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EC NURSING AND HEALTHCARE
Research Article

Factors Associated with Hygiene and Sanitation Practices among Adults in Muhanga District, Rwanda

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Received: March 22, 2022; **Published:** June 28, 2022

Abstract

By 2030, the world's population will have increased from 7.6 billion to 8.6 billion, and by 2050, it will have increased to 9.8 billion. Such rapid expansion would exacerbate the already rising demand for water, sanitation, and hygiene-related facilities and services, particularly among low-income households. The general objective of this study was to assess the factors associated with hygiene and sanitation practices among adults in Muhanga District. A cross sectional descriptive study was conducted in four rural sectors of Muhanga. A sample size of 380 households (male and female aged above 21 years old) were selected from the total of 32,618 households by using Rao-soft formula. Multistage and convenience sampling techniques was used, the structured questionnaires were administered and SPSS version 21 used for data analysis. The study has been shown that the majorities 75.5% of the respondents were married and the study findings show that prevalence of practice level and found out that the majority 66.3% of the respondents had good practice towards water, hygiene and sanitation. This study shown that the majority 68.7% of the respondents were getting water from source of fountain. The respondents who lived in urban were more likely to have good practice [AOR = 7.517, 95%CI: 2.706 - 20.881; P = < 0.001] compared to those who lived in rural area. It concluded that the lifestyle people living in was a factor which had much contribution to hygiene and sanitation practices among adults in Muhanga District.

Keywords: *Hygiene; Sanitation Practices; Muhanga District*

Introduction

During the Millennium Development Goals (MDG) era, substantial progress was made in increasing access to water and sanitation around the world. In the previous two decades, more than 2 billion people gained access to improved drinking water and nearly 2 billion gained access to sanitation. However, 663 million people continue to require improved drinking water, and concerns about the long-term sustainability and safety of drinking water supplies remain [1]. More than 2.4 billion people do not have access to modern sanitation, and nearly one billion people defecate in the open [1].

In terms of sanitation and drinking water coverage, there are substantial differences between rural and urban areas. In comparison to 82 percent of the urban population, just 51% of the rural population has access to improved sanitation. Seven out of ten of the 2.4 billion individuals without better sanitation reside in rural regions. When it comes to drinking water, there are significant disparities in both the

level of service available to rural and urban residents, as well as the sheer number of people who do not have access to improved drinking water [2].

According to UNICEF, 32% of the rural population has access to piped water on premises, compared to 79% of the urban population, and 8/10 people in rural areas do not have access to any sort of improved drinking water [1]. In 2011, an estimated 768 million people relied on 'unimproved' water supplies (as defined by the WHO/UNICEF Joint Monitoring Program for Water and Sanitation - JMP), which are expected to have significant levels of pathogen contamination, particularly in low-income settings [3]. Many more rely on sources that are labelled as "better," yet are nonetheless dangerous to consume [4].

Sub-Saharan Africa, along with Oceania, falls behind other regions in terms of people served. The majority of countries in Sub-Saharan Africa are on track to fulfil the MDG objective. Over 2.5 billion people do not have access to improved sanitation [5]. It is believed that 80 percent of the world's population is affected by poor hand hygiene practices [6]. The majority of people impacted by diseases linked to poor WASH conditions live in Sub-Saharan Africa [2,7].

However, the cost of poor sanitation and hygiene extends beyond health concerns [2]. Poor sanitation and hygiene can contribute to absenteeism at school and at work, affecting academic progress and workplace performance. In terms of economic and general development, these effects affect not only the individual, but also the community and larger society [2]. In Rwanda, the picture on improving household access to basic infrastructure and services is variable. Based on National Strategy for Transformation (NST1) as adopted in October 2017, households with access to improved drinking water source (without considering time and distance) were estimated at 85% in 2017. While about 84% of households use improved sanitation services, without considering some criteria like sharing between two or more households [8].

In Muhanga 84.4 percent of households (HHs), Water and Sanitation, have access to clean water, which is slightly higher than the national average (74.2%). 64.7 percent of HHs use protected springs, 11.6 percent use pipe, 4.3 percent have water piped into their dwelling/yard, and 3.8 percent have protected well. Even while the district has done well, it is still a long way from meeting the EDPRS target of 100 percent. Muhanga HHS is within 5 - 14 minutes of main drinking water for 52.2 percent of its students, while 22.9 percent are within 15 - 29 minutes. At the national level, these account for 39 percent and 23.6 percent, respectively, over the same distance.

The majority of people (75.5%) use protected latrines, while only 1.8 percent do not have access to one, which is a high score when compared to the national average (6.1 percent). Waste management is still an issue, with 25.7 percent of HHs throwing their household waste in the bushes or fields, and only 72.3 percent having compost bins. This is greater than the national average, which shows that 31.1 percent of households discard trash in the bushes and 59.4 percent of households use compost bins. HHs use public garbage at a rate of 0.4 percent in the town, compared to 5.0 percent nationally [9].

Awareness about safe drinking water, sanitary latrines, and of hygiene and related health issues are crucial factors in habituating practice in a particular context. Hygiene practice becomes difficult in many parts of the world, including Bangladesh, due to lack of safe water and soap.

In Rwanda, the water and sanitation policies and strategies approved in 2016 provided a framework for achieving universal access to WASH services. Rwanda is ambitious to achieve 100% access to safely managed water and sanitation services by the year 2030 [10].

However, there are still some challenges including the funding gaps to increasing access to WASH services, particularly in scattered settlements in rural areas [11]. Moreover, the scale of the need for safe water, sanitation and hygiene; and how best to sustain WASH services and to reach people most in need. Due to this background the researcher was very curious to conduct this study in order to assess

the factors associated with practices towards water, sanitation and hygiene among the adults' head of the households in Muhanga district, as WASH is very provocative of above health issues took place in those study areas.

Research Objectives

- To investigate the level of hygiene and sanitation practices in Muhanga District.
- To assess the availability of safe water among adults in Muhanga District.
- To investigate factors associated with poor hygiene and sanitation in Muhanga District.

Research Questions

- What is the level of hygiene and sanitation practices in Muhanga District?
- What is the availability of safe water among adults in Muhanga District?
- What are the factors associated with poor hygiene and sanitation in Muhanga District?

Methods

Study design

A research design is defined as an overall strategy for acquiring knowledge through a method that answers research questions (Rebar., *et al*. 2011). This study conducted by using a cross-sectional descriptive study design to comprehend and split down phenomenon into parts to evaluate the outcome of hygiene and sanitation practices.

Study setting

Muhanga District is located in fifty kilometers (50 km) from Kigali, City and is divided into 12 sectors. The majority of Muhanga District's population live in rural areas; it has 5.6 percent of households in settlement (Imidugudu), 11.2 percent in unplanned clustered rural housing, 76.7 percent in isolated rural housing, 2 percent in agglomeration, and 4.5 percent in unplanned urban housing.

Target population

The population of this study consisted of the heads of household/families from the selected sectors of Muhanga District. The study participants were aged from 21 years old and above. He/she should be the head of the family and having the willing to participate in this study. Participants who are not aged to the fixed age were be excluded. Adult who is not head of the family was excluded.

Sample size and sampling procedure

Data was collected by using the structured questionnaires that were given to the respondents by the researcher herself and guiding the fulfillment of it. The used questionnaire contains four sections including socio-demographic characteristic, assessment of the level of hygiene and sanitation practices, assessment of the availability of safe water and investigation of factors associated with poor hygiene and sanitation. That questionnaire was translated in mother tongue for more comprehensive to the local people. Concerning the sampling techniques to be used in order to reach the sample, multistage sampling technique was used in those 4 sectors through cells, imidugudu

and finaly households and the laters were be choose by n^{th} number until the sample was completed in selected areas. The study sample of was the heads of household/families in the selected sectors of Muhanga District. A convenience sampling strategy was used to select 380 head of households. Data was collected twice, at two-day intervals, from two groups of participants in the pretest, which included 10% of sample size (38 head of households) from different sectors of the selected ones and any necessary adjustments to the research tools were made.

Data analysis and ethical consideration

The data were analyzed using SPSS software to produce the tables required to meet the objectives and statistical tools used were descriptive (frequencies, percentages, mean average and standard deviation) and The Odds ratio (OR) and their 95% confidence intervals (CI) were used to assess the strength of associations between several variables and access to a sanitation facility (improved and unimproved). The study was implemented in accordance with the research protocol approved by both the MKUR research ethical committee and Muhanga District research ethical. Permissions from them was also obtained and inform the sectors and cells.

Results

Characteristics of the respondents and households

Socio-economic and demographic characteristics contains age in years, place of residence, marital status education level, employment status, age-group number of living children, family size and health insurance.

Variables	Description	Frequency	Percent (%)
Sector	Nyarubaka	112	29.5
	Shyogwe	93	24.5
	Cyeza	91	23.9
	Rugengabare	84	22.1
Place of residence	Urban	28	7.4
	Semi-urban	72	18.9
	Rural	280	73.7
Sex	Male	116	30.5
	Female	264	69.5
Marital status	Married	287	75.5
	Widow/widower	50	13.2
	Divorced	43	11.3
Religious	Catholic	155	40.8
	Protestant	8	2.1
	ADEPR	86	22.6
	Adventist	72	18.9
	Other	59	15.5
Education level	No formal	88	23.2
	Primary	219	57.6
	Secondary	37	9.7
	University	36	9.5

Occupation	Cultivator	109	28.7
	Employed	29	7.6
	Small scale business	43	11.3
	Other	199	52.4
Wealth index	Class-I	109	28.7
	Class-II	140	36.8
	Class-III	131	34.5
Age group	21 to 25	38	10
	26 to 30	36	9.5
	31 to 35	58	15.3
	36 to 40	66	17.4
	41 to above	182	47.9
Family size	1 - 3	115	30.3
	4 - 6	206	54.2
	7 - 9	52	13.7
	10 and above	7	1.8
Health insurance	Mutuelle	358	94.2
	RAMA	14	3.7
	MMI	8	2.1

Table 1: *Socio-economic and demographic characteristics of the respondents.*

Source: Primary data (2021).

The table 1 present that 29.5% of the respondents belonged to Nyarubaka sector while 23.9% of them belonged to Cyeza and the remaining 24.5 and 22.1% of them belonged to Shyogwe and Rugengabare sectors respectively. Concerning the place of residence, it has revealed that majority (73.9%) of the respondents were living in rural areas. Concerning the marital status, it has been shown that the majorities (75.5%) of the respondents were married and live with their spouse. The above table have presented that 57% of the respondents had primary education level. Concerning with wealth index, it is inferred from the above table that 65.5% of the respondents were classified in class I and II.

Presentation of findings

The findings of this study are presented according to their research objectives, which are to investigate prevalence of poor or good hygiene and sanitation practices, to assess the availability of safe water and to assess the factors associated with poor hygiene and sanitation among adults in Muhanga District.

Prevalence of poor/good hygiene practices

The first objective of this study was to investigate the prevalence of poor or hygiene among adult people as it is presented in the frequency table 2 below.

Variables	Description	Frequency	Percentage (%)
Hand wash with soap before eating	Yes/regular	219	57.6
	No/irregular	161	42.5
Hand wash with soap after toilet	Yes/regular	295	77.6
	No/irregular	85	22.4
Taking bath practices	Yes/regular	109	28.7
	No/irregular	271	71.3
Washing clothes	Yes/regular	101	26.6
	No/irregular	279	73.4
Drinking cleaned water	Yes	165	43.4
	No	215	56.6
Blushing teeth	Yes	277	72.9
	No	103	27.1
Water for personal hygiene is the same with cooking water	Yes	351	92.4
	No	29	7.6
Separated shed livestock	Yes	131	34.5
	No separated	56	14.7
	No livestock	193	50.8
Sharing toilet	Yes	137	36.1
	No	243	63.9
Tools used for cooking	Wood	72	18.9
	Charcoal	155	40.8
	Gaz	29	7.6
	Other/herbal	124	32.6
State of kitchen	Ventilation	123	32.4
	No ventilation	257	67.6
Place of kitchen	Within house/main	175	46.1
	Separated with house	66	17.4
	Outside of the house	139	36.6
Surrounded by bush	Yes	44	11.6
	No	336	88.4
Surrounded by stagnated water	Yes	14	3.7
	No	366	96.3

Table 2: *Prevalence of good/poor hygiene and sanitation.*

Source: Primary data (2021).

The table 2 present that 57.6% of the respondents were washing hands with soap before eating, 77.6% of the respondents were washing hands with soap after toilet, 71.3% of the respondents were not taking bath regular, 73.4% of the respondents were not washing clothes, 56.6% of the respondents were not drinking cleaned water, it has been reported that the majority (72.9%) of the respondents

were brushing teeth and it has been inferred that the higher proportion (92.4%) of the respondents had reported that they were the same used for both acts. 69.2% of the respondents had good condition of toilet. It has been seen from the above table that 36.1% of the respondents were Sharing toilet. Concerning with the state of kitchen, it has been depicted that 67.9% of the respondents have reported that they had no ventilated kitchen. Concerning with the place of kitchen, it has been shown that 46.1% of the respondents have reported that their kitchens were within the main house. It has been seen that 88.4% of the respondents had no house Surrounded by bush and also, it has been seen that 96.3% of the respondents had no house Surrounded by stagnated water.

The level of hygiene practices in Muhanga district

The level of hygiene practices was assessed using the score assessment of 11 variables. The mean score was 6.7 and people with a score less than the mean considered to have poor practices and those with score greater than the mean considered to have good practices.

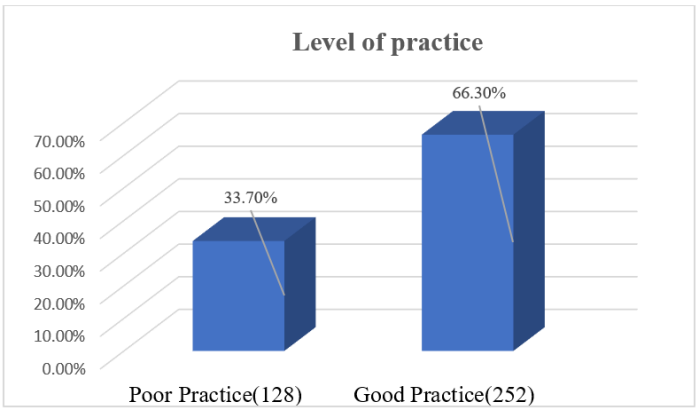

Figure 1: *Level of practice.*

The figure 1 presents the level of practice and shows that the majority 252 (66.3%) of the respondents had good practice towards water, hygiene and sanitation while 128 (33.7%) of them had poor practice towards water, hygiene and sanitation.

Availability of safe water

The presence of water, its type and how to reach its station or source it's all about availability of water. The second objective of this study was to assess the availability of safe water and was assessed by asking participants to identify the main source of water for the household as well as the time taken to reach water station or source as presented in the frequency (Table 3).

Variable	Description	Frequency	Percent
Source of available water	Pipe	80	21.1
	Fountain	265	69.7
	River /stream	28	7.4
	Other	7	1.8
Time used to get available water	1 - 30 min	211	55.5
	1h and above	112	29.5
	31 - 60 min	57	15.0

Table 3: *Availability of safe water.*

Source: Primary data (2021).

The table 3 present the source of drinking water, it has been shown that the majority (68.7%) of the respondents were getting water from source of fountain. It is inferred from the above table that 55.5% of the respondents got water by using 1 to 30 minutes time.

Factors association with hygiene and sanitation practices

The third objective was to assess factors associated with poor hygiene and sanitation among adults in Muhanga District and the bi-variate analysis was used to determine the association between hygiene and sanitation practices and socio-economic and demographic characteristics.

Variables	Description	Level of practice		P-value
		Poor practice n (%)	Good practice n (%)	
Residence sector	Nyarubaka	45 (40.2)	67 (59.1)	0.001
	Shyogwe	40 (43.0)	53 (57.0)	
	Cyeza	27 (29.7)	64 (70.3)	
	Rugengabare	16 (19.0)	68 (81.0)	
Place of residence	Urban	14 (10.9)	86 (34.1)	<0.001
	Rural	114 (89.1)	166 (65.9)	
Sex	Male	39 (33.6)	77 (66.4)	0.986
	Female	89 (33.7)	175 (66.3)	
Marital status	Married	96 (33.4)	191 (66.6)	0.976
	widow/widower	18 (36.0)	32 (64.0)	
	Divorced	14 (32.6)	29 (67.4)	
Religious	Catholic	67 (43.2)	88 (56.8)	<0.001
	Protestant	1 (12.5)	7 (87.5)	
	ADEPR	39 (45.3)	47 (54.7)	
	Adventist	10 (13.9)	62 (86.1)	
	Other	11 (18.6)	48 (81.4)	
Education level	No formal education	45 (51.1)	43 (48.9)	<0.001
	Primary	73 (33.3)	146 (66.7)	
	Secondary	5 (13.5)	7 (86.5)	
	University	5 (13.9)	31 (86.1)	
Occupation	Cultivator	26 (23.9)	83 (76.1)	<0.001
	Employed	4 (13.8)	25 (86.2)	
	Small scale business	7 (16.3)	36 (83.7)	
	Other	91 (45.7)	108 (54.3)	
Wealth index	Class-1	35 (31.1)	74 (67.9)	0.046
	Class-2	36 (25.7)	104 (74.3)	
	Class-3	57 (43.5)	74 (56.5)	

Age group	21 to 25	10 (26.3)	28 (73.7)	0.944
	26 to 30	15 (41.7)	21 (58.3)	
	31 to 35	25 (43.1)	33 (56.9)	
	36 to 40	13 (19.7)	53 (80.3)	
	41 to above	65 (35.7)	117 (64.3)	
Family size	01 - 3	32 (27.8)	83 (72.2)	0.025
	04 - 6	67 (32.5)	139 (67.5)	
	07 - 9	28 (53.8)	24 (46.2)	
	10 and above	1 (14.3)	6 (85.7)	
Health insurance	Mutuelle de santé	124 (96.9)	234 (92.9)	0.11
	RAMA/MMI	4 (3.1)	18 (7.1)	
Source of available water	Pipe	7 (5.5)	73 (29)	<0.001
	Fountain	117 (91.4)	148 (58.7)	
	Stream	4 (3.1)	31 (12.3)	
Time taken to get water	1 - 30 Min	38 (18.0)	173 (82.0)	<0.001
	31 - 60 Min	19 (33.3)	38 (66.7)	
	1h01 and above	71 (63.4)	41 (36.6)	

Table 4: *Bivariate analysis between socio-economic and demographic factors and hygiene and sanitation practices.*
Source: Primary data, Significant at p < 0.05.

Table 4 showed the result from bivariate analysis and the study revealed that there was statistical significance between hygiene and sanitation practices and residence sector, place of residency, religion of the respondents, educational level, occupation, wealth index and family size.

Variable	Category	AOR	95% CI for AOR		P value
			Lower bound	Upper bound	
Residence sector	Nyarubaka	Ref			
	Shyogwe	0.449	0.167	1.209	0.113
	Cyeza	0.248	0.086	0.715	0.01
	Rugengabare	0.547	0.213	1.404	0.21
Place of residency	Rural	Ref			
	Urban	7.517	2.706	20.881	<0.001
Religion	Catholic	Ref			
	Protestant	0.152	0.051	0.453	0.001
	ADEPR	5.607	0.501	62.789	0.162
	Adventist	0.189	0.06	0.595	0.04
	Other	0.906	0.152	5.391	0.914
Educational level	Primary	Ref			
	Secondary	3.996	1.514	10.542	0.005
	Tertiary	3.871	1.464	10.233	0.006

Occupation	Cultivator	Ref			
	Employed	5.006	2.459	10.193	<0.001
	Small business	0.807	0.186	3.498	0.774
	Other	0.153	0.024	0.979	0.047
Wealth Index	Class-1	1.62	0.959	2.767	0.071
	Class-2	2.225	1.333	3.716	0.002
	Class-3	Ref			
Family Size	1-3	Ref			
	4-6	1.438	0.782	2.646	0.243
	7-9	0.668	0.296	1.507	0.331
	10 and above	3.009	0.331	27.32	0.328
Source of available water	Pipe	Ref			
	Fountain	0.157	0.064	0.386	<0.001
	Stream	1.902	0.467	7.739	0.369
Time taken to get water	1-30min	Ref			
	31-60min	0.127	0.075	0.213	<0.001
	Above 1h	0.439	0.229	0.844	0.014

Table 5: *Logistic regression to examine association between hygiene and sanitation practices and socio-demographic characteristic of respondent.*

Source: Primary data (2021).

The above table shows the results of multivariate analysis regarding factors associated with water, hygiene and sanitation practices at Muhanga District. The respondents belonging to Cyeza sector were less likely to have good practices [AOR = 0.248; 95%CI: 0.086 - 0.715; P-value 0.010] compare to the respondents who belonged to Nyarubaka sector. The respondents who lived in urban area were more likely to have good practice [AOR = 7.517, 95%CI: 2.706 - 20.881; P = < 0.001] compared to those who lived in rural area. The respondents who belonged to protestant were less likely to have good practices towards hygiene and sanitation [AOR = 0.152, 95%CI: 0.051 - 0.453; P-value = 0.001] and Adventists were less likely to have good practices towards hygiene and sanitation [AOR = 0.189, 95%CI: 0.060 - 0.595; P value = 0.040] compare to respondents who belonging to catholic religion.

Respondents who had secondary education level were more likely to have good practice towards hygiene and sanitation [AOR = 3.996, 95% CI: 1.514 - 10.542; P-value = 0.005] and respondents who had tertiary education level were more likely to have good practice towards hygiene and sanitation [AOR = 3.871, 95% CI: 1.464 - 10.233; P-value = 0.006] compared to respondents who had primary level of education. Employed people were more time likely to have good practice towards hygiene and sanitation [AOR = 5,006,95% CI: 2.459 - 10.193 P-value = < 0.001 and those who were doing other different activities that generated income were less likely to have good practices towards hygiene and sanitation (AOR = 0.153,95% CI: 0.024 - 0.979; P-value = 0.047] compared to cultivators.

The respondents in class 2 were more likely to have good practices towards hygiene and sanitation [AOR = 2.225; 95%CI: 1.333 - 3.716; P = 0.002] and those who were in class-1 (AOR = 1.62; 95% CI: 0.959 - 2.767; P = 0.071] compared to respondents belonged to class3. The respondents who used water from fountain were less likely to have good practices towards hygiene and sanitation [AOR = 0.157; 95%CI = 0.064 - 0.386; P = < 0.001] compared to those who got water from pipe. The respondents who took 31-60 minutes to get water were less likely to have good practices towards hygiene and sanitation [AOR = 0.127; 95%CI = 0.075 - 0.213; P = < 0.001] and

respondents who needed 1 hour and above were less likely to have good practices towards hygiene and sanitation [AOR = 0.439; 95%CI = 0.229 - 0.844; P = 0.014] compared to those who needed 1 - 30 minutes to get water.

Discussion

The current study sought to assess the factors associated with hygiene and sanitation practices among adults in Muhanga District. This section is meant to discuss the finding from analysis of data collected from 380 respondents among the household in four sectors. It also illustrates the relevance of these finding and relation with other carried studies.

In this study, it has been shown that the majority 66.3% of the respondents had good practice towards water, hygiene and sanitation while 33.7% of them had poor practice towards water, hygiene and sanitation.

A similar study was conducted in southern (Rwanda) and found that the best practices of hand washing with soap were higher at 88 percent of respondents, and it was also discovered that the possession of toilet was higher at 83.5 percent of the respondents own latrines. Concerning drinking clean water, this study found almost the same at forty-four percent of respondents use boiling water methods and 55 percent do not treat water at all. The primary method of water treatment was thought to be boiling water [13].

The second objective was of this study to assess the availability of safe water, this study shown that present the source of drinking water, it has shown that the majority (68.7%) of the respondents were getting water from source of fountain. It was found that 55.5% of the respondents got water by using 1 to 30 minutes.

In a similar study, it was discovered that different to the source using water, the studies conducted by [14,15] on sources of water, participants reported multiple sources of drinking water, including those that had improved tube were 84%, piped water 8.9%, small tank 2.3% and those that had not dug well 4.9%.

In the study done [16] in Rwanda, it was found that overall, only 47.3 percent of the population is served with an improved water supply within 500 meters of their home and 49 percent of households spent 30 minutes or longer on a round-trip to water source [17].

The present study revealed that, the factors significantly associated with hygiene and sanitation practices were residence sector, place of residence whether was rural or urban, religion, education level, occupation, wealth index, source of available water and time taken to get water.

The study conducted from Nyanza was not far from present study where, identified that the key factors associated with practices of sanitation facility at a household were socio-economic status, family size, and Individual and community factors are key determinants for a household to practice of sanitation facility [18].

Conclusion

The aim of this study was to assess the factors associated with hygiene and sanitation practices among adults in Muhanga District.

The present research determined the level of practice and found out that the majority of the respondents had good practice towards water, hygiene and sanitation while another few number of them had poor practice towards water, hygiene and sanitation. The study has shown that the majority of the respondents were getting water from source of fountain while other respondents got water from pipes. The factors significantly associated with hygiene and sanitation practices were residence, religion, education level, occupation, wealth index, source of available water and time taken to reach the source of water.

Recommendations

Muhanga District was recommended to increase the source of water near the population's residence to shorten time taken to reach the source of water.

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