



ISSN : 2350-0743

www.ijramr.com



International Journal of Recent Advances in Multidisciplinary Research

Vol. 09, Issue 03, pp.7518-7538, March, 2022

RESEARCH ARTICLE

A SURVEY OF THE SANITATION PRACTICE AND THE PREVALENCE OF DIARRHEA IN JOS METROPOLIS

*IZAM, Y.Y., OTUBO G. C. and OLOTU, P. N.

Department of Pharmacology, Faculty of Pharmaceutical Sciences, University of Jos

ARTICLE INFO

Article History:

Received 10th December, 2021

Received in revised form

24th January, 2022

Accepted 17th February, 2022

Published online 22nd March, 2022

Keywords:

Sanitation, Hygiene,
Prevalence and Diarrhea.

*Corresponding Author:

IZAM, Y.Y.,

ABSTRACT

Aim: The central aim of this research was to investigate people's practice of sanitation and personal hygiene, prevalence of diarrheal diseases and to suggest ways of reducing the incidence of these diseases in the community. **Methods:** To achieve these objectives two methods (interview and observation) were used to study the problem so that the strength of each method could conquer the deficiencies of a single method studies. The entire study was conducted between May and July 2017. **Results:** The result of the findings revealed that more than half of the respondents in the study area have a good sanitation condition and the prevalence of diarrhea was 37.3%. **Conclusion:** From the study, it can be seen that people's observance of sanitation and personal hygiene in the study area was generally good. The prevalence of diarrhea was high in the study area. Hence the needs to further improve the sanitation condition of the study area.

INTRODUCTION

Human survival in the planet earth is bedeviled with a lot of health related problems caused by man's existing environmental conditions. These are the surrounding conditions of man's living environment which has been observed by researchers to be consequentially detrimental to the health, social and economic well being of the individual and his family or society where they live (1-3). Man's health is determined by some factors which play a leading role in making man what he is, these conditions are social, economic, political, natural manmade and environmental factors. Human healthy living is tied to some circumstances where man finds himself. For instance, the environment man lives, access to quality water, transportation and storage of such water for family consumption, hygiene and sanitation level. The surrounding environment as well as waste disposal and management, feeding pattern and personal hygiene among others to a large extent determine the degree of one's health (4). WHO/UNICEF (World Health Organization/United Nation's International Children's Emergency Funds) joint monitoring program estimates for water supply and sanitation released in early 2013 shows that 36 percent of the world's

population. (2-5 billion) do not have access to improved sanitation facilities and 768 million people still use unsafe drinking water sources. Insufficient access to safe water and sanitation services, coupled with poor hygiene practices, kills and sickens, thousands of children every day and leads to penury and reduced opportunities for thousands more (5). (2) Discovered a common chain running round the discussion parlance when looking at the cases of malaria, cholera, dysentery and dengue fever. The author hence posited that one common theme is that the areas mostly prone to epidemics are areas of the world that are domicile to some of the world's poorest people. In order to manage these and other infectious diseases, it is crucial that people in these regions have access to, safe drinking water and improved sanitation and hygiene. Building wells and latrines before a disaster or an epidemic strikes would offer the basic human rights these citizens need to guard themselves against three of the world's most dangerous diseases (4). The World Bank (2003) identifies the demographic characteristics of the household including education of members, occupation, size and composition as factors controlling the readiness of the household to use an improved water supply and sanitation system. Education, particularly for females results in well spaced child birth and greater ability of parents to give better health care. This in turn adds to reduced mortality rates among children less than 5 years (6).

*Corresponding Author: IZAM, Y.Y.,

Department of Pharmacology, Faculty of Pharmaceutical Sciences,
University of Jos.

STATEMENT OF THE PROBLEM

Jos Metropolis is the largest town in Plateau State and serves as the State capital. It doubles as the headquarters of Jos-North and Jos- South Local Government areas of Plateau State. It is without doubt an old town whose growth as an urban nucleus is driven by commercial and mining activities as a dominant urban center within the state. Jos has continually received invasion of migrants from country side and a combination of rural- urban migration and high fertility rates of the families has led to a distention in its population. However, the pace of population growth far out strips the ability of the urban authorities (particularly Jos Metropolitan Development Board, Ministry of Housing and Environment and Ministry of Lands Surveys and Town Planning) to provide and maintain the necessary facilities such as housing, drain sewers and water supply, therefore leaving so many people in loathsome shanty towns. In spite of the water and sanitation programs executed within the Jos Metropolis, there is little positive impact and thus diarrhoeal diseases are still very high in the Jos Metropolis. Hence, in order to solve any problem it is very important to understand the issues that contribute to it, since identifying the problem in itself is said to be a solution in disguise. Numerous health impact research have evidently recognized that the upgrading of water supply and sanitation alone is generally necessary but not adequate to attain broad health effects if personal and domestic hygiene are not given equivalent importance (7). The trouble of safe sanitation provision in developing countries has previously been dealt with by researchers for quite some time. However, until recent times they were more often than not considered as technical and / or economic problems. Even rural sanitation issues were repeatedly dealt with from an entirely engineering perspective, with only a simple reference to social or demographic aspects. Therefore relatively not much has been learnt about how the socio- cultural demographic factors encroach on hygienic behaviours which in turn influences the transmission of diseases. The relationship between household socio cultural factors and sanitation conditions of household in Jos Metropolis has not been systematically documented or there is inadequate research that explores such relationship.

THE RESEARCH QUESTIONS

The following research questions were posed to help address the objectives

- How is sanitation behaviours affected by household sociocultural demographic factors like age and educational level in the study area.
- What is the prevalence/occurrence of diarrhoea among young children under 5 years old in these households?

GENERAL OBJECTIVES

The main aim of this research is to investigate people's practices of sanitation, personal hygiene, and the prevalence/occurrences of diarrhea diseases, and recommend ways of reducing the incidences of these diseases in the community.

The specific objectives were

- To establish the degree to which sanitation behaviour is affected by household socio-cultural, demographic factors like age and educational level in the study area.
- To investigate the occurrence of diarrhoea among young children under 5 years old in these households and

HYPOTHESIS

In addition to the above objectives the following hypothesis were tested.

Hypothesis 1

Null hypothesis: Occurrence of diarrhoea in children in the household is independent of the educational attainment of child care givers.

Alternative hypothesis: Occurrence of diarrhea in children in the household is dependent on the educational attainment of child care givers.

Hypothesis 2

Null hypothesis: There is no relationship between household's backgrounds factors and the sanitation condition of the household.

Alternative hypothesis: There is a relationship between household's backgrounds factors and the sanitation condition of the households.

MATERIALS AND METHODS

THE STUDY SETTING: The Jos City is located in Nigeria's middle belt, with an area of about 26,899 square kilometers, (8). It is located between latitude 8° and 10° N, longitude 7° and 11° East. Barkin Ladi in the south East, Jos South and Riyom in the South West and Bassa in the North (Plateau State Ministry for Lands, Survey and Town Planning). Though situated in the tropical zone a higher altitude means that Jos city has a near temperature climate with an average temperature of between 18° and 22° C. Harmattan winds cause the coldest weather between December and February. The warmest temperature usually occurs in the dry season months of March and April (9). Jos receives about 1,400 millimeter (55inches) of rainfall, annually, the precipitation arising from both conventional and orographic sources owing to the location of the city on Jos Plateau (9). The low temperature of plateau state has led to a reduced incidence of some tropical diseases such as malaria (10).

STUDY DESIGN: The study design was a Descriptive (Observational and Survey) study. Surveys are helpful in describing the characteristic of a large population. It guarantees more accurate samples to gather targeted result. Questionnaire as a data collection tool was employed because it is the major data collection method in surveys and yields to qualitative data. Due to the stipulation for open tenderness, the instrument may be used to produce qualitative and exploratory data (11). The observational approach is a very direct method and is best for study of human behavior. This research work also investigates people behavior (Sanitation and personal hygiene so as to capture at first hand, the sanitation behavior and level of hygiene of the people and also to counteract any bias from the interview.

general sub-topics for the interview questions were household characteristics, waste disposal methods, water use behavior, water storage, occurrence of diarrheal disease in households, presence of sanitation facilities, hygiene practice and health education of infant caretakers. For the observation method the multi-stage cluster sampling explained above was also employed in the choice of households, the spot observation used in this study is a variation of the non-participant method but in this case, indicators of sanitation practice were observed as an alternative for the real sanitation behavior of the respondent. For example, the researcher observed the accessibility of soap and water for regular hand washing as an indicator of good sanitation that also augments the respondents performing the real act of hand washing. This method of Observation is quicker and less disturbing (16). A quick spot check of the household environment allowed the researcher to mark for the presence or absence of such physical clues to sanitation practices on an observational guide (see Appendix B). A household score was its sanitation index and the indices were later documented to get the sanitation condition of the household. The grouping of household cleanliness ranged between 1 and 25, which was recorded poor and good. The poor sanitation condition had an index of 1 to 15 and good was 16 to 25. The observation involved looking out for physical evidence of sanitation practice as well as water storage conditions. Total number 400 households were observed using the observational guide attached in appendix B.

THE DATA ANALYSIS

On the basis of making scientific decision (0.05) was used as a level of significance. The primary data in respect of 400 respondents was entered in the SPSS Package Version 22 and both descriptive and inferential statistics worked out. Pearson Correlation was appropriately employed in the testing of the two hypotheses.

RESULTS

This chapter clearly revealed the detailed presentation and result analysis found by the researcher. The results of the findings were used to discuss the research questions and research hypothesis formulated to guide the study. The research questionnaire data was captured and analyzed using SPSS statistics Version 22 where P-value approach short for probability was employed in testing the hypothesis.

Table 1. Frequency Distribution of Household Characteristics

Variable	Frequency (n)	(%)
Wall construction		
Bricks	328	82
Mud	70	17.5
Raffia	2	0.5
Total	400	100
Floor construction		
Tile	76	19
Concrete	294	73.5
Earth	30	7.5
Total	400	100
Roof Construction		
Concrete	24	6
Mud	8	2
Corrugated Iron sheet	329	82.3
Aluminum	39	9.8
Total	400	100

Table 2. Frequency Distribution of the Socio Cultural Characteristics of Heads of Households

Variable	Frequency (n)	(%)
Gender		
Male	382	95.5
Female	18	4.5
Total	400	100
Age range (yrs)		
10-19	22	5.5
20-29	60	15
30-39	98	24.5
40-49	120	30
50 & above	100	25
Total	400	100
Marital status		
Married	377	94.3
Single	8	2
Others	14	3.5
Missing system	1	0.3
Total	400	100
Occupation		
Civil servants	143	35.8
Artisans	12	3
Farming	50	12.5
Applicants	11	2.8
Business	145	36.3
Drivers	16	4
Clerics	5	1.3
Others	18	4.5
Total	400	100
Educational attainment		
Illiterate	109	27.20
Literate	291	72.80
Total	400	100
Religion		
Christian	307	76.8
Islam	78	19.5
Traditionalist	12	3
Total	397	99.3
Missing system	3	0.8
Total	400	100

HOUSEHOLD CHARACTERISTIC

Wall Construction: Majority of the households used bricks or cement blocks accounting for 328 respondents representing 82%, as shown in table 1 below while the remaining 72 respondents representing 18% used mud and raffia for their wall constructions.

Floor Construction: For the floor construction, majority of households used concrete accounting for 294 respondents representing 73.5% while few of them used tiles and earth representing only 26.5%.

Roof Construction: Majority of householders used corrugated Iron sheets for roofing accounting for 329 households representing 82.3%, 24 households representing 6% used concrete, 39 households representing 9.8% use Aluminum sheets, while 8 households representing 2% used mud.

SOCIO-CULTURAL CHARACTERISTICS OF HOUSEHOLD HEADS

The socio cultural characteristics that were regarded as relevant to the heads of household in the sample community were gender, age, marital status, occupation, educational achievement and religion affiliation.

Table 3. Frequency Distribution of Socio-Cultural Characteristics of Caretakers of Children below the Age of 5

Variable	Frequency (n)	(%)
Gender		
Male	30	7.5
Female	370	92.5
Total	400	100
Age range (yrs)		
10-19	20	5
20-29	126	31.5
30-39	199	49.8
40-49	42	10.5
50 & above	13	3.3
Total	400	100
Marital status		
Married	366	91.5
Single	34	8.5
Total	400	100
Educational attainment		
Illiterate	143	35.75
Literate	257	64.25
Total	400	100

Table 4. Distribution of Sanitation Condition and availability of Sanitation Facilities

Variable	Frequency (n)	(%)
Availability of Toilet facilities		
Yes	280	70
No	120	30
Total	400	100
Types of Toilet facilities		
Water closet	209	52.3
Total	400	100
Types of Toilet facilities		
Water closet	209	52.3
Simple pit latrine	129	32.3
Composting dry latrine	20	5
Manual bucket latrine	2	0.5
Bush plastic bag	40	10
Total	400	100
Method of rubbish disposal		
Dump site/ waste pit	278	69.5
Random	45	11.3
Burned	34	8.5
Buried	1	0.3
Composted	6	1.5
Others	36	9
Total	400	100
Distance from dumpsite		
Less than 50m	114	28.5
50-100m	112	28.5
101-150m	31	7.75
More than 150m	21	5.25
Missing system	122	30.5
Total	400	100

Gender of Heads of household: The percentage of male heads of household was 95.5% representing 382 respondents while that of the female was 4.5% representing 18 respondents.

Age Ranges of Household Heads: Majority of the heads of household are between the ages of 40-49 accounting for 120 respondents representing 30% (as shown in table 2 below).

Marital Status of Heads of Households: From table 2, it can be seen that a large majority of household heads in this research were married 377 respondents representing 94.3%. The remaining percentages were single.

Occupation of Heads of Households: The two most dominants population is civil servants and business men / traders accounting for 35.8% and 36.3% respectively. The remaining percentages were for other occupations.

Table 5. Distribution of Water Use in the Household

Variable	Frequency (n)	(%)
Sources of drinking water		
Pipe water	132	33
Tube well/borehole	67	16.8
Hand dug well	148	37
Spring	4	1
Rain water collection	1	0.3
Tanker truck	2	0.5
Bottle water	46	11.5
Total	400	100
Water treatment		
Yes	102	25.5
No	298	74.5
Total	400	100
Method of water removal		
Pouring	93	23.3
Dipping	188	47
Both pouring and dipping	106	26.5
Container has tap	13	3.3
Total	400	100
Types of water storage containers		
Narrow mouthed	130	32.5
Wide mouthed	152	38
Both types	118	29.5
Total	400	100
Covering of water storage containers		
All are covered	223	55.8
Some are covered	151	37.8
None is covered	26	6.5
Total	400	100

Educational attainment of heads of households: For the purpose of this study the meaning of a literate is someone with at least 6 years of formal education, which is up to primary six in the Nigerian standard. The study revealed that 72.80% of household heads in the sampled community are literate i.e. had formal education while 27.25% were illiterate.

Table 6: Frequency Distribution of Infant Diarrhea Occurrence

Infant Diarrhea Occurrence	Frequency (n)	Percent (%)
Valid		
Yes	149	37.3
No	216	54
Don't know	35	8.8
Total	400	100

Religion Affiliation of Heads Households: Majority of the household heads were Christians accounting for 307 representing 76.8%. 78 respondents representing 19.5% were Muslims the least was traditional believers with 3% of respondents.

SOCIO-CULTURAL CHARACTERISTICS OF CARETAKERS

The socio cultural characteristics that were regarded as relevant to the caretakers of children below 5 years in the households were gender, age, marital status and educational attainment of these caretakers.

Gender of Caretakers: Overwhelming majority of infant caretakers were females, 370 respondents representing 92.5% were females, while 30 respondent representing 7.5% were males.

Age Ranges of Caretakers: Majority of the caretakers are from middle age group accounting for 199 respondents representing 49.8% as seen in table 3.

Marital Status of Caretakers of Children under the Age of 5: The result shows that majority (91.5%) of the caretakers are married while 34 respondent representing 8.5 % were single.

Educational attainment of caretakers of Children under the Age of 5: The study revealed that 64.25% of caretakers of children below the age of 5 in the sampled community are literate i.e had formal education while 35.75 % were illiterate.

SANITATION CONDITIONS AND AVAILABILITY OF SANITATION FACILITIES

Availability of sanitation facilities such as toilets, rubbish dumps and the sanitation conditions of the sampled houses were determined.

Availability of Toilet Facilities: Majority of household respondent affirmed that they have toilet facilities in their houses accounting for 70% representing 280 respondents. The remaining 30% had no toilet facilities in their houses.

Types of Toilet Facilities: Majority of the household respondent affirmed that they use the water closet and simple pit latrine accounting for 338 respondent representing 84.6%.

Method of Rubbish Disposal by Households: Out of the 400 households, 278 households representing 69.5% dispose their waste in the dump site, 45 households representing 11.3% percent dispose their waste at random, 34 households representing 8.5% burn their waste, 6 households representing 1.5% leave their waste to compost, 1 household representing 0.3% percent bury their waste while the remaining 9 percent dispose their waste by other means.

Distance of Dumpsites from Houses: 112 households representing 28.0% have their dumps, 50-150m from the household, 114 households representing 28.5%; have their dumps less than 50meters from the house, then 31 households representing 7.75% percent having their dumps 101-150meters from their houses.

WATER USE IN THE HOUSEHOLD

The sources of drinking water, water treatment, method of removal of water from drinking containers, types of water storage containers and covering of household water storage containers were determined.

Sources of Stored Water in the Household: Out of the 400 households, surveyed, 132 households representing 33% percent used pipe borne water, while 148 households representing 37 % obtain their water supply from hand dug wells, 67 households representing 16.8% percent obtain their water from boreholes, while 46 households representing 11.5% get their water from bottled table water. The rest of the households get their water from sources like springs, rain water collection, and tanker truck.

Water Treatment: From Table 5, it can be deduced that majority of the respondent do not treat their water before drinking. Out of a total of 400 respondents 298 representing 74.5 percent do not treat their water before using it while 102 respondents representing 25.5% treat their water before usage.

Removal of Water from Drinking Containers: 188 respondents representing 47 percent remove water from drinking containers by dipping while 93 respondents representing 23.3% remove water by pouring, about 106 respondent representing 26.5% do so by both pouring and dipping and the remaining 13 respondents representing 3.3% do not need to get water by pouring or dipping due to the availability of taps on the containers, this suggest that majority of the respondent remove water by dipping.

Types of Water Storage Containers: 152 respondent representing 38% use wide mouthed containers while 118 respondents representing 29.5% use both narrow and wide mouthed containers implying that majority of respondents use wide mouthed containers.

Covering of Water Storage Containers in the Households: The result in Table 5 shows that, out of the 400 households, 223 households representing 55.8% do cover their water for drinking, 151 households representing 37.8% cover some of their water storage containers while 26 households representing 6.5% percent do not cover any of the containers. Uncovered drinking water sources risk getting polluted before it gets used up.

INFANT DIARRHEA OCCURRENCE

Caretakers of children were asked if their children aged below 5 had diarrhea in the previous 2 weeks and the results are as shown in Table 6; the results showed that 149 caretakers representing 37.3% admitted that their children were attacked by diarrhea within the last 2 weeks while 216 caretakers representing 54% had no experience of diarrhea within the same period. This only confirms the prevalence of diarrhea in the study area which is 37.3 %.

ATTENDANCE OF CHILD CARETAKERS AT HEALTH EDUCATION PROGRAMS:

Out of the 400 respondents, about half of the total respondents do attend and half do not attend Childcare Education Programs representing 49% and 51% respectively. The result in Table 7 above revealed that half of the total respondents do attend and half do not attend, representing 49% and 51% respectively.

Table 7. Attendance of Child Caretakers at Health Education Programs

Attendance to Health Education Program	Frequency(n)	Percent (%)
Valid Yes	196	49
No	204	51
Total	400	100

THE SANITATION CONDITION OF COMMUNITIES UNDER STUDY:

From Table 8, out of 400 households, 188 households representing 47% percent had good sanitation in their houses, 133 households representing 33.3 percent had a satisfactory sanitation while 79 households representing 19.8% percent had poor sanitation condition

Table 8. Sanitation Condition of Communities under Study

Sanitation Condition	Frequency(n)	Percent (%)
Valid Poor	79	19.8
Satisfactory	133	33.3
Good	188	47
Total	400	100

HYPOTHESIS TESTING USING PEARSON CORRELATION: The Pearson Product moment correlation coefficient (Pearson’s correlation, for short) is a measure of the strength and direction of association that exist between two variables. The SPSS software was used to obtain Pearson’s product moment correlation coefficient value (r). A Pearson’s correlation attempts to draw line of best fit through the data of two variables, and the Pearson correlation coefficient r, indicates how far away all these data points are from the line of best fits (i.e. how well, the data points fits this model/line of best fit).

Hypothesis

The education attainment of child caretaker and the occurrence of diarrhoea. It was hypothesized that.

Ho: Occurrence of children diarrhea in the household is independent of the educational attainment of child caretakers.

PEARSON CORRELATION RESULT FOR EDUCATIONAL LEVEL OF CHILD CARETAKER AND OCCURRENCE OF DIARRHEA IN THE HOUSEHOLD

Pearson product moment correlation was conducted and the output is contained in Table 9 below which clearly revealed that there is a statistically significant relationship between the education attainment of caretaker and occurrence of diarrhea in the household (r = .290, n = 400, p = 0.0001). Therefore there is enough evidence to reject the null hypothesis. The result is further investigated with cross table as shown in Table 9, since the caretaker education attainment and occurrence of diarrhea are both nominal data.

Table 9. Pearson Correlation Result for Education Level of Child Caretaker and Occurrence of Diarrhea in the Household

		Educational Attainment of Caretaker	Occurrence of Infant Diarrhea in the Household
Education attainment of caretakers	Pearson correlation	1	.290
	Sig. (2 – tailed)	400	0.000
	N.		
Occurrence of infant diarrhea in the household	Pearson correlation	.290	0.000
	Sig. (2 tailed)	400	400
	N		

CROSS TABULATION OF INFANT DIARRHEA AND CHILD

CARETAKER EDUCATION: From Table 10, the result indicates that 18.3% of caretakers whose infants had diarrhea were literate and 19% of caretakers whose infants had diarrhoea were illiterate.

Table 10. Cross Tabulation of Infant Diarrhea Occurrence and Child Caretaker Education

Education attainment of caretaker		Occurrence of Diarrhea in House n(%)			Total
		Yes	No	Don't know	
Illiterate		76(19)	61(15.3)	6(1.5)	143(35.8)
	Literate	73(18.30)	155(38.80)	29(7.30)	257(64.30)
Total		149(37.30)	216(54.00)	35(8.80)	400(100.00)

Key= n (%) implies number of occurrence/percentage

Hypothesis 2: Household Socio-Cultural Demographic Factors and the Sanitation Condition

It was hypothesized that:

Ho: There is no relationship between household’s background factors and the sanitation conditions of the household. Household characteristics believed to be very crucial to the objectives of this study included, age of household head, marital status of head of household, religious affiliation of the head of household, occupation of the head of household and the education attainment of the head of household.

AGE OF HOUSEHOLD HEAD AND THE SANITATION CONDITION:

Pearson correlation was conducted and the result revealed that there was a significant negative relationship between the age of the head of household and the sanitation condition of the household since the p – value of 0.006 is less than the level of significance 0.05. Hence there is adequate evidence to reject the null hypothesis.

Table 11. Age of Household Head and the Sanitation Condition

Correlations		Age of head of household	Sanitation conditions scores
Age of head of household	Pearson correlation	1	-.138
	Sig. (2 tailed)		
Sanitation Condition Score	Pearson correlation	-.138	1
	Sig (2 tailed)	0.006	
	N	400	400

MARITAL STATUS OF HOUSEHOLD HEADS AND SANITATION CONDITION:

Pearson correlation was run and the result revealed that there is a significant negative relationship between the marital status of the head of household and the sanitation condition of the household since the p-value of 0.011 is less than the level of significant 0.05. Hence there is a sufficient evidence to reject the null hypothesis.

CROSS TABULATION OF MARITAL STATUS OF HOUSEHOLD HEAD AND SANITATION CONDITION

The output of the cross tabulation in Table 13 below revealed that 177 out of 377 respondent whose sanitation condition were good are married compared to single and others with 5 and 10 respectively.

RELIGION AFFILIATION OF HOUSEHOLDS AND THE SANITATION CONDITION:

Pearson correlation was carried out and the result indicated that there is a significant negative relationship between the religion of head of household and the sanitation condition of the household since the p= value of 0.007 is less than the level of significance 0.05. Hence there is sufficient evidence to reject the null hypothesis.

CROSS TABULATION FOR RELIGION OF HEADS OF HOUSEHOLD AND SANITATION CONDITION:

From Table 15 below 146 respondents representing 36.8% of the 185 household who had good sanitation were Christian as compared to 39(9.8) for Islam and none for traditionalist respectively. This means that of the three major religions in the sampled households, the Christian households had better sanitation conditions than the Muslims and traditionalist.

OCCUPATION OF HOUSEHOLD HEADS AND SANITATION CONDITION:

Pearson correlation was carried out and the result indicate that there is a significant negative relationship between the occupation of head of

Table 12. Marital Status of Household Head and the Sanitation Condition

Correlations			
Marital status	Pearson correlation	Marital status	Sanitation conditions scores
	Sig. (2 tailed)	1	-.127
	N	399	399
Sanitation Condition	Pearson correlation	-.127	1
	Sig. (2 tailed)	0.011	
	N	399	399

Table 13: Cross Tabulation of Marital Status of Household Head and Sanitation Condition

	Sanitation Condition Level			
	Married	Single	Others	Total
Poor	79(19.80)	0(0.00)	0(0.00)	79
Satisfactory	126(31.60)	3(0.80)	4(1.00)	133(33.3)
Good	172(43.10)	5(1.30)	10(2.50)	187(46.90)
Total	377(94.50)	8(2.00)	14(3.50)	399(100.00)

Key= n (%) Number of Household Heads/percentage

Table 14. Religion Affiliation of Household Head and the Sanitation Condition

Correlation			
Religion of head of household	Pearson correlation	Religion of Head of Household	Sanitation Condition Score
	Sig. (2 tailed)	1	-.135
	N	397	397
Sanitation Condition Score	Pearson correlation	-.135	1
	Sig. (2 tailed)	0.007	
	N	397	400

Table 15. Cross Tabulation for Religion of Head of Household and Sanitation Condition

Sanitation condition level	Religion of Head of Household n(%)			
	Christian	Islam	Traditionalist	Total
Poor	59(14.90)	16(4.00)	4(1.00)	79(19.90)
Satisfactory	102(25.70)	23(5.80)	8(2.00)	133(33.50)
Good	146(36.80)	39(9.80)	0(0.00)	185(46.60)
Total	307(77.30)	78(19.60)	12(3.00)	397(100.00)

Key= n (%) implies number of household heads/percentage

Table 16: Occupation of Household Heads and the Sanitation Condition

Correlation			
Occupation of head of household	Pearson correlation	Occupation of Head of Household	Sanitation Condition Score
	Sig. (2 tailed)	1	-0.177
	N	400	400
Sanitation Condition Score	Pearson correlation	-.177	1
	Sig. (2 tailed)	0.000	
	N	400	400

Table 17. Cross Tabulation of the Occupation of Heads of Households and the Sanitation Condition

Occupation of head of household	Occupation of Head of Household/ Sanitation Condition Level n (%)			
	Poor	Satisfactory	Good	Total
Civil Servant	13(3.30)	44(11.00)	86(21.50)	143(35.80)
Artisans	5(1.30)	6(1.50)	1(0.30)	12(3.00)
Farming	25(6.3)	12(3.00)	13(3.30)	50(12.50)
Applicant	0(0.00)	8(2.00)	3(0.80)	11(2.80)
Business	28(7.00)	47(11.80)	70(17.50)	145(36.30)
Driver	2(0.50)	8(2.00)	6(1.50)	16(4.00)
Cleric	0(0.00)	2(0.50)	3(0.80)	5(1.30)
Others	6(1.50)	6(1.50)	6(1.50)	18(4.50)
Total	79(19.80)	133(33.0)	188(47.00)	400(100.00)

Key= n (%) implies number of heads of household /percentage

Table 18. Educational Attainment of Household Head and the Sanitation Condition

		Correlation	
		Educational Attainment of Head of the Household	Sanitation Condition Score
Educational attainment of the head of household	Pearson correlation	1	.329
	Sig. (2 tailed)		0.000
	N	400	400
Sanitation condition score	Pearson correlation	.329	1
	Sig. (2 tailed)	0.000	
	N	400	400

Table 19. Cross Tabulation for Education Attainment of Household head and the Sanitation Condition

Sanitation condition level * Educational Attainment of Household			Head Cross Tabulation n(%)	
			Educational attainment of head of household	Total
Sanitation condition level		Illiterate	Literate	Total
Sanitation condition level	Poor	51(12.80)	28(7.00)	79(19.80)
	Satisfactory	38(9.50)	95(23.80)	133(33.30)
	Good	20(5.00)	168(42.00)	188(47.00)
Total		109(27.8)	291(72.80)	400(100.00)

Key = n (%) implies number of Heads of Household

Household and the sanitation condition of the household since the p- value of 0.0001 is less than the level of significant 0.05. Hence there is evidence to reject the null hypothesis.

CROSS TABULATION OF THE OCCUPATION OF HEAD OF HOUSEHOLD/SANITATION CONDITION LEVEL: From Table 17 below, it can be seen that out of the 188 persons representing 47.00% that have good sanitation condition, 21.50% are civil servants, followed by 17.50% who are traders (business men/women), the remaining 8% are farmers, applicants and others.

EDUCATIONAL ATTAINMENT OF HOUSEHOLD HEAD AND THE SANITATION CONDITION: Pearson correlation was carried out and the result indicate that there is significant positive relationship between the education attainment of head of the household and the sanitation condition of the household since the p- value of 0.0001 is less than the level of significant 0.05. Hence there is enough evidence to reject the null hypothesis. It therefore implies that the higher the educational attainment of the household head, the better the sanitation condition of the house.

CROSS TABULATION FOR EDUCATIONAL ATTAINMENT OF HOUSEHOLD HEAD AND THE SANITATION CONDITION: From Table 19 below, 168 out of 291 respondents who had good sanitation are literate as compared to 20 out of 109 who had good sanitation condition and are illiterate. This implies the higher the level of education of the respondent the better their sanitation condition.

CHAPTER FOUR

DISCUSSION

From the data in Table 1, it is obvious that the walls of most houses in the study area are built with bricks or cement blocks and concrete is the most used material for floor construction while majority of the houses used corrugated Iron sheet for roofing. Mud (earth mixed with vegetation materials) and earth are easily targeted by insects and termites, hence open stored water in the household, could be contaminated with dead insects, nest materials, eggs and faeces. The usage of the contaminated water devoid of suitable treatment increases the incidence of water borne diseases (17).

Although, corrugated sheets are the mainly used material for roofing in the community, mud is being used by 2% of the houses. The use of straw for roofing may also produce sanitation problems because straw makes available breeding places for insects such as tsetse flies cockroaches and mosquitoes. These insects may attack the inhabitants of household leading to all forms of diseases. Pest like rodents, birds, lizard and pets are always in search for food, water, warmth and shelter. These may find the use of poor quality building materials like earth, mud and vegetal matter as an excellent condition (17). A study in Guatemala revealed that rural houses with walls, floor and roofs made from clay or vegetal materials are more susceptible to insects' vectors infestation. The use of quality materials like tiles and cement blocks needs to be strongly encouraged to reduce the incident of health problems (17). Socio cultural characteristics of a family unit establish the models for learners (18). The socio cultural characteristics that were considered as important to the objectives of this survey were gender, age, marital status, occupation, educational attainment and religion affiliation of the heads of households and caretakers of children below 5 years in the household. The head of household is an individual around whom the household is organized. The caretaker of a child is the one who offers the essential needs of the child such as health care, feeding, bathing and tendering for the child. It is normally the mother who spends a lot of time with the child and the more supportive of the mother, the more matured the child will become (19). The presence of infant caretakers in the households is very vital because infant easily pick up things around them and put in their mouth out of curiosity. In addition to putting their dirty hands into their mouths, infants can as well put toys leftovers food from the floor or even their dirty hands into uncovered stored water sources. This can lead to the contamination of these water sources with disease causing pathogens which can cause bacterial and parasitic infection in childhood giving rise to general immune system imbalances, increasing stunted growth and inhibiting brain development (20). Worm infestations for example reduce the efficacy of reliable vaccines like tuberculosis (Bacillus Calmette Guerin (BCG), Human Immune Deficiency Virus (HIV) (21) and malaria (22). Therefore, there is a great need for children to be given round the clock caring at the household level particularly in rural communities by parents or relatives brought in for the purpose of caring for these

children. For the gender of heads of households, the result revealed that an awesome majority of these heads of the households were male which is normal only few women were household heads which comes about probably due to lost of their husbands. The percentage of the male heads of household was 95.5% which is higher than the National standard of 82% (23). For the gender of caretakers an overwhelming majority were females 92.5% percent while 7.5 percent were males. The age for marriage is critical in deciding fertility behaviors, marriage for women in most societies including the study area (Jos metropolis) takes place soon after puberty, usually between 18 and 25 years (24). Early age of marriage in traditional societies contribute to high fertility as just about the entire child bearing period of the woman from puberty to menopause is available for utilization (25). The result of this study revealed that majority of the heads of households were between the ages of 40-49 which is (30%), followed by 25% who are above the age of 50, the least was 5.5% who are between the ages of 10-19 years. The National mean age of marriage for men in Nigeria was 30-40, (23), this put in plain words why majority of the respondents are within the ages of 40-49 bearing in mind that they have been in marriage for a while and had children. In the case of the caretakers majority of them are middle aged (69.8%), there is no standard for the mean age of child caretaker in Nigeria. Table 2 and 3 shows that a large majority of the heads of households and children's caretakers are married represented as 94.3% and 91.5% respectively. Children with both parents in the home earning two incomes tend to have an enhanced financial and educational advantage. The effects of a single parent's home on a child's behaviors can be extensive and impact numerous areas of life including academic achievements, and social behaviors (26). In mothers only families, children have the predisposition to experience short and long term economic and psychological disadvantages like higher absent rate to school, lower rate of education and higher dropout rate (with boys more negatively affected than girls and more anti social activities including alcohol and drug addiction. Adolescent on the other hand are more negatively affected by parental differences preceding divorce than by living in single parents families and actually gain in responsibility as a result of altered family schedule (27) Children in single mothers home are also more liable to experience health related problem as a result of a turn down in their living standard including the lack of health insurance (28). Later as children from single parents turn out to be adults, they are more likely to marry have children early and divorce. Girls are at greater risk of becoming single mothers due to non-martial child bearing or divorce (29). The socio-economic characteristics of family affect the family's involvement in community development matters (30) and health disparities are systematically linked to economic status (31). Research by (30) shows that low economic status as measured by income, education and occupation has a negative correlation with rates of involvement in community organization. As such low economic status population feel helpless to change processes that affect them and therefore disconnect from active community roles, in addition such groups have little time and resources to participate in such outside activities that do not directly provide livelihood. This isolation of some level of the population will affect the extent of learning that takes place in the community as well as the rate at which new knowledge are disseminate at health education meetings (30). The study of the socio economical characteristic revealed that the two most main occupations are civil servants and business men/traders. The percentage of civil

servants among the heads of household was 35.8%, and this is greater than the percentage of the entire civil servants in Plateau State which is about 2% (32). The percentage of trader's business men in the study area was 36.3%, which is higher than the National standard of 22.3% (33). For the purpose of this study the definition of the literate is someone with at least 6 years of formal education, which is up to primary six in Nigerian standard. The study revealed that 72.80% of the heads of household and 64.25% of caretakers of children below 5 are literate (had formal education). When compared to the national standard of 84.4% for the heads of household and 72.7% for the children caretaker, it can be deduced that the heads of households in the sampled community are thus less educated than their counterparts in Nigeria generally. The level of education can affect their knowledge to make informed decision about health promoting behaviours. Concerning the religion of respondents, the studies showed that majority of the heads of households are Christians accounting for 76.8% while 19.5% were Muslims. The least was traditional believers with 3% of respondents. Religion affords an remarkable effective vehicle for transforming attitude and behaviours because of its ability to link what people say and do with what they think (34), due to this reason, the religion affiliation of the heads of household was considered. Religion can also protect and promote a healthy lifestyle and social support making people to experience social contact with co-religionist and have a network of social associations that can help and protect whenever the case. Religious people can also experience a improved mental health, more constructive to psychological states, more optimism and faith which in turn can result to a better physical states due to a lesser amount of stress and "PS1" influences (35). Supernatural laws that control energies not presently comprehended by science but possibly understandable at some point by science acts as indirect way on health (35).

In the Christian faith, alcohol and tobacco are prohibited, the Christian faith also believes that cleanliness is next to godliness and the church does not try to control the action of its members, and decisions about whether to agree to medical intervention lies with the individual (36). In Islam, enormous significance is attached to cleanliness therefore before every act of prayer; an individual will wash his/her face, hands and feet. Hand washing is also considered crucial before eating (36). In this study, the availability of sanitation facilities such as toilets, rubbish dumps and the sanitation condition of the sampled houses were determined. This is important because the values associated with a household like the availability of adequate waste and excreta disposal facilities and their hygienic use are fundamental part of primary health care (37). Accessibility of sanitation facilities such as toilets, rubbish dumps and the sanitation condition of the sampled houses were determined. The importance is owing to the fact that the values associated with a household like the availability of adequate waste and excreta disposal facilities and their hygienic use are fundamental element of primary health care (37). The observation of the toilet facilities revealed that about 70% of the household have toilets while 30% of the households have no toilet facilities, some household which have no toilets have alternative places of convenience. The absence of the household toilets or place of convenience in the 30% of the population would automatically provide the inhabitants of the community, the opportunity to ease themselves in bushes, along river banks or even into polythene bags and litter the environment with them.

This is a great source of pollution to the environment, their water sources could easily be contaminated leading to increase in water borne diseases in the community. The distribution of places of convenience for the households is given in Table 4. In the study community 10 percent of the household that had no toilet, facilities used the bushes. This is lower than the national rate of those who use bushes as place of convenience which is 26.7% (38). The decrease in this ratio could be as a result of civilization and increased awareness over the years; secondly, the study area is an urban area whereas the national ratio is for both urban and rural areas. Majority of the households in the study area, use the standard water system toilets accounting for 209 respondents representing 52.3%, this is higher than the National percentage of 19.3% (38). The reason might also be because of study area is an urban area and inhabitants having better awareness than those in the rural areas of the State. The incidence of bush as a place of convenience has severe consequences for the health of the people. Thick vegetation and often wet bushes will not encourage people to go deep into the bush to ease them and feces are found nearer to human inhabitants (39). In times of heavy down pour, runoff water may wash feces into nearby water bodies causing contamination, flies can digest anything, and they live and breed on rubbish, animal droppings, human feces and human food. As flies are not capable of eating solid food, they first vomit on the food and then squash the vomit until the food is watery such food back up probably leaves behind some feces (39). About 0.5% of the households use the manual bucket latrine, the method of discarding the content of these buckets is a big problem. Usually, the buckets are poured out into nearby bushes creating the same problem as those who ease themselves in bushes. Others dispose into pits covered for that purpose somewhere outside the town. It appears safe for them but infiltration and deep percolation can still transmit bacteria even into underground waters. Concerning the method of rubbish disposal by households, 69.5% dispose their waste in the dumpsite, while 11.3% dispose their waste at random, majority of the households have their dumps close to the houses thereby exposing them to rodents and vultures and also providing breeding grounds for flies and mosquitoes. Rodents carry harmful bacteria in their feces, urine, feet or fur, dumping rubbish close to the household is hazardous particularly when children are present in these households. As children play on the contaminated soils in the background, a ferocious cycle of worm infestation is set in motion from the soil to the hands and to the mouth (40).

It is therefore not shocking to notice the emergence of communicable diseases such as diarrhoea in these communities, due to inappropriate waste management. The inappropriate methods of human and environmental waste disposal are a great source of pollution to hand dug wells and spring water. It was observed in this study that a large percentage of respondents relied on hand dug wells, springs and tanker truck as the main source of drinking water, and these sources are easily contaminated by environmental and human waste. From Table 5, it can be deduced that majority of the respondent do not treat their water before drinking, this attitude on water usage makes them much more prone to water borne diseases. It was also observed that a large percentage of respondents remove water from containers by dipping, this means that there is a high probability for the water to be contaminated through dipping smaller containers into large ones, air and dust containing microorganism can get attached to these containers leading to infectivity (41).

Only about 3.3 percent have containers with taps which is not likely to be contaminated. Concerning the types of containers used for storing drinking water, the study revealed that majority of the household use containers that are wide mouthed which also increases the possibility of contamination through air and dust that can access it easily without difficulty (41). A physical observation of the drinking water storage containers in the sampled household revealed a large percentage of households (55.8%) do cover their water storage containers while 37.8% cover some of their storage containers only 6.5% do not cover any of the containers. Studies have shown that exposed drinking water sources have the possibility of getting polluted before it gets used up. *Ascaris ova* and other *helminthes ova*, including *trichuris* and *taenia spp* that exist in the air and dust are causes of contaminated water (22). Caretakers of children were asked if their children aged below 5 had diarrhea in the previous 2 weeks and the result are as shown in Table 6 where the prevalence of diarrhea in the study area was found to be 37.3%. This figure is higher than the Nigerian prevalence rate which is 18.8% (42). Childcare education programs takes place once or twice in a month depending on the community and it is popularly called "weighing" during which community health nurses visit. On such occasions, the infants are weighed as a sign of nutritional or general wellbeing and the caretakers are advised on the best way to care for their children. Caretaker's presence to such programs will help them understand children better and their development which can be transferred positively in the training of the child. The study revealed that half of the total respondents attend the childcare educational program while the remaining halves do not attend. This rate is insufficient and therefore the need to address this problem, since lack of caretaker's education may result to improper sanitation education of children.

The direct observation of sanitation practice was embarked on to derive first hand information about sanitation behavior of the people that has become so much part of them. A quick spot check of the household environment allowed the researcher to tick for the presence or absence of such physical signs to sanitation practices on an observational guide. A household score was its sanitation index and the indices were later recorded to get the sanitation condition of the household. The category of household cleanliness ranged between 1 and 25, which was recorded poor and good. The poor sanitation condition had an index of 1 to 15 and good was 16 to 25. The use of the coding system was encouraged by the Joint Committee Report (Joint Publication 2004) as part of its good sanitation evaluation framework. These suggest that, there might be a limit consistence of several factors before any health influence can be observed in field setting. For example, the presence of absence of toilet amenities alone cannot be used to notice an impact on diarrhea prevalence. (16), put in plain words that other factors like presence of animal faeces, dirty utensils and hand washing with soap could form a cluster of hygiene practices. The analysis of such cluster is often expressed in form of an index gotten by counting up the score for each practice in the cluster (16). In a study of children and mothers at jeopardy of diarrheal diseases in Nepal, (43), the use of index coding was also employed. Table 8 revealed that 47.0% of household had good sanitation in their houses, while 19.8% had poor sanitation condition. In general, the sanitation condition of the sampled communities can be said to be good. Good sanitation condition means high index value. This implies that minority of respondents had flies, human/animal

waste and weeds in their household on the observational guide. Also household rubbish was correctly disposed and most houses had soap and water for hand washing after visiting the toilets. From the result in Table 11, the p-value of 0.0001 is less than the level of significance 0.05; therefore the null hypothesis which states that the occurrence of children diarrhea in the household is independent of the educational attainment of child's caretaker was rejected. Because most of the caretakers are well-read and it's easier for them to positively engage and teach the children proper hygiene, and sanitary practices. The result of the cross tabulation showed that the occurrence of diarrhea in the household for literate respondent was comparable to that of the illiterate. This result is not anticipated because it is believed that well learned child caretakers may have better awareness of infant diarrhea avoidances, therefore, there is a likelihood that the relationship between these factors is not linear or might be too complex for this study to accurately determine, there are other factors that should be measured in other to determine such a complex relationship. Several reports (44-45) recognized poverty, poor sanitation, lack of water supply and congestion as factors connected to diarrhea prevalence in the households. Other factors that may possibly be associated with household diarrhea prevalence include childbirth, short birth spacing, lack of breast feeding and malnutrition (46). The second hypothesis states that there is no relationship between household background factors and the sanitation conditions of the households. The household characteristics that were considered essential to the objectives of this study included, age of household heads, marital status of household heads, religious affiliation of the heads of household and the educational attainment of the heads of household. Pearson correlation was carried out and the result revealed that there was a significant negative relationship between the age of the head of household and the sanitation condition of the household since the p- value of 0.006 is less than the level of significance 0.05. Hence there is adequate evidence to reject the null hypothesis.

It may therefore be reputed that younger heads of household have an increased chance of being healthy and are better caretakers of their households (47). For the marital status of household heads, Pearson correlation was run and the result revealed that there is a significant positive relationship between the marital status of the head of households and the sanitation condition of the household since the p- value of 0.011 is less than the level of significance 0.05. Hence there is a sufficient evidence to reject the null hypothesis. Cross tabulation revealed that households with two parents (married) had better sanitation conditions than households headed by single parents. This implies that in households with both parents, it's uncommon to experience health related problem and poor sanitation due to a decline in their living standard and lack of insurance (28). For religion affiliation of the household head, Pearson correlation revealed that there is a significant negative relationship between the religion of head of household and the sanitation condition of the household since the P = value of 0.007 is less than the level of significance 0.05, hence there is adequate evidence to reject the null hypothesis. 36.8% of the households who have good sanitation condition were Christian as compared to 9.80% and 0% for Muslim and those who practice traditional religion. This implies that out of the three main religion is the sampled households, the Christian households had better sanitation conditions than the Muslim and traditionalist, this depends on

where the sample was taken because all the religion practices keep and encourage a healthy lifestyle (35), (36). On occupation of household heads, Pearson correlation was also carried out and the result indicate that there was a significant negative relationship between the occupation of head of household and the sanitation condition of the household since the P-value of 0.0001 is less than the level of significant 0.05. Hence there is evidence to reject the null hypothesis. The result of the cross tabulation revealed that majority of households with good sanitation condition are those headed by civil servants and business men (traders), this could be because, low economic status as measured by income, education and occupation has a negative correlation to rates of community participation which influences extend of learning that take place in the community as well as the rate at which new knowledge are dispersed at health education meetings (30). Among the different occupations listed in the Table 18, civil servants and traders have high economic status as considered by income, judged against other occupation. People with low economic status have a lesser amount of money for health care and often live further away from health care amenities (48) – (49). Pearson correlation result of the relationship between educational attainment of the heads of the household and the sanitation condition shows that there is a significant positive relationship between these variables since the P-value of 0.0001 is less than the level of significant 0.05. Hence the null hypothesis was rejected. It therefore means that the higher the educational attainment of the household head, the better the sanitation condition of the houses. The cross tabulation result in Table 20 shows that literates have better sanitation condition than the illiterates. This is most likely because formal education will let them become more aware of the health benefits of enhanced water supply and sanitation and are more likely to use improved services if they are available (50).

CHAPTER FIVE

CONCLUSION & RECOMMENDATION

CONCLUSION

According to the World Health Organization (WHO), 1.1 billion people lack access to enhanced water supply in 2002, and 2.3 billion people got ill from diseases caused by unhygienic water. Each year 1.8 million people die from diarrhea diseases and 90% of these deaths are of children under five years (WHO, 2004). The study community, has experienced a high pace of population growth which far outstrips the ability of the relevant authorities like Jos Metropolitan Development Board, Ministry of Lands Survey and Town Planning, Ministry of Environment etc. to provide and maintain the necessary facilities such as housing, drain sewer and water systems and therefore leaving many people in despicable shanty towns. The main findings of the study are stated below:

- There was a significant relationship between the occurrence of diarrhoea in children below the age of 5 and the educational attainment of the child caretaker, at $P < 0.05$ so the null hypothesis was rejected. Most of the caretakers are literate so it is easier for them to positively engage and teach the children proper hygiene and sanitary practices.
- Household background variables like age, marital status, occupation, religious affiliation of head of household and the educational attainment of the head of household had

relationship with the sanitation conditions in the household. The study revealed that the younger the head of household, the increased chances of them being healthy and maintaining a good environment. There was also a significant positive relationship between the marital status of the head of households and the sanitation condition of the household. This implies that household with both parents had better sanitation condition than those houses headed by single parents. It was also found that houses headed by Christians, had better sanitation conditions than that of the Muslims and these households also had better sanitation condition than those headed by the traditional worshippers. The study also showed that households of educated heads had better sanitation conditions than those headed by illiterate. It was also found that houses where civil servants and business men are heading had better sanitation condition than other houses.

From the study, it can be seen that household's socio cultural demographic factors like age, marital status, educational attainment, religion of head of households and occupation had significant relationship with the sanitation condition of the household. Majority of children's caretakers were literate and yet not all of them attend child health care programs. Majority of the householders used brick or cement blocks. Concrete is the most used material for roofing in the study area while corrugated sheets are mostly used for roofing. The use of high quality materials for walls, floors and roofs makes it difficult for insect vector and pest attack thereby increasing the sanitation condition in these houses. Although the study revealed that most of households had basic sanitation facilities like household toilets and rubbish dumps, these facilities are inadequate because the use of bush as place of convenience and indiscriminate disposal of rubbish. A physical observation of drinking water storage containers in the sampled households revealed that most of the respondents dipped cups and bottled into storage containers to fetch water for use.

From these methods of collecting water, foreign materials can easily be introduced into the containers anytime water is collected, also in spite of the fact that some of the households get water from unprotected sources most of the respondents do not treat their water before drinking. This wrong attitude toward water usage makes the respondents much more prone to water borne diseases.

RECOMMENDATION

As a way forward to further improve the sanitation conditions of the study area and general health of the people the following actions are recommended.

- Studies of this nature should be carried out using larger sample sizes.
- An intervention study needs to be carried out to determine the impact of water, sanitation and hygiene intervention. On disease related to unsafe water, lack of sanitation and hygiene.
- A detailed study of different simple and cheaper water treatment methods, should be carried out and also a comparative study of these methods of water treatment.

SUGGESTED INTERVENTION

- **Water Quality Intervention :** Water treatment, both in the household and at the source of the supply are options

for improving water quality, interventions to treat and maintain the quality of water at the point of use (Pou) are considered to be among the most effective water quality interventions (51). However, (Pou) water treatment offers only the health benefit and so its choice as an intervention depends purely on the epidemiological evidence.

- **Sanitation:** By removing contact with excreta, sanitation technologies, eliminate one of the main transmission routes of diarrheal pathogens. By removing a transmission pathway, it is possible to reduce the morbidity and mortality associated with diarrheal diseases. Reviews of studies conducted on the impact of proper excreta, disposal on health found that sanitation improvements reduce diarrhea morbidity by 22-36%. (52-54).
- **Hygiene Promotion:** By directly reducing transmission of fecal pathogens by hand, improved hygiene offers a potentially important barrier that can prevent contamination of drinking water and food as well as direct ingestion. Health education is based on the premise that knowledge of the health benefits is sufficient to change people's behavior. Some studies have shown that such cognitive factors are far less effective drivers of change than emotional drivers such as the desire for prestige or concern for one's children (55-56). The concept of hygiene education has been superseded by the broader notion of hygiene promotion, which includes the broader perspective. Hygiene promotion refers to hand washing with soap and other practices that promote cleanliness (57).
- **Promotion of Community Participation in Sanitation Improvement Programs:** An effective sanitation improvement intervention, program should be implemented. Any intervention program should promote community level participation and also strengthen social learning capacity among community members. It is very important to sustain community level networks and local social ties in the implementation of behavior change programs. Studies concerning HIV/AIDS prevention in Sub-Saharan Africa, offer insight into potentially useful interaction method for improving water and sanitation messages (58).
- **Intervention of Agencies:** Agencies like the local government council, NGOs, Water and Sanitation Agencies, Education Institutions, Ministry of Information and the Environmental Health Division of Ministry of Health can collaborates with communities, to give more attention in educating the people of the need to keep their environment clean and cultivate good sanitation and hygiene practices. The messages should be planned based on the community's characteristics and appreciation of health, sanitation and hygiene. As suggested by PHAST (59) local health clubs and animations must be employed to promote good hygiene routine.
- **Environment Health Inspection:** Environmental Health Departments in local government state level etc. and the water sanitation committees should step up the supervision of environmental sanitation. The prosecution of environmental health offenders should serve as a deterrent to ensure that people behave appropriately with regards to household and community hygiene. They can also be agents of information flow for health education message in the communities.

ACKNOWLEDGEMENT

Joshua Nyako (Director Environmental Health Department Jos Metropolitan Development Board Plateau State), Issued permission and guidance for conducting household survey in Jos Metropolis.

AUTHOR CONTRIBUTION

Y.Y Izam; (First and corresponding author) study concept and design, conducting the survey, acquisition of data, drafting of the manuscript and critical revision of the manuscript for intellectual content. G. C Otubo and P. N Olotu; Statistical analysis technical (analysis and interpretation of data) and material supports.

REFERENCES

- Rabie, T. and Curtis, V. (2006). Hand washing and Risk of Respiratory infections, a quantitative systematic review. *Tropical medicine of International Health*, 11(3), 258-267.
- Hamlin, C. (2009). "Cholera forcing". The myth of the good epidemic and the coming of good water. *American Journal of Public Health*, 2009; 9(9), (11), 1946-1954. Doi: 10.2105/AJPH.165688.
- Falco, M. and Smith, M. (2010). Poor sanitation could worsen Haiti cholera outbreak, 2010 CDC/2010/HEALTH/11/18/Haiti Cholera Sanitation.
- Eneji, C.O., Bassey, A.E., Eneji, J.E., Obogo, G.O. and Dunn amah, A.Y. (2015). Influence of Family types and parent's socioeconomic status on school dropout among female students in the old Ogoja zone of Cross Rivers, Nigeria. *Global Advanced Research Journal of Arts and Humanities (GARJAH)*, 2(1): 007-013.
- Lori, J.R. (2013). Maternity Waiting homes and traditional Midwives in rural Liberia. *International Journal of Gynecology & Obstetrics*, 123(2), 115-123.
- Grant J.P.(1995). *The state of the World's Children.*" New York Oxford University Press for UNICEF, 1(1): 15-24.
- Scherlenlieb, M.A. (2003). Factors Influencing Sanitation Conditions- United Kingdom Essays. <http://ww.ukessays.com/factors/2003>.
- Federal Republic of Nigeria, (2006). *National Census*
- Blench, R.M., Daniel, P. and Hassan, U. (2003). Access rights and conflict over common pool resources in three states in Nigeria. *Report to Conflict Resolution Unit, World Bank*.
- Farrar, J.T., Berlin, J.A. and Strom, B.L. (2003). Clinically Important Changes in acute Pain Outcome Measure. University of Pennsylvania School of Medicine, Philadelphia, 2003 PA 19104, USA.
- Dornyei, Z. (2007). Research methods in applied linguistics New York: Oxford University Press. 336 pages. Reviewed by Priyanvada Abeywickrama, San Francisco States University.
- Plotincov, L. (1967). *Strangers to the City Urban Main in Jos*. University of Pittsburg Press, Pittsburg, p. 63
- Online Nigeria (2003). <http://www.Online.com.ng> R
- Yamane, T. (1967). Statistics, an Introductory Analysis, 2nd Ed, New York. Harper and Row
- Sarandakos, S. (1998). "Social research", 2nd edition, Hound mills, Macmillan Press Ltd. Pp 168
- Arimond, M. and Reul, M. (2003) "Spot-check observational method for assessing Hygiene Practices. Review of Experience and Implication for programmes" Centre for Health and Population Research. *Journal of Health and population Nutrition*, 20 (1): 65-76.
- Hashimoto, K., Nakagawa, J., Cordon-Rosales, C., Jaures, J.A., Trampe, A. and Marraquin, L. (2003). The impact of vector control on Triatomadimidata in the Guatemalan. Department of Jutiapa Annals of Tropical Medicine Parasitology, 97, 289-298.
- Robin, A., Siegel, P., Moye, A., Gilroy, M. and Silkand, A. (1999). A controlled comparism of family versus individual therapy for adolescent with anorexia nervosa. *American Academy Child Adolescent Psychiatry*, 3(8), 1482-1489
- McConnell, M.F. (1982). Pseudochyolous effusion in a cat with cardiomyopathy. *Australia Veterinary Journal*, 58(2), 72 – 74.
- Berkman, D.S., Lescano, A.G., Gilman, R.M., Lopez, S.L. and Black, M.M. (2002). Effect of stunting diarrheal disease and parasitic infection during infancy on cognition, in late childhood: a follow up study. *Lancet*, 3(59): 564 – 571.
- WHO (2004). *WHO guidelines for drinking water quality, 3rd ed. vol. 1. Recommendations* World Health Organization, Geneva
- Markus, M.B. (2002). Helminthiasis new medical significance. *Trends Parasitology*, 1(8), 205.
- National Bureau of Statistics (NBS), (2013). *Annual abstract of statistics* <http://www.nigeriastat.gon>
- Girl's child right (2003). UNICEF Nigeria <https://www.unicef.org>.
- Nukunya GK (1992). *Tradition and change, an introduction to sociology*. Ghana Universities Press Accra
- United State (US) Census Bureau 2012, <https://en.m.usa.gov>statistics>.
- Demo, D.H. and Adcock, A. (1991). The impact of divorce on children in contemporary families. Looking forward, looking back, ed. a. Booth. Minneapolis, Mn. *National Council of Family Relations*.
- Mauldin, T.A. (1990). Women who remain above the poverty level in divorce. *Implication for family policy Family relations*, 3(9), 141 – 146.
- Mclanahan, S. and Booth, K. (1989). Mother only families, problems prospects and politics. *Journal of Marriage and the Family*, 5(1), 557 – 580
- Hausknecht, M. (1962). The joiners, a sociological description of voluntary association membership, New York: Bedminster Press. 45 – 50 and 71 – 78
- Wagstaff, A. (2000). Socio-economic inequalities in child mortality. *Bulletin of the WHO*, 78(1), 19 – 29.
- National Bureau of Statistics (NBS), (2012). *Annual abstract of statistics 2012* <http://www.nigeriastat.gon>.
- Bureau of Public Service Reforms, BPSR (2012) Nigeria
- Zanden, J. W. V. (1992). *The social experience, an introduction to sociology 2nd edition*, New York McGraw-Hill p. 373
- Omar, D. and Thoresen, C.E. (2002). Does religion cause health? Differing interpretation and diverse meaning. *Journal of Health Psychology*, 7(4), 365-380
- Rumun, J.A. (2014). Influence of religious beliefs on health care practices. *International Journal of Education and Research*, 2(4), 42-43.
- McJunkin, E.F. (1982). *Water and human health? Agency for international development*. Washington D.C USAID, pp. 134

38. WHO (1996). *World health organization. The world health report fighting disease, fostering development*
39. United Nations International Children Emergency Funds (2013). Report on the State of the World's children Focus on children with disabilities. <https://www.unicef.org/sowc>. 2013.
40. Kendie, S.B. (1999). Do attitude matter? Waste disposal and wetlands degradation in the Cape Coast Municipality of Ghana. *Malaysian Journal of Tropical Geography*, 29(2), 10
41. Kagei, N. (1983). Techniques for the measurement of environmental pollutions by infective stage of soil-transmitted helminthes. As cited in collected papers on the control of soil-transmitted helminthiasis. (ed. M. Yokogawa, S. Hayashi, A. Jobayashi, N. Kagel, N. Suzuki, & C. Kunii), 2(1), 27-46. Asian Parasite Control Organization, Tokyo.
42. United Nation Educational Scientific and Cultural Organization (UNESCO) (2015). *Literacy statistics metadata information table*
43. Laston, L.S., Zeithly, S., Braham, S., Jahan, A.R. and Bateman, O.M. (1993). Prevention of diarrhea through improved hygiene behavior. *International Centre for Diarrhea Research Bangladesh & Environmental Health Project, U, S Agency for International Development*.
44. Awasthi, S., Pande, V.K. and Glick, H. (1996). Under fives mortality in the urban slums of Lucknow. *Indian Journal of Pediatrics*, 6(3); 363 – 368
45. Bhattacharya, S.K., Bhattacharyya, M.K., Manna, B., Dutta, D., Debby, A., Dutta, P. *et al.*, (1995) Risk factors for development of dehydration in young children with acute watery diarrhea: A case control study. *Acta Paediatrica*, 8(4). 160 – 164
46. Scariati, P.D., Grummer-strawn, L.M. and Fein, S.B. (1997). A longitudinal analysis of infant morbidity and the extend of breastfeeding in the United States. *Pediatrics*, 99, E5
47. Brett, S., McKay, K. (2015). Marriage relationship and family. *The Art of Manliness Journal. The Surprising Benefits of Marriage*
48. Caulfield, L.E., DeOnis, M., Blossner, M. and Black, R.E. (2004). Under nutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria and measles. *American Journal of clinical Nutrition*, 80(1), 193-98
49. Rice, A.L., Sacco, L., Hyder, A. and Black, R.E. (2000). Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. *Bull World Health Organization*. 78(10), 1207-1221
50. World Bank, (1993). "World development report 1993, investing in health" Oxford University Press. Incorporation, New York N.Y. 10016 Pp. 25-29 and 213-225
51. Clasen, T., Schmidt, W.P., Rabie, T., Roberts, I. and Cairncross, S. (2007). Interventions to improve water quality for preventing diarrhea. *Systemic review and meta-analysis. BMJ*. 2007; 3(34) 759- 782.
52. Esrey, S.A., Feachem, R.G. and Hughes, J.M. (1985). Interventions for the control of diarrheal diseases among young children. Improving water supplies and excretes disposal facilities. *Bulletin of the World Health Organization*, 1985; 63(4): 757-772
53. Esrey, S.A., Potash, J.B., Roberts, L. and Schiff, C. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. *Bull world Health Organization*, 69(5): 600 -615
54. Waddington, H., Snilstvent, B., White, H., and Fewtrell, L. (2009). *Water Sanitation and hygiene interventions to combat childhood diarrhea in developing countries synthetic reviewed*. New Delhi; 3ie
55. Aunger, R., Schmidt, W.P., Ranpura, A., Coombes, Y., Maina, P.M., Matiko, C.N. and Curtis, V. (2010). *Three Kinds of Psychological determinants for hand-washing behaviors in Kenya Social Science & Medicine* 7(1) 383-391.
56. Scott, B.E., Schmidt, W.P., Aunger, R., Curtis, V., Garbrah-Aidoo, N. and Animashaun, R. (2008). Marketing Hygiene Behavior: The Impact of Different Communication Channels on Reported hand washing Behaviors of Women in Ghana. *Health Education Research*, 2008; 23(3), 392-401.
57. Curtis, V., and Cairncross, S. (2003) "Effect of washing hands with soap and diarrhea risk in the community: A Systematic Review" *Lancet Infectious Disease* 3(5): 275
58. Green, E., Halperin, D., Natalya, V. and Hogle, J. (2006). Uganda's HIV prevention success: The role of secular behavior change and the national response. *AIDS Behavior*, 10(4), 335
59. WHO (1998). PHAST step by step guide: A participating approach for the control of diarrheal disease. *World Health Organization*, Geneva

APPENDIX A1

CONSENT FORMS

QUESTIONNAIRE FOR A SURVEY ON SANITATION, WATER QUALITY, HYGIENE AND THE PREVALENCE OF DIARRHEA IN JOS METROPOLIS

My name is Pharmacist Yocy Yohanna Izam. I am collecting data on water, hygiene and sanitation status in the Community. The study will help in identifying some health related issues in the community. I request to ask a few question regarding water, sanitation and hygiene in your household. Your responses will be treated with confidentiality and in making the report, names will not be mentioned. You are free to answer any question and may also ask questions or clarification before we start.

Thank you for your anticipated favourable response.

APPENDIX A2
INTERVIEW SCHEDULE FOR HEAD OF HOUSEHOLD REPRESENTATIVES AND
CARETAKERS OF CHILDREN LESS THAN 5 YEARS IN HOUSEHOLD

SECTION A

LOCATION

A1:CLUSTER AREA

A2:HOUSE ADRES

SECTION B: HOUSEHOLD CHARACTERISTICS

B1: Material used for wall Construction

- 1. Brick or cement blocks []
2. Mud []
3. Stone []
4. Raffia []
5. Others (specify)

B2: Material used for Floor construction (flooring)

- (1) Tile []
(2) Concrete []
(3) Earth []
(4) Others (specify).....

B3: Material used for Roof construction (roofing sheets)

- (1) Cement []
(2) Mud []
(3) Corrugated sheets []
(4) Aluminum []
(5) Others (Specify).....

B4. Children [0-59 months] living here. Yes [] No []

B5. Caretakers of Children (0-59) months present. Yes [] No []

SECTION C: SOCIO-CULTURAL BACKGROUND OF HEAD OF THE HOUSEHOLD

- 1. Gender of head of household (circle one). Male [] Female []
2. Age
3. Marital status (1) married [] (2) single [] (3) others [].....
4. Religion of Head of Household
5. The occupation of the Head of Household
6. What is the educational attainment of the head of household?
(1) No formal schooling [] (2) primary, Incomplete [] primary completed []
(4) Secondary, incomplete [] (5) Secondary professional level []

(6) University, incomplete [] (7) University, completed [] (8) don't know []

SECTION D: WASTE DISPOSAL (Garbage)

7. What is the main way your dispose of your garbage?

(1) In waste pit/dump site [] (2) Random [] (3) Burned [] (4) Buried []
(5) composed [] 6. Others

8. If disposed within household, how far is this from the house?

(1) Less than 50meters [] (2) 51- 100m [] (3) 101-150m [] (4) more- than 150m []

9. What type of place of convenience (toilet) do members of this household use?

1. Water closet []
2. Simple pit latrine []
3. Composting dry latrine []
4. Manual bucket latrine []
5. Bush plastic bag []
6. Others

10. Do you have toilet facility inside your household? (1) Yes [] (2) No []

SECTION E: WATER USE IN THE HOUSEHOLD

11. What is the main source of drinking water for members of this household?

(1) Piped water [] (2) tube well / borehole (pump) [] (3) Hand dug well []
(4) Spring [] (5) Rain water collection [] (6) Tanker truck [] (7) Bottled water [] (8) Surface
water (rivers/lakes) [] (8) Others specify

12. Do you treat water in any way to make it safe to drink? (1) Yes [] (2) No []

13. If yes, what do you usually do to the water to make it safe?

(1) Boil [] (2) Add bleach/chlorine (water guard) [] (3) Sieve it through cloth [] (4) Water filter
(Ceramic, sand) [] (5) solar disinfectant [] (6) sedimentation (alum) []
(7) Others specify.....

14. How do you remove water from the drinking water container? (1) Pouring [] (2)
Dipping [] (3) Both pouring and dipping [] (4) Container has a tap [] (5) others (specify)
.....

15. What type of containers are these?

(1) Narrow mouthed [] (2) wide mouthed [] (3) Both types []

16. Are the containers covered? (1) All are [] (2) Some are [] (3) None is []

SECTION F: FOR CARETAKERS OF CHILDREN LESS THAN 5 YEARS

17. Gender of caretaker (circle one) (1) Male [] (2) Female [].

18. Age of caretaker (1) 10-19yrs [] (2) 20-29yrs [] (3) 30-39yrs [] (4) 40-49yrs [] (5) 50 and
above [].

19. Marital status of caretaker (1) married [] (2) single []

20. What is the educational attainment of the caretaker of children under five years old? (1) No formal schooling [] (2) Primary, incomplete [] (3) Primary completed [] (4) Secondary incomplete [] (5) Secondary professional level [] (6) University incomplete [] (7) University, completed [] (8) don't know [].
21. Has the child has diarrhea during the past 2 weeks? (1) Yes [] (2) No [] (3) Don't know [].
22. Do you attend child care educational (weighing programmes)?
(1) Yes [] (2) No []

OBSERVATIONAL GUIDE FOR HYGIENE AND SANITATION OF HOUSEHOLD ENVIRONMENT

On approaching the house, observe the presence of the following:

Flies in the compound? Yes/No

Faeces on the path to the house? Yes/No

Faeces around the house? Yes/No

Faeces in the compound? Yes/No

Animal faeces around the house? Yes/No

Is the compound clean (swept)? Yes/No

Weeds around house? Yes/No

Is cooked food covered? Yes/No

Animals running around compound? Yes/No

Waste water from washing cooked utensils

Poured in the yard? Yes/No

For the following items, ask to see and physically inspect before ticking. Add one extra mark after each verification if found in good condition as required by the Joint Publication 8 report.

Unwashed dishes seen? Yes/No

Is stored water covered? Yes/No

Any household toilet seen? Yes/No

Any household waste dump seen? Yes/No

Faeces seen in the dump? Yes/No

Soap and water for hand washing seen? Yes/No

Are wastes well kept? Yes/No

Observational guide adopted from joint publication (2004). The hygiene improvement framework: a comprehensive approach for preventing childhood diarrhea EHP, UNICEF, USAID, WORLDBANK/WSP, WSSCC contract HRN – 1-00-99-00011-00, May 2004, Washington Dc pp. 26 – 35.

Poor household index estimation using observational guide

Items Mark

Flies in the compound? Yes/No[0]

Faeces on the path to the house?Yes/No[1]

Faeces around the house?Yes/No[1]

Faeces on the compound?Yes/No[1]

Animal faeces around the house?Yes/No[0]

Animal faeces in the house Yes/No[0]

Is the compound clean (swept)?Yes/No[1]

Weeds around house?Yes/No[1]

Is cooked food covered?Yes/No[0]

Animals running around compound?Yes/No[0]

Waste water from washing cooked utensils

Poured in the yard?Yes/No[0]

For the following items, ask to see and physically inspect before ticking. Add one extra mark after each verification if found in good condition as required by the Joint Publication 8 report.

Mark extra mark

Unwashed dishes seen?Yes/No[1][1]

Is stored water covered?Yes/No[0][0]

Remarks: Water storage containers were dirty and uncovered, no extra marks Awarded

Any household toilet seen?Yes/No[0][0]

Any household waste dump seen? Yes/No[0][1]

Faeces seen in the dump? Yes/No[1][1]

Remarks: Household Dump not Available but extra marks Awarded for Good Waste Disposal

Soap and water for hand washing seen?Yes/No[0][0]

Are wastes well kept?Yes/No[1][1]

Average score: 12

Household sanitation index = 12

Since the sanitation index is less than 16, the household had a poor sanitation condition.

Good household Index Estimation using Observational Guide

Items

Flies in the compound? Yes/No[1]

Faeces on the path to the house? Yes/No[1]

Faeces around the house? Yes/No[1]

Faeces on the compound? Yes/No[1]

Animal faeces around the house? Yes/No[1]

Animal faeces in the house Yes/No[1]

Is the compound clean (swept)? Yes/No[1]

Weeds around house? Yes/No[0]

Is cooked food covered? Yes/No[1]

Animals running around compound? Yes/No[0]

Waste water from washing cooked utensils

Poured in the yard? Yes/No[0]

For the following items, ask to see and physically inspect before ticking. Add one extra mark after each verification if found in good condition as required by the Joint Publication 8 report.

Mark extra mark

Unwashed dishes seen? Yes/No[1][1]

Is stored water covered? Yes/No[1][1]

Any household toilet seen? Yes/No[1][0]

Remarks: Bucket latrine present in household but not clean inside so no extra marks awarded

Any household waste dump seen? Yes/No[1][1]

Faeces seen in the dump? Yes/No[1][1]

Remarks: Extra marks awarded for good waste disposal and rubbish dump management

Soap and water for hand washing seen? Yes/No[1][1]

Remarks: Liquid soap and container full of rainwater present near toilet entrance, extra marks given

Is waste well kept? Yes/No[1][1]

Average score: 21

Household sanitation index = 21

Since the sanitation index is more than 16, the household had a good sanitation condition.

APPENDIX A4

APPROVAL TO CONDUCT HOUSEHOLD SURVEY IN JOS METROPOLIS



GOVERNMENT OF PLATEAU STATE
JOS METROPOLITAN DEVELOPMENT BOARD
ADJACENT GENERAL POST OFFICE, NO. 3 AHMADU BELLO WAY
P.M.B. 2023, JOS
PLATEAU STATE OF NIGERIA



Our Ref: _____ Your Ref: _____ Date: _____

5th February, 2017

Pharmacist Yocy Yohanna Izam
University Health Services
University of Jos
PMB 2084
Jos, Plateau State.

Ma,

RE-REQUEST TO CONDUCT HOUSEHOLD SURVEY IN JOS METROPOLIS

With reference to your request dated 5th February, 2017, I write to convey approval for you to conduct household survey in Jos Metropolis.

With kind regards,

Joshua Nyako

Director Environmental Health Department
