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Prevalence of Waterborne Diseases in Relation to Age and Gender in Nakoloke Sub County Mbale District, Uganda

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ABSTRACT:
Water is one of the most important requirements for human health and life. It's the most effective carrier of pathogens causing a number of infectious diseases in developing countries particularly in rural areas. The aim of the study was to investigate the prevalence of waterborne diseases in relation to age groups and gender in Nakaloke sub county Mbale district Eastern Uganda. Retrospective data was obtained from Nakaloke health Centre III and were used to determine the most common waterborne diseases in Nakaloke, Kireka and Nandala Villages for a period of five years. The data were analyzed using SPSS to find the age and gender of the patients and their vulnerability to diseases in the study area. Diarrhoea was found to be the most prevalent waterborne diseases among gastroenteritis, skin infection, typhoid, cholera, and dysentery. Children below 5 years of age and females were more vulnerable to waterborne diseases in the study area. It was also found that these diseases are more prevalent in rainy season than dry season. It was therefore recommended improvement in sanitations, hygiene and access to safe drinking water in the study area.

Keyword: *Waterborne disease, Prevalence, Gender, Water quality, Nakaloke*

INTRODUCTION:

Water is important to human life and health, the most common and widespread health risk associated with drinking water is contamination, either directly or indirectly, by human or animal waste [1]. Waterborne diseases account for an estimated cases 4.1% of the global burden of diseases, and cause about 1.8 million human deaths annually and 88% is attributed to unsafe water supply, sanitation and poor personal hygiene [2]. According to the World Health Organization 884 million people lack access to even basic drinking water service, including 159 million people who are dependent on surface water such rivers and lakes. Also 423 million people taking water from unprotected springs and wells [3]. In Mbale district of Uganda most of the people who are living in rural areas are taking water from unprotected springs. An easy access to safe drinking water and proper sanitation are the basic determinants of a better health. But this has always been an issue in Nakaloke as the critical situation. Unprotected springs and boreholes became major sources of drinking water to the communities residing within the district including all its sub counties.

Globally, at least 2.1 billion people use a drinking water sources contaminated with feaces. Contaminated water and poor sanitation are linked to transmission of diseases such as diarrhoea, cholera, dysentery, typhoid and polio. Diarrhoeal death cases reported was estimated to be 502 000 each year [3]. Some 842 000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water, sanitation and hand hygiene. Diarrhoea is the most widely known disease linked to contaminated food and water but there are other hazards. Almost 240 million people are affected by schistosomiasis – an acute and chronic disease caused by parasitic worms contracted through exposure to infested water [4].

According to UN Environment Programme (UNEP), 300 million people in Africa still do not have reasonable access to safe drinking water and nearly 230 million people defecate in the open [5]. Waterborne diseases are caused by several pathogenic microorganisms that include bacteria, viruses, protozoan and helminthes. This is usually occurred as a result of poorly treated drinking water and waste water or natural disaster like flooding and environmental pollution [6].

In developing countries, accessibility of safe drinking water is still a problem and people are forced to use available unimproved water sources. These water sources are often microbiologically unsafe and as a result, the most well-known waterborne diseases such as cholera, amoebic dysentery and typhoid are reported from almost all African countries especially in tropical areas of the region including Uganda [7].

According to Uganda Ministry of Water and Environment [8] report of 2012, as of June 2012, access to safe water within 1km in the rural areas was 64%, despite the efforts and achievements by the Ugandan government to tackle the menace of safe and clean water. Drinking water is safe if it is free of diseases causing agent, harmful chemical substances and waste from human and animals. The drinking water quality is related to acceptability (physical), microbiological and chemical variables [9]. The present study aimed at investigating the prevalence of waterborne diseases in relation to age and gender in Nakaloke sub county Mbale District Uganda.

MATERIALS AND METHODS

Description of Study area

Nakaloke Sub County is situated in Bungokho in Mbale District of Eastern Uganda and has a length of 13.8 kilometres. Its geographical coordinates are 1° 9' 0" North, 30° 9 0" East. The climate is topographic with bimodal type of rainfall mainly during March to June and September to November with an average rainfall of 150 mm per annum [10] in figure 1.

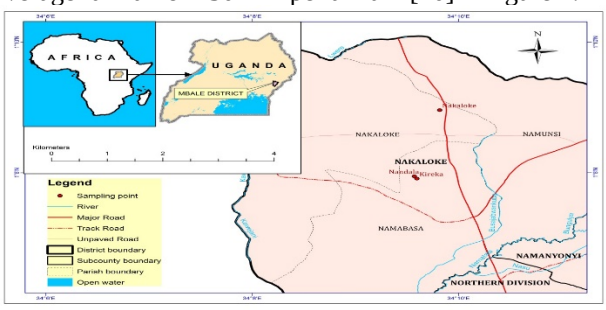

Figure 1: A map showing the location of study area

Study population

The study was conducted in Nakaloke Sub County in three different villages. About twenty one (21) villages were found in health records collected from Nakaloke health Centre III. Three villages Nakaloke, Kireka and Nandala were selected as target area of the study to make comparative study in the sub county due highest entries and fewer entries of incidences of waterborne cases.

Determining prevalence of water borne diseases

Retrospective data of patients records covered the period of 60 months from January to December of 2010 to 2014 were collected from Nakaloke Health Centre III to identify common waterborne diseases in the study area. Document review technique was adopt in this study, out patients registers were reviewed and information on the frequency and type of waterborne diseases captured, it was done by searching Information of each individual patient concerning age, gender, and date in the data. The cumulative hospital retrospective data showed that two villages were recorded with highest entries of diseases (Nakaloke and Kireka) and one village (Nandala) with fewer entries of diseases was chose as study site.

Data analysis

Descriptive statistics were conducted to determine the frequency of occurrence of diseases. While an independent t-test was done to test if there was significance gender difference between the numbers of cases infected with waterborne diseases. One way ANOVA was used to test for differences in the number of infected cases among age groups and at significance level of P= 0.05.

RESULTS AND DISCUSSION

Prevalence and distribution of waterborne diseases in Nakaloke Sub-county

The investigation of prevalence and distribution of waterborne diseases in Nakaloke Sub County was conducted through review of documents from Nakaloke health center III for a period of 2010 to 2014.

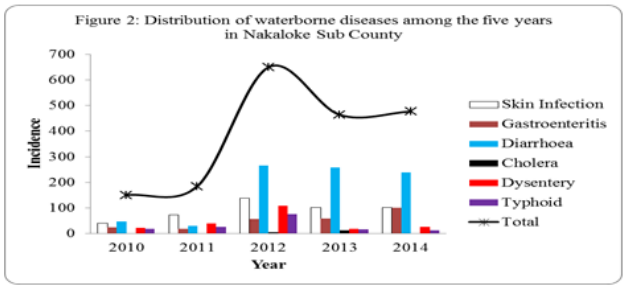

Figure 2, Distribution of waterborne diseases among the five year in Nakaloke Sub County.

Figure 2 above shows yearly distribution of waterborne diseases. The trends of the diseases are increasing over years from 2010 to 2014. There was steady progression of the waterborne diseases burden from 2010 and peak is in 2012, it then falls down in 2013 and rose up in 2014. Year 2012 accounting with high incidence of waterborne diseases in the study area, this was because during the year 2012 there was lacks of access to adequate sanitation and inadequate access to safe drinking water sources in the sub-county. It has been showed that Mbale was one of the districts in Uganda lacking access to fit drinking water that are of microbiological standard, likewise contamination of water sources had occurred in the sub county. Outbreak of Waterborne diseases had been reported in Nakaloke Sub County during the year of 2012. This is in line with the finding of [11] who reported that the trend of diseases in Nakaloke Sub County increased in month of June with the highest number cases and decreased in the month of July and January. In eastern region of Uganda three districts have been reported with an outbreak of cholera including Mbale. Nakaloke Sub-County is one of the Sub Counties affected [12]. According to Uganda Ministry of Water and Environment [8] report of 2012, access to safe water within 1km in the rural areas was 64%, despite the efforts and achievements by the Ugandan government to tackle the menace of safe and clean water.

Distribution of waterborne diseases with gender

At sub county level, a further analysis was made to ascertain how the disease is related to gender. The results are shown in table 1 below.

TABLE 1: Number of people who have relevant waterborne diseases.

	Waterborne diseases						Total
	Skin Infection	Diarrhoea	Gastroenteritis	Typhoid	Dysentery	Cholera	
Male	173	406	105	58	80	7	829
Female	280	431	153	90	133	10	1097
Total	453	837	258	148	213	17	1926

Results from the Table 1 showed that the female are more vulnerable to skin infection, diarrhoea and gastroenteritis, typhoid, dysentery as well as cholera. Women and children are most susceptible to water borne disease due to their roles in water collection, clothes washing and other domestic activities. Women are also responsible for the care of sick family members [13]. [14] Also reported that females were more prone to waterborne diseases as compared to males. The three most contagious diseases are typhoid, dysentery, and cholera which fortunately contribute least distribution of waterborne diseases in Nakaloke Sub County. These diseases can spread and affect large mass of the population within a short time causing drastic impacts [11].

Distribution of waterborne diseases with age

At the sub county level, cross tabulation statistical analysis were used to determine the spread of waterborne in relation to different age classifications. The results are shown in Table 2.

Table 2 Number of male age groups affected by waterborne diseases

		Waterborne diseases						Total
		Skin Infection	Diarrhoea	Gastroenteritis	Typhoid	Dysentery	Cholera	
Age group	0-5	106	316	87	21	40	2	572
	6-15	27	20	8	7	17	1	80
	16-30	12	14	5	13	9	0	53
	>30	3	10	6	11	6	4	40
Total		148	360	106	52	72	7	745

The results of the distribution of waterborne diseases according to different age groups show that 0-5 age group is more infected with the highest prevalence in each diseases accounting for 1325, followed by age groups 6-15 and 16-30 with 270 and 205 respectively. The group of >30 has 126 as shown above (Table 2 &3). This is clear indication that children within 0-5 age groups are more vulnerable to waterborne diseases. This is because their immune systems are not well developed. Going by the findings of [15] lack of safe

drinking water makes children more vulnerable to disease. Their immune systems and detoxification mechanisms are not fully developed, so they often due less able to respond to a water-related infection. [16] found out that age distribution of diarrhoea cases obtained in the basic health centres, much cases of diarrhoea were recorded and children of five years and below account high proportion of diarrhoea. [11] Found out that Top most common contributors of waterborne diseases in Nakaloke Sub County are diarrhoea, skin infection, and gastroenteritis in that order. The study also is in accordance with the finding of [17] which stated that the effects arising from contact of waterborne pathogens vary depending on the volume of water ingested by an individual and the individual immune status with the children and elderly being the most susceptible. Children also have less body mass than adults. This means that waterborne pathogens may be dangerous for a child at a concentration that is relatively harmless for an adult [15]. Diarrhoea is the most prevalent waterborne diseases in the study site followed by skin infections during the period of study. The result of this study could be agreed with [6] and [18] who revealed that diarrhoea is the most prevalent waterborne diseases in rural communities located along River Ase in Southern Nigeria. World health organization has predicted that there will be about 5 million deaths in children below age of five by 2025 of which 97% will be in developing countries and mostly caused by infectious disease within which diarrhoea will continue to play a prominent role [19].

		Waterborne diseases						Total
		Skin Infection	Diarrhoea	Gastroenteritis	Typhoid	Dysentery	Cholera	
Age group	0-5	207	374	85	30	57	0	753
	6-15	64	43	18	25	36	4	190
	16-30	24	47	32	24	24	1	152
	>30	10	13	17	17	24	5	86
Total		305	477	152	96	141	10	1181

CONCLUSION

Water play a vital role in human health and it can serve as a vehicle in transmission of pathogenic microorganisms to human. The study revealed the occurrence and distribution of common waterborne diseases in the study area and gives adequate information on the diseases communities suffering due ingestion contaminated water. Also prevalence of diseases may have been influence by the quality of water sources consumed by the communities in the study area. Diarrhoea is the most common waterborne diseases found in the records and is commonly among all age group and villages but more prevalent in children under five years and in Nakaloke village. The study revealed that Female are more prone to waterborne cases than male. Monitoring of drinking water sources is recommended routinely.

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