizes the importance of healthcare-seeking behavior and access to healthcare services. However, there is still room for improvement in terms of timely and appropriate treatment. The study identified factors associated with diarrhea, including factors such as inadequate access to clean water and poor sanitation, which serve as crucial avenues for intervention. These findings underscore the importance of holistic approaches that address not only the treatment of diarrhea but also its prevention through improved water, sanitation, and hygiene (WASH) practices. The study noted a knowledge gap among caregivers regarding oral rehydration therapy (ORT) and appropriate home management of diarrhea.

Recommendation

Ghana health service in collaboration with media commission should educate mothers and potential mothers on home level diarrhea management under five years. Further studies need to be conducted on the effectiveness of the homebased management of under

five years diarrhea.

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Author Contributions

A.M.S., B. T. B. and A.W.M. conceived and designed the protocol. A.M.S and A. K. H developed the proposal, data analysis, and checked the draft. B. T. B., S.A., F. A., and A.W.M prepared the manuscript. All authors read and approved the final paper.

Availability of Data and Materials

The data used to support the findings of this study are available from the corresponding author upon request.

Declaration of Conflicting Interests

The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

An introductory letter was taken from our faculty Dean through the head of department. Permission was sought from the Medical Superintendent of the Tamale West Hospital. Ethical approval was given by University for Development Studies Institutional Review Board (UDSIRB) with a valid period of six months. The researchers also obtained written consent of respondents before including them in the study. The purpose of the study, study procedures, potential risks and benefits of the study as well as eligibility for the study were explained to the participants. All information collected were treated with high sense of confidentially and used for the study purposes only.

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