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ASSESSMENT OF WATER, SANITATION AND HYGIENE PRACTICES OF HOUSEHOLDS IN BALANGA NORTH, GOMBE, NIGERIA

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Abstract

Increasing disease burden and diminishing environmental health conditions among the urban and rural poor in Sub Saharan African countries have been attributed to poor sanitation and hygiene practices. This study sought to assess the knowledge, attitude and practice of households regarding water, sanitation and hygiene (WASH). Data was gathered through conducting a questionnaire survey and stratified random sampling technique was adopted to select 150 household units among the settlement clusters at a response rate of 100%. Results of the study revealed that 48.7% of the households had water sourced from wells and boreholes. The results indicated that 37.7% and 32% of households reported their water sources to be safe and potable respectively while 31.3% reported unsafe water use. The result also indicated recorded cases of unsafe water use to include cholera, diarrhoea, typhoid and dysentery with incidences of 12.7%, 40.7%, 39.3% and 7.3% respectively. The majority of the households represented by 56% were not satisfied with the water situation as a result of irregular supply. The result also revealed that all the households were aware of the benefits of handwashing and use of toilet facilities compare to the practice of open defecation and most of them practised hand washing before a meal. The results also indicated that households that use pit latrines and water closets to septic tanks for their sanitary needs are represented by 66.7% and 2% respectively while 31.3% lacked sanitation facilities and practised open defecation. Only 9.3% of households practised safe sanitation of refuse disposal at designated dumpsites, while 44%, 14.6% and 32% disposed of their refuse around the home, on the roadsides and indiscriminate dumping respectively. In conclusion, this study showed the absence or near absence of public water supply. It also revealed good sanitation knowledge of households, however, waste handling and hygiene practices of handwashing are poor and several households still engaged in the practice of open defecation. Recommendations made based on the findings are government at all levels should make provision for community tap points that will ensure safe water use to reduce the incidences of water-borne diseases, public education on waste handling as well as the critical times of handwashing is encouraged and the provision of public conveniences at strategic locations to discourage open defecation.

Keywords: Attitude, Household, Hygiene, Knowledge, Sanitation, Water

Introduction

Safe sanitation is one of the foundations of a healthy, comfortable and dignified life, as well as a human right and everyone, is entitled to sanitation services that not only provide privacy, ensure dignity and safety but are also physically accessible and affordable (WHO, 2018). But the reality for billions of people is one of the polluted environments, in which one or many of the links in the chain that makes up safe sanitation such as the provision of potable water, toilet facilities, waste treatment and efficient disposal and management is missing or probably out of reach (UNICEF/WHO, 2020).

Over half of the world's population with a record of 4.2 billion people uses sanitation services that leave human waste untreated, threatening human and environmental health WHO/UNICEF (2020). An estimated 673 million people have no toilets at all and practice open defecation, while nearly 698 million school-age children lacked basic sanitation services at their schools. The consequences of poor sanitation are devastating to public health, social and economic

development. Poor sanitation affects everyone and lack of safe sanitation leads to illness and disease that may affect children on different scales such as diarrhoea, cholera, typhoid and worm infections. In addition to some of the effects of poor sanitation on dignity, safety and gender equality, there are significant financial costs related to lack of sanitation, including increased health care costs, lost income, forgone educational opportunities and costs resulting from pollution (UNICEF/WHO, 2020).

The practice of water, sanitation and hygiene (WASH) still poses a great challenge to many countries across the globe. It was estimated that 68% of Nigeria's total population in 2018 had access to basic water supply, and progress towards the achievement of universal and equitable access to basic water supply has been slow (FGN/UNICEF, 2020). Only 19% of the total population use safely managed sanitation services, 24% are still practising open defecation (OD) with 30% of this practice obtainable in the rural areas. Unless this problem is effectively addressed, the current number of people still practising OD is predicted to increase with population growth trends (FGN/UNICEF, 2020). The COVID-19 pandemic had not only exacerbated sanitation challenges in most rural and urban informal settlements but also reawakened the consciousness to the central role that water, sanitation and hygiene (WASH) plays in protecting people from diseases (UNICEF/WHO, 2020).

In recent years, the linkage between water, sanitation and hygiene and overall wellbeing has been emphasized. While the impact of poor sanitation and hygiene on human health has been widely acknowledged (Bartram, Lewis, Lenton and Wright, 2005; Montgomery and Elimelech, 2007; Mara, Lane, Scott, and Trouba, 2010; Ezeh, Agho, Dibley and Hall, 2014; W.H.O, 2016), some studies have shown that the knowledge, attitude and practice of safe water, sanitation and hygiene particularly in the rural areas are not encouraging (Shittu, Akpan, Mafiana, Ogunshola and Sodipe, 2014; Orimoloye et al, 2015; Enebeli et al, 2019; Inah et al, 2020; Wada, Olawade, Asogbon, Makinde and Adebayo, 2021). The study of Danjin, Adewoye, and Sawyerr (2020) in Gombe focused on WASH practices about malaria prevalence among primary school children and the assessment of WASH practices at the household level is lacking. If Target 6.2 of the Sustainable Development Goals and the commitment of the Federal Government to make Nigeria open defecation free by 2025 is anything to go by, there must be efforts geared towards the periodic assessment of the knowledge, attitude and practice of water, sanitation and hygiene (WASH) at the household level particularly in the rural areas where basic and improved sanitation coverage is inadequate. The objective of this study is to assess the knowledge, attitude and practice of households regarding water, sanitation and hygiene (WASH) in Balanga north, Gombe. The information generated

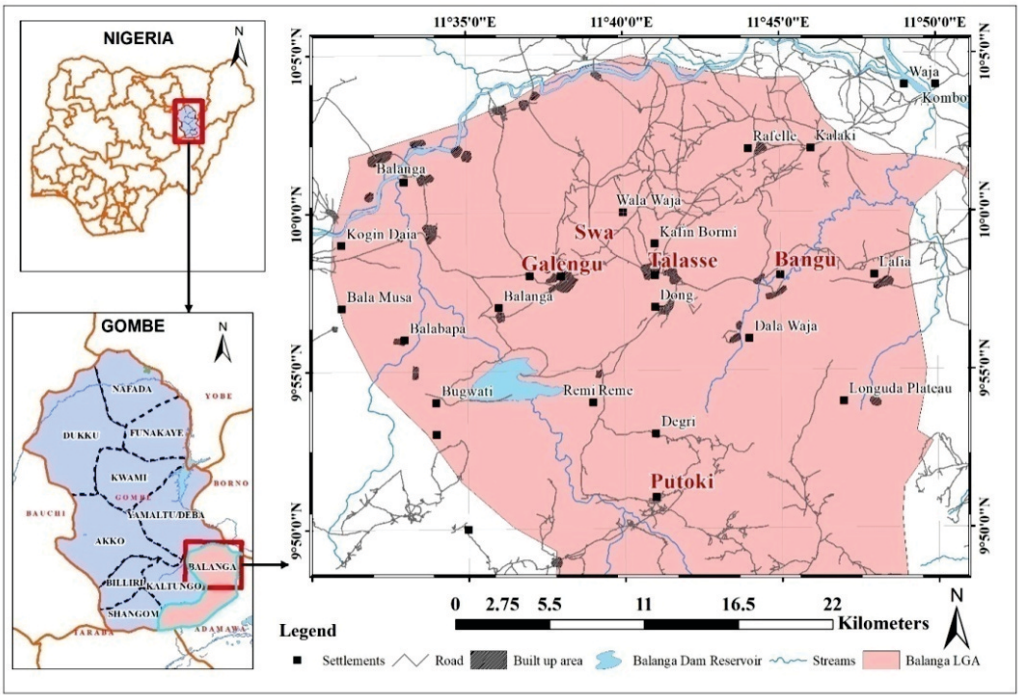

Fig 1: The Study Area
Source: Modified from Ministry of Land and Survey, Gombe State

from this study will provide baseline data upon which further research can be anchored and revalidated.

Materials and Methods

Description of the study area

Balanga north is located between latitudes $9^0$50' 00''N and 10^0 5'00''N and longitudes $11^0$35'00''E and$11^0$50'00''E. The major towns that make up Balanga North include Balanga, Talasse, Gelengu, Putoki, Swa and Bangu as shown on Figure 1. The climate over the study area is described as a tropical continental climate. Temperature is high all year round with a mean annual air temperature of 30^0c. The highest temperatures are recorded during the dry heatwave months between March and May with a maximum air temperature of above 37^0c. During the rainy season, the temperature drops considerably due to dense cloud cover between July and August as well as during the harmattan period of November to February. Rainfall is strongly seasonal due to the oscillation of the inter-tropical convergence zone (ITCZ) which controls the Tropical Maritime and the Tropical Continental air masses of contrasting air moisture and relative humidity over the study area. The mean annual precipitation is 835 mm (Balzerek et al, 2003).

Data collection and analysis

Based on settlement hierarchy and composition of household dwellings, a stratified random sampling technique was adopted to select household units among the settlement clusters of Gelengu, Swa, Talasse, Bangu and Putoki for the study. Purposeful and accidental (i.e. non-probability sampling technique) sampling methods were adopted to select respondents from the settlements under study. The purposefully selected respondents include district heads and community leaders while the accidental samples comprised household heads that were in their residences at the time of the survey conducted through the administration of questionnaire as an effective technique for capturing the perspectives of households concerning water, sanitation and hygiene practices in Balanga North with a total sample of 150 respondents. The data generated from the questionnaire were summarized using descriptive statistics and cross-tabulations.

Results and Discussion

Demographic characteristics of respondents

The demographic characteristics of the respondents in the sampled settlements are presented in Table 1. From the analysis, an average of 65.3% of the household heads that serves as respondents were males while 34.7% was female.

Water, sanitation and hygiene knowledge of household

Table 2 shows data on water, sanitation and hygiene knowledge of households. It reveals the available sources of water for households include water sourced from streams or rivers, groundwater of wells and boreholes, tap water and water from private water vendor supply.

The result shows that wells and boreholes are the dominant sources of water supply representing 48.7% on average. Sources from streams and rivers were placed second with a record of 27.3%. Households with tap piped water connection was 15%. Vendor water through private water supply is the least source in the study area with a percentage of 6%. The observed dominance of well and borehole utilization either through individual, communal and commercial hand-dug well and borehole clearly shows the absence or near absence of public water supply in the area. This has implications on the quantity of water consumption available to households and may consequently jeopardize sanitation and hygiene practices of the rural households. The tendency is that water rationing among various uses becomes prioritized thereby compromising hygienic practices that encourage bathing at least twice daily, thorough washing of cooking utensils, hand washing regularly among

Table 1: *Demographic characteristics of respondents*

Characteristics	Talasse (n=50)		Gelengu (n=30)		Putoki (n=30)		Bangu (n=20)		Swa (n=20)		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Gender												
Male	34	68%	22	73.3%	15	50%	14	70%	13	65%	98	65.3%
Female	16	32%	8	26.7%	15	50%	6	30%	7	35%	52	34.7%

Source: Fieldwork, 2020

Table 2: *Water, sanitation and hygiene knowledge of household*

Characteristics	Talasse (n=50)		Gelengu (n=30)		Putoki (n=30)		Bangu (n=20)		Swa (n=20)		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Water sources												
Stream/River	4	8%	7	23.3%	21	70%	3	15%	6	30%	41	27.3%
Well/Borehole	24	48%	16	53. 3%	9	30%	15	75%	9	45%	73	48.7%
Tap water	15	30%	5	16. 7%	0	0%	2	10%	5	25%	27	18%
Private water Supply	7	14%	2	6.7%	0	0%	0	0%	0	0%	9	6%
Responsibility for fetching water												
Girls	25	50%	15	50%	8	26.7%	3	15%	9	45%	60	40%
Boys	8	16%	7	23.3%	6	20%	8	40%	5	25%	34	22.7%
Men	8	16%	2	6.7%	3	10%	9	45%	1	5%	23	15.3%
Women	9	18%	6	20%	13	43.3%	0	0%	5	25%	33	22%
Quality of water sources												
Safe	25	50%	7	23.3%	3	10%	11	55%	9	45%	55	36.7%
Unsafe	5	10%	7	23.3%	25	83.3%	4	20%	6	30%	47	31.3%
Potable	20	40%	16	53.3%	2	6.7%	5	25%	5	25%	48	32%
Water storage facilities												
Open container	9	18%	4	13.3%	10	33.3%	3	15%	2	10%	28	18.7%
Closed container	30	60%	18	60%	17	56.7%	15	75%	14	70%	94	62.7%
Buckets	3	6%	4	13.3%	2	6.7%	2	10%	3	15%	14	9.3%
Gee Pee tank	8	16%	4	13.3%	1	3.3%	0	0%	1	5%	14	9.3%
Water treatment method												
Sedimentation	12	24%	5	16.7%	12	40%	6	30%	4	20%	39	26%
Filtration	11	22%	8	26.7%	10	33.3%	6	30%	6	30%	41	27.3%
Boiling	20	0%	16	53.3%	8	26.7%	8	40%	8	40%	60	40%
Water guard	7	14%	1	3.3%	0	0%	0	0%	2	10%	10	6.7%
Freq. of washing water collection containers												
Everyday	2	4%	4	13.3%	2	6.7%	2	10%	0	0%	10	7%
Weekly	6	12%	1	3.3%	0	0%	0	0%	5	25%	12	8%
When dirty	10	20%	9	30%	10	33.3%	4	20%	4	20%	37	25%
Before fetching Water	32	64%	16	53.3%	18	60%	14	70%	11	55%	91	60%
Effect of unsafe drinking water												
Cholera	8	16%	4	13.3%	2	6.7%	3	15%	2	10%	19	12.7%
Diarrhea	17	34%	11	36.7%	16	53.3%	10	50%	7	35%	61	40.7%
Typhoid	18	36%	13	3.3%	11	36.7%	6	30%	11	55%	59	39.3%
Dysentery	7	14%	2	6.7%	1	3.3%	1	5%	0	0%	11	7.3%
Challenges associated with fetching water												
Distance	5	10%	4	13.3%	3	10%	7	35%	1	5%	20	13.3%
Cost of water Purchase	8	16%	14	46.7%	9	30%	1	5%	9	45%	41	27.3%
Irregular water Supply	33	66%	2	6.7%	13	43.3%	1	5%	3	15%	52	34.7%
Unclean dirty Water	4	8%	10	33.3%	5	16.7%	11	55%	7	35%	37	24.7%
Levels of satisfaction with water supply situation												
Satisfactory	10	20%	6	20%	7	23.3%	4	20%	2	10%	29	19.3%
Very Poor	27	54%	14	46.7%	17	56.7%	8	40%	18	90%	84	56%
Inadequate	7	14%	7	23.3%	5	16.7%	5	25%	0	0%	24	16%
Undecided	6	12%	3	10%	1	3.3%	3	15 %	0	0%	13	8.7%

Source: Fieldwork, 2020

others. The table also shows that the responsibility for fetching water is not restricted to older women alone but girls, boys and men are also involved. On average in all the settlements, water fetching respondents consist of 40% girls, 22.7% boys, 15.3% men and 22% women. This further confirmed that the responsibility for water fetching is majorly the activities of children and women in sub- Saharan Africa. The result of the relative satisfaction of the interviewed households about domestic water quality shows a record of 36.7%, 31.3% and 32% respectively for safe, unsafe and potable water quality. One of the reasons for poor water quality could be attributable to poor sanitary conditions around the water sources as some of the wells are open well without cover lids. Also, the dipping of containers to draw water from these open hand-dug wells could have been significantly contaminated. In terms of water storage facilities, the result from Table 2 shows that the interviewed household uses open containers, closed containers, buckets and Gee Pee tanks. On average 62.7% preferred closed containers for water storage, while the percentage of the household that employs open containers is 1.7%, the remaining 9.3% and 9.3% either use buckets or Gee Pee tanks. With regards to water treatment methods, the result from Table 2 shows that the interviewed household employs one of sedimentation, filtration, boiling and use of water guard. On average the most preferred water treatment is boiling 40%, closely followed by filtration 27.3%, sedimentation 26% and water guard 6.7%. On practices and frequency of washing of water collection containers and storage, the result from Table 2 shows that the interviewed household practice this activity in the sequence of every day, weekly, when dirty and before fetching water. Averagely the most preferred washing arrangement for water collection containers is before fetching water with a 60% practice, closely followed by when dirty 25%, weekly 8% and everyday 7%. It follows that the awareness and cleanliness of water collection containers of the households are high. Table 2 shows that the interviewed households agreed that unsafe drinking water have resultant effects and they have recorded incidence of cholera, diarrhoea, typhoid and dysentery respectively. The average incidence of water-borne infections of cholera, diarrhoea, typhoid and dysentery across the study settlements is 12.7%%, 40.7%, 39.3% and 7.3% respectively. The awareness of the effects of unsafe drinking water on health is high among households and further consumption of unsafe drinking water may lead to one or more infectious diseases.

In relation to challenges associated with fetching water, Table 2 shows that the interviewed households majorly sourced their water from streams and rivers, groundwater of wells and boreholes, tap water and water from private water vendors. Since most of them don't have water supply inside their household premises they hereby face the following resulting challenges of distance, cost of water purchase, irregular water supply and unclean dirty water. In all, it recorded an average of distance 13.3%, cost of water purchase 27.3%, irregular water supply 34.7% and unclean dirty water 24.7% in the study settlements. It shows that irregular water supply is a major challenge to water, sanitation and hygiene and a contributing factor to why the households consume unclean dirty water in some instances. Regarding the level of satisfaction with the water supply situation as presented in Table 2 the result shows a varying degree of responses with the majority dissatisfied with the situation while very few were satisfied with some indifferent to the situation. On average majority of the households were not satisfied with the water supply situation with responses of very poor and inadequate recording 56% and 16% respectively. While those satisfied and undecided recorded 19.3% and 8.7% respectively. The water supply situation is worrisome in most rural communities particularly during the dry season when people had to trek many kilometres in search of water thereby dissipating much energy. The finding of this study is in line with earlier studies that reported households with improved drinking water sources were more likely to use improved sanitation facilities than those with unimproved water sources (Abubakar, 2017; Olukanni and Okorie, 2015).

The attitude of household to sanitation and hygiene practice

Analysis of the attitude of households to sanitation and hygiene practice is presented in table 3.

The assessment of the benefits of toilet facilities over open defecation in the promotion of sanitation and hygiene presented in table 3 reveals a good level of sanitary education of the sampled households. The identified benefits include avoiding bad smells, limiting the spread of infection, enhancing privacy and avoiding harassment. On average 43.3% of the household believed that toilets help to avoid bad smells compare to open defecation, the limit spread of infection 41.3%, enhance privacy 10.7% and avoid harassment 4.7%. Open defecation and disposal of night soil into the environment is partly responsible

Table 3 *Attitude of household to sanitation and hygiene practice*

Characteristics	Talasse (n=50)		Gelengu (n=30)		Putoki (n=30)		Bangu (n=20)		Swa (n=20)		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Benefits of toilet facilities compare to open defecation												
Avoid bad small	29	58%	13	43.3%	9	30%	9	45%	5	2 5%	65	43.3%
Limit spread of Infection	15	30%	12	40%	19	63.3%	7	35%	9	45%	62	41.3%
Enhance privacy	2	4 %	5	16.7%	2	6.7%	3	15%	4	20%	16	10.7%
Avoid harassment	4	8%	0	0%	0	0%	1	5%	2	10%	7	4.7%
Critical time for household hand washing practices												
Before eating	36	72%	21	70%	16	53.3%	7	35%	9	45%	89	59.3%
After eating	4	8%	1	3.3%	3	10%	2	10%	3	15%	13	8.6%
After use of toilet/ Defecation	4	8%	7	23.3%	8	26.7%	11	55%	8	40%	38	25.3%
After house cleaning	6	12%	1	3.3%	3	10%	0	0%	0	0%	10	6.7%

Source: Fieldwork, 2020

for the health risks and also accountable for some of the disease burden in developing countries. While increased use of appropriate toilet facilities has helped to promote sanitation and hygiene thereby reducing poor sanitation related fatalities. The critical time that the sampled household performs handwashing routine within the context of water, sanitation and hygiene (WASH) practices presented in table 3 reveals WASH practices were carried out before eating, after eating, after use of toilet or defecation and finally after house cleaning. The analysis on average shows the following pattern of WASH practice, before eating 59.3%, after eating 8.6%, after use of toilet or defecation 25.3% and after house cleaning 6.7%. The importance of water, sanitation and hygiene in reducing community transmission of diseases and promoting healthy living is well established. In this study, the respondents' awareness to WASH is very low particularly with practices of handwashing after eating and after use of toilet or defecation.

Sanitation and hygiene practice of household

The respondents' household sanitation and hygiene practice is presented in table 4

Assessment of sampled households in Table 4 with regards to toilet facilities used to ensure safe sanitation reveals that most households employed open defecation, open-pit latrine and a few used water closets. On average across settlements and households, open defecation accounts for 31.3%, open-pit latrines account for 66.7% and water closets account for only 2%. An open-pit latrine is most common among the households. Open defecation is also a common practice because some of the households are without provision for toilet facilities thereby using the nearest bushes, open spaces and dilapidated buildings as free toilets for all. Observation around the pit latrines shows that they are not insulated with brick structure and leachate from it is capable of polluting groundwater while open defecation is a potential environmental contaminant. The result of this study is in agreement with the findings of Abubakar, (2017); Kaoje et al, (2019) and Inah et al, (2020) who reported that more urban households used modern sanitation facilities (toilets that flush to sewer systems or septic) than rural households whose preference is either tailored to the use of ventilated improved pit (VIP) latrines or open-pit latrines with close to one-third of the households having no access to any sanitation facility practising defecation in the open.

In relation to solid waste management, the assessment of sampled households in table 4 reveals that most households disposed of their refuse around the home, some on the roadside while others either disposed of them indiscriminately or dispose of it at the designated dumpsite. It is disturbing that the safe sanitation issue relating to solid waste management is very poor with the majority of the households on the average practising dumping around the home 44%, dumping on roadside 14.6%, indiscriminate dumping 32% and designated dumpsite 7.3%. The attitude of sampled households toward handwashing practice after using toilet facilities as presented in Table 4 shows that respondents that regularly wash

Table 4 *Sanitation and hygiene practice of household*

Characteristics	Talasse (n=50)		Gelengu (n=30)		Putoki (n=30)		Bangu (n=20)		Swa (n=20)		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Toilet facilities/ Practices Employed by households												
Open defecation	11	22%	14	46.7%	11	36.7%	8	40%	3	15%	47	31.3%
Open pit latrine	38	76%	15	50%	18	60%	12	60%	17	85%	100	66.7%
Water closet	1	2%	1	3.3%	1	3.3%	0	0%	0	0%	3	2%
Methods of household refuse disposal												
Dump around the Home	21	2%	13	3.3%	15	50%	8	40%	9	45%	66	44%
Dump on road side	9	18%	6	20%	2	6.7%	4	20%	1	5%	22	14.6%
Indiscriminate Dumping	18	36%	7	23.3%	8	26.6%	6	30%	9	45%	48	32%
Designated dumpsite	2	4%	4	13.3%	5	16.7%	2	10%	1	5%	14	9.3%
Frequency of hand washing after using toilet												
Regularly with soap and water	15	30%	3	10%	3	10%	3	15%	1	5%	25	16.7%
Irregularly with soap and water	17	34%	4	13.3%	14	46.7%	4	20%	3	15%	42	28%
Use only water	6	12%	4	13.3%	5	16.6%	5	25%	4	20%	24	16%
Do not wash at all	12	24%	19	63.3%	8	26.7%	8	40%	12	60%	59	39.3%
Benefits of hand washing												
Improve hygiene	7	14%	7	23.3%	4	13.3%	3	15%	5	25%	26	17.3%
Kill germ	10	20%	9	30%	4	13.3%	5	25%	2	10%	30	20%
Prevent odour	3	6%	3	10%	2	6.7%	1	5%	0	0%	9	6%
Prevention of disease	30	60%	11	36.7%	20	66.7%	11	55%	13	65%	85	56.7%

Source: Fieldwork, 2020

their hands with soap and water comprised 16.7%, irregularly with soap and water make up 28%, those that use only water make up 16% while the remaining 39.3% do not wash their hands at all after use of the toilet. The opinions of sampled households on awareness of the benefits of handwashing are presented in Table 4. The awareness of the benefits of handwashing varies from improving hygiene, killing germs, preventing odour and prevention diseases. Averagely all the sampled household has a good knowledge of the benefits of handwashing with the majority representing 56.7% having awareness of the prevention of diseases. Findings from the studies of Sadiq et al, (2018); Kaoje et al, (2019) and Inah, et al, (2020) also reported some negative environmental practices like the dumping of refuse indiscriminately and handwashing mostly done after a meal with water alone.

Implications of water, sanitation and hygiene practices

Adequate and regular practices of sanitation and hygiene are essential to human health and survival. Issues surrounding water, sanitation and hygiene constitute several challenges to countries today. Nigeria ranks as one of the top three countries in the world in the number of people living without access to safe water and sanitation (UNICEF, 2019), and ranks second for the number of people practising open defecation (Premium Times, 2019). In consonance with earlier studies, there is awareness of sanitation and hygiene practices but the compliance is poor. The situation of open defecation and indiscriminate dumping of solid waste is not different from the condition reported in Ibadan by Orimoloye et al, (2015) and in Calabar by Inah et al, (2020). This practice most often contributes to contamination of drinking water sources and may cause frequent diarrhoea in children, including dysentery, cholera and typhoid. It is expedient that people have access to portable drinking water and sanitation systems for proper disposal of their excreta to prevent infection. Concerning hand washing, the result of this study confirms that of Orimoloye et al (2015) where handwashing was mainly practised after eating. The practice of handwashing with soap and water shows that 16.7% of the respondent

engaged in the practice regularly, 28% of the respondents practice it irregularly, a respondents that uses water only accounted for 16%, while those that do not wash at all accounted for 39.3%. Further, the result revealed that the practice of proper handwashing with soap and water is less important among rural dwellers, therefore there is a need to educate the populace on the critical times to carry out handwashing practice particular when in contact with faecal materials.

Conclusion and Recommendations

This study underscores the importance of regular assessment of the knowledge, attitude and practice of water, sanitation and hygiene (WASH) at the household level. In conclusion, this study showed the absence or near absence of public water supply and also revealed good sanitation knowledge of households. However, waste handling and hygiene practices of handwashing are poor and several households are still engaged in the practice of open defecation. Recommendations made based on the findings is government at all levels should make provision for community tap points that will ensure safe water use to reduce the incidences of water-borne diseases, public education on waste handling as well as the critical times of handwashing is encouraged and the provision of public conveniences at strategic locations to discourage open defecation.

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