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DEPARTMENT OF NATURAL AND ENVIRONMENTAL SCIENCES

Senior Research Project

THE IMPACTS OF INADEQUATE SANITATION ON THE HEALTH OF CHILDREN IN RURAL AREAS. CASE STUDIES: DANDU AND WUROCHEKKE COMMUNITIES, YOLA SOUTH, ADAMAWA STATE.

By

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Signature Date

DEDICATION

This is dedicated to all the communities lacking the necessary sanitary facilities for a healthy and better living.

ACKNOWLEDGMENT

Firstly, I would like to thank God for given me the strength and good health to complete this research. I would also like to acknowledge my parents Mr. and Mrs. Okpe for their constant motivation and support.

My profound gratitude goes to Dr Friday Ogwu my research supervisor, Dr Lynne Baker my second reader and Dr Jessica Boyd my research supervisor for guiding me through this research.

Also I would like to appreciate Mr. Saaqid Mamood and Mallam Murtala who helped me during the research outings and lastly, I am grateful to all the respondents from the two communities who participated in the study.

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American University of Nigeria, 2014

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ABSTRACT

This research was conducted in two communities; Dandu and Wuro Chekke, Yola south, Adamawa state. The aim of the study was to investigate the availability of sanitation infrastructures and to find out the relationship between sanitation and health among children in the two rural areas of the state. This was done by conducting interviews and making observation of 50 respondents who were mainly mothers and their environment. The socio-economic status and sanitation practices of the respondents, water supply source, and availability of health care centers in the areas and some of environmental conditions of their communities were included in the interviews and the observation process. The factors were considered in other to find out if there was any relationship between the factors mentioned above and the

occurrence of malaria, typhoid and intestinal worm infestation in the children under the age of five.

Results from the study were analyzed using charts mostly and the results showed that in the two communities, there was hardly any link between the factors that were used to measure sanitation or the standard of living and the diseases in the children. There the hypothesis of this study which is that "There is a relationship between the health of a child and the level of sanitation, water quality and low income in rural areas" was not proven due to time limitations and also lack of records showing disease occurrences in children less than five years in the communities.

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INTRODUCTION

Environment, sanitation and health are inextricably interlinked. An environment with poor amenities such as polluted air, poor sanitation, unkempt drinking water and poor housing, has been seen to have a negative effect on the health status of individuals and wellbeing of people. Such places have added to communicable disease and also in the prolonging of epidemiological transition. Physical environmental factors and socio-cultural issues which are cumulative also lead to disease of greater burden. The environment in the medical sense includes what affects an organism with regards to influence and condition and also the surroundings. For the purpose of this paper, environment by the International Epidemiological Association can be defined as "All that which is external to the human host. This can be divided into physical, biological, social, cultural, etc., any or all of which can influence health status of populations." From this definition, anything that is not genetic would be included in the environment. However, this can be argued because considering genes for instance whether in the short or long term, they are influenced by the environment.

Looking the globe as a whole, the health burden is on the increase; even the so-called developed world deal with pollutants that emerge every now and then which pose a considerable threat to human health. Urbanization is on an alarming rate in the developing countries. In 2001, according to the United Nations, Nigeria had a population of 167 million which affected the housing demand in the urban area. As such, haphazard development for new migrants or less privileged ones has resulted in slum development. In contrast to this background study, there is the crucial need for action to aid with the reduction of environmental health burden within the rural areas

of the country. The rural or slum development is commonly seen in developing countries. This has built up problems that can be witnessed in different urban centers where infrastructure provided lag behind in city expansion and population growth. The group which is most vulnerable to environmental burdens is the occupants of the rural area.

Similarly, in developing countries, gastroenteritis can be seen to represent morbidity in children. Within these developing countries, the annual diarrhea rate is estimated to 3.2 events per child (). Zones that are considered to be endemic, colonization of these parasites are the norm. This can be as a result of malnutrition which is also a cause of immune deficiency. Parasitic diarrhea is frequent and acute among children that are not well fed or malnourished, children who are well-fed on the other hand remain healthy carriers. More so, diarrhea can be seen as a possible cause and concern of malnutrition. Diarrhea also stunts children's growth, malnutrition increase the diarrhoeic frequency which creates a vicious cycle.

The negative effect of diarrhea infection on the state of nutrition can be due to the following reasons: by increasing catabolism and the stocking of micro nutrients needed for tissue growth and formation intestinal absorption and appetite reduction. The case of retarded growth in a quarter to a third per case is due to intestinal infection as explained by mathematical models.

Dating back to the 1980's, even the mildest form has been seen or known for weakening immune defenses. Micro-nutrients play a role which allows adequate immune responses to attacks which is now being accepted and the effects which are pathological of the most common deficiency types are also recognized.

With the aforementioned, this paragraph delves into malaria owing to the fact that it is part of the case study also side malaria, diarrhea and intestinal worms.

Malaria and intestinal helminth parasites co-exist in the tropic as a result of climatic conditions that are prevailing and also due to poor sanitary practices. The effects of these parasites are cognitive in development, school attendance of children and also educational performance. The full documentation of these parasites has not been fully recorded in Nigeria due to the fact that community-based studies are limited. The general plasmodium prevalence parasites which are asexual, intestinal helminth infections and helminth malaria infections were about 52.3% and 57.1% respectively (WHO, 2012). It should also be known that in children *Ascaris lumbricoides* was the only intestinal species identifies amongst children.

Malaria and helminth infections are distributed widely in both tropical and subtropical areas which of course are both of public health concern. Children under the age of five die from malaria every 30 seconds (Ekundayo, 2011). In Nigeria, intestinal helminth infections with *Trichuris trichuiris, Ascaris lumbricoides and hook worm,* have remained dominant. The latest report shows about 102 countries still endemic for malaria with about 219, 000, 000 cases and 660, 000 deaths (Ekundayo, 2011). Nigeria and the democratic republic of Congo account for 40% total of the estimated deaths related to malaria and also 40% of the malaria cases globally.

These diseases are common amongst children because they are more susceptible to the two infections owing to the incomplete development and their greater immunological vulnerability, lower standard hygiene and morbidity (Montresor and Crampton, 2002). Helminth that is soil transmitted amount for about 10% of any

population understudied. The most vulnerable are school children. 28.6% to 75.6% of ascariasis is prevalent amongst school children and factors such as poor hygiene, poor water supply, and poverty, limited access to preventive measures, health care and lack of protective clothing.

Some few decades ago, there have been similar infections with regards to worm and malaria. The relations between these two studies of infection have been reported to be proactively different or to aggravate prevalence of acute malaria. Despite environmental conditions and socio-economic factors that affect the distribution of malaria and helminthes, especially with regards to children and the rural communities, a brief explanation of what studies has revealed can be viewed within the next paragraph.

Findings from these studies have demonstrated a serious persistence of intestinal helminth infections, asymptomatic malaria infections and anemia commonly found amongst children in rural areas. An overall prevalence of falciparum malaria accounts for about 52.3% which is hyper-endemic for malaria. However, the high prevalence of asymptomatic malaria which is more rampant during the dry season is a cry for attention because this could be one of the reasons why malaria is hyper-endemic within the study area. Children under the age of five have been seen to have an immunity which develops progressively form childhood to adolescence.

Socio-economic status basically affects three areas of health which are healthcare in general, health behavior and environmental exposure. Considering the United States, it has been found that health worsens especially from families who stay in low income areas with little or no education. On the other hand with an improvement in

socio-economic status, so did the overall health outcome. This can also be said about African children as well as Hispanic with same indicators of health improving as income and education levels change.

There was an overall prevalence which was observed for intestinal helmith infections in which children were used for the understudy, this showed a decline in prevalence which when compared to the 2005 report. The reason for the decrease in helminth could be as a result of campaign or Ivermectin, however the case maybe.

Another study showed that children without intestinal helminth infections were about two times likely to have a positive test for malaria parasite as compared to children already with the infection. This study has been in contraction and arguable according to findings by Ojurongbe in Osun state, this study and similar studies in Thailand shows a rather positive and statistical relationship between malarial infection and geohelminth respectively. The reasons for such cannot be explained and requires a deeper research into why such occurs. To support such findings, a research was done in Ghana there was a relation between helminth and increased levels of Interleukin which is known to inhibit the protective immune responses against malaria parasites which can also be seen in exacerbating parasitemia common to plasmodium infection. This result from Ghana suggests that the infections cause by helminth may have an alteration towards the immune response of antimalarial through the suppression of proinflammatory activity.

The above study has showed that malaria and co-infection are mostly common to children within the rural areas. Most importantly, for parasitic infections, age is an independent factor for both parasitic infections. The findings serve as a guide to

future research on prevention and control of children that reside in rural areas of Nigeria. This also provides a ground as to how to tackle the issues of malaria within the rural communities.

According to Corvalán in 2006, the estimated global disease burden and death percentage are 24 and 23 respectively which in most cases can be attributed to environmental factors, which in a sense can be averted with environmental modification which include provision of safe water, adequate hygiene and standard sanitation. International bodies such as The United Nations Children's Emergency Fund (UNICEF), the World Health Organization but to mention a few have proved to be concerned and in some cases lend a helping hand to curb environmental issues in various parts of the globe. The risk posed by environmental factors contributes at least 80% of major diseases in the world today (). Within the developing countries, the rate of environmental disease is a burden, if compared to the developed countries the difference is fifteen times higher (Smith et al 1999). *"Available global evidence suggests that (a) lack of access to clean water and sanitation and (b) indoor air pollution are the two principal risk factors of illness and death, mainly affecting children and women in poor families."*

The result accompanied by such health risks on both sexes due to the environment, is cumbersome if measured in millions. As a result the need for a healthy environment cannot be overemphasized especially within countries that are poor. The need for better access to safe and secure drinking water, better the air quality, provision of quality sanitation that is, both indoors and outdoors. In 2005 UNICEF and WHO stated that *"1.1 billion people lack access to safe drinking water; 2.6 billion are without proper sanitation."* Poor sanitation and contaminated water on a yearly

basis contribute towards the 5.4 million case of diarrhea across the globe (), in which there are about 1.6 million deaths (Haller 2004) in which majority are children under the age of five (as stated in the introduction). Intestinal worms grow well or survive better in sanitary conditions that are poor which is common to communities which are poor. These poor communities are more prevalent in the developing world. The prevalence of these communities has left nothing less than two billion people infected and in most cases it depends on the severity of such infections, in some cases it may lead to retarded growth, anemia and also malnutrition as the case maybe (WHO 2006). In 2006 UNICEF's report it can be seen that apart from diarrhea, *"six million people are blind from trachoma"* which is disease by poor hygiene practices and lack of water.

Within the developing countries, the population affected the most are those living in extreme conditions of poverty, be it in the urban or slum areas or rural as the case maybe. The pollution cause by indoors is responsible for over 1.5 million respiratory infection every year and also about 2.7 percent of the disease burden globally (WHO 2007). Looking at the world at large, half of the population use biomass and coal (solid fuel) for cooking and heating space which is attributable to indoor air pollution (WHO 2007). The poor health burden is mostly found in children under the age of five, women, the elderly and the disabled. In as much as, most deaths are attributed to indoor use of solid fuel and kids under the age of five, the countries affected the most include China, Ethiopia, Tanzania, Nigeria, Angola, Pakistan, India and a host of others (). The outdoor pollution is mostly experience by men as a result of bad air. However, the burden of the pollution is rested upon the children under the age of five (WHO 2008); this is because they are vulnerable to risks from the environment

(UNICEF 2006). Malaria is a disease caused by a parasite belonging to the plasmodium genus. This so called parasite can be transmitted by a bite of a female known as Anopheles mosquito already infected.

Environmental Health in Nigeria

Analysis from the issues facing health related problems in Nigeria gives a peculiar scene to double countries. A scene which is jeopardizing resulting from traditional environmental issues related with poverty, poor development as well as the location problem of industries and urbanization which has led to degradation of the environment and natural resources exploitation (Ahmed and Murtaza, 1995). Basic problems associated with the environment include unsafe water supply, poor food sanitation, lack of sanitation and poor vector control but to mention a few. In a survey conducted by the Nigerian Demographic and Health Survey in 2003, shows that 34.1%, 28.7% and 61.1% of rural homes have no toilet facilities, use toilets and use pit latrines respectively (Blum and Feachem, 1983). Within the same survey it showed that most rural indigenes are unable to access clean drinking water which leads to more health problems. Most of the water gotten is either from rivers, streams, open wells. The secondary problem includes noise pollution, industrial pollution, ozone depletion and a host of others.

Controversy on the Relationships between Diarrhea and Growth

There has been research as to the relation between diarrhea and growth. Few researchers came together to try and explain why. From their work they stated only malnutrition can be held responsible for the stunting of growth and the infection.

This survey was carried out in the Gambia within the late 1970's (Briend, 1989) which saw the close relationship that exists between diarrhea and growth. The results were somewhat suggestive that the diarrheic episodes and curves gotten could be brought together except during raining season. From the research there was a noticeable decrease in the severity number, however, the children's growth remain the same. As a result, there was a conclusion that the improvement in their weight curve had nothing to do with their diarrheic cases.

Although there's the possibility that growth could be the consequence of daily food supplement (Briend, 1990), this does not relate to malnutrition. In Bangladesh a survey was carried out on little children from 6 to 35 months and this showed a long time effect of diarrhea in relation to growth were not significant. Even if the deficiencies of diarrhea were acquired they disappeared after a few weeks. Looking closing at other analysis from various papers will show a challenging stand played on the part by diarrhea and malnutrition. However these data are not quite clear if diarrhea is a major cause of malnutrition. In Indonesia a study showed that there is no link between diarrhea and growth, however, there is a relationship between respiratory infections and growth.

Relating back to the impact diarrhea has on water, the water supply and sanitation needs to be improved and also have a strong effect with regards to the mortality and morbidity of various infections. The access to water if improved will reduce the diarrheic infection by 22 per cent, human waste by 16 per cent. However, this might not be too true owing to the fact that if water is improved it will account for 37 per cent in reduction rather than 41 per cent as presumed by laboratories ().

Analyses from the effect and studies that relateto diarrhea cannot be in totality be dealt with within the limits of this paper but however the role hygiene plays an important role which is vital due to the reason that most diarrheas that are endemic in nature can be passed between people due to lack of hygiene. As simple as a hand wash is in high risk diarrhea populated areas have been widely understudied and even though has not gone beyond methodological criticism, there is a general preference that it helps with the reduction in contracting diarrhea infection.

Diarrhea is also one of many symptoms responsible for intestinal infections. In the rural areas especially, no matter the individual's health status, it is very easy to be faced with intestinal parasitic colonization. There are different diarrhea parasites but the most common are *Cryptosporidium, histolytica and Giadia lamblia.* No matter the test or the clinical impact, it will largely depend on the immune system of the individual which is usually the host. If the immune defenses are low diarrhea is more frequent. As stated earlier malnutrition is still a major cause and children that are well fed are healthy parasite carriers. The best way for diarrhea to be treated is for malnutrition to be addressed alongside children's immunodeficiency.

Intestinal worms can be seen to have a corresponding relationship with diarrhea due to the fact that infection occur when an individual has taken water that is contaminated, air pollution, and a few other reasons as rightly stated earlier in the paper. In Gambia, survey according to Lunn in 2000 shows that about 43 per cent of children within the age of 15 months show signs of reduced Intestinal absorption known as malabsoption. Few other studies have also been conducted as well and shown that food supplements composed mainly of naturally fillings from plants

could help reduce the intake of these worms through food which can be contaminated by pathogens.

The immune system during this nutrition and infection shows knowledge of existing relationships which exist between the immune system, malnutrition and infection. In another research in the late 1990's, malnutrition even in its moderate form can be seen to weaken the immune system. This in turn leaves the body exposed to all these bacteria especially in undernourished children or few adults who reside in developing countries mostly within the rural regions.

Research questions

I. Is there adequate hygienic water supply in the area?
II. Are there any adequate health care facilities in the areas?
III. How is waste handled or disposed in homes and generally in the community?
IV. What is sanitation or hygiene levels using different variables like hand hygiene after defecation, presence of cockroaches and rats, drinking water care?
V. What is the effect of standard of living and educational background on their sanitation or hygiene practices?

Objectives of the study

For the purpose of this work the specific objectives of the study shall be;

I. To assess water supply in the communities
II. To assess available health care facilities in the areas
III. To find out how waste is handled or disposed in homes and generally in the community.

IV. To assess sanitation or hygiene levels using different variables.

V. To find out if their standard of living and educational background has any effects on their sanitation or hygiene practices.

Aim/ expected research outcome

The aim of this study is to investigate the availability of sanitation infrastructures and to find out the relationship between sanitation and health among children in two rural areas in Yola, Adamawa state.

RESEARCH METHODOLOGY

Introduction

This chapter discusses the research questions to be answered as well as the method of the research design, the number of the population which is the sample, the steps and procedures taken in collecting information and the instruments used in data collection. The data collection was carried out in Dandu and Wuro Chekke communities in Yola south of Adamawa state.

Study area

Adamawa state is one of the states in the Northeast of Nigeria with his capital at Yola. It was formed in 1991. There are over 80 ethnic groups in the state including Fulani, Chamba, Waja, Tambo and others. The people are noted for their deep cultural heritage which reflects in its history. They are 21 local Government in the state. Majority of its inhabitants are farmers and cattle breeders and the ones living at the bank of the river are into fishing. The study will focus mainly on the Dandu and Wuro Chekke communities in Yola south of Adamawa state. Dandu is a small community located on the outskirts of Wuro Hausa. Most of the people in the community are farmers and fishermen. Wuro Chekke is a neighboring community to Dandu in Wuro Hausa also with most of its inhabitants as farmers.

Research Method

The study adopts a qualitative method of research which will involve investigating and using structured interview guides to obtain the necessary information needed for the study. The study is aimed at collecting information from respondents on the “the impact of inadequate sanitation on child health: The study of Dandu and Wuro Chekke communities in Yola south of Adamawa”.

Target Population

The populations targeted are the dwellers of Dandu and Wuro Chekke communities in Yola south of Adamawa**.** The technique that is used to gather information is the use of questionnaires from dwellers and Interview form from health workers and clinics within the community. An interview guide will be used to conduct interviews in the communities to obtain information needed for the study.

Method of Data Analysis

When significant information is derived from the research, the final step will be to draw conclusions from the result; the data collected with the aid of the research instruments will be analyzed using a number of statistical tools. The basic tools used include tables, and charts.

Data collection

The data were primarily be collected by conducting interviews. The interview guide that was used included structured questions, and closed ended questions. The target audiences were parents in the community, specifically mothers.

HYPOTHESIS

Null Hypothesis ($H_{o)}$

There is no significant relationship between the rate of diseases related to sanitation among children due to poor water quality and supply, poor sanitary conditions and low income in rural areas.

Alternative Hypothesis ($H_{1)}$

There is a relationship between the health of a child and the level of sanitation, water quality and low income in rural areas.

RESULTS AND ANALYSIS

Socio- economic/ familial structure of respondents in both communities

The results show that 12% of the respondents are around the age of 16 to 20 years, 36% are around the age of 21 to 25, 20% are around 26-30, 16% are between the age of 31 and 35, 10% of them were around the age of 36 to 40 while 6% of them were around 41 to 45. This shows that in both communities most of the mothers are young.

From the information gotten on the educational status of the respondents from both communities, it was seen that a high percentage of the mothers around 58% have no formal education which means a lot of them are not literate, about 24% and 14% of them attained primary and secondary levels of education respectively.

32%of the respondents were mostly stay at home mums with no income so they were just dependent on their partner's source of income. Some of them have businesses, some are tailors while a few are teachers. 6% of earn between N14,000 to N10,000, 20% of them earn between N9000 to N5000, while the remaining 42% of the respondents earn between N4000 to N1000 monthly.

Information gotten also show that 78% of the respondents are married and have the support of another parent while 22% are widowed which means they are basically on their own when it comes to fending for and supporting their family.

For the methods the respondents usually use to feed their babies, 96% of the respondents which is majority of the respondents in the two communities breast feed their infants while 4% supplement breast feeding with baby formulas.

80% of the respondents have children who are under the age 5years while 10% of the respondents have none under the age of 5years. Also, majority of the respondents which is about 74% of the respondents that were interviewed from both communities revealed that all of their children share one room while the other 13% say their children share 2 rooms.

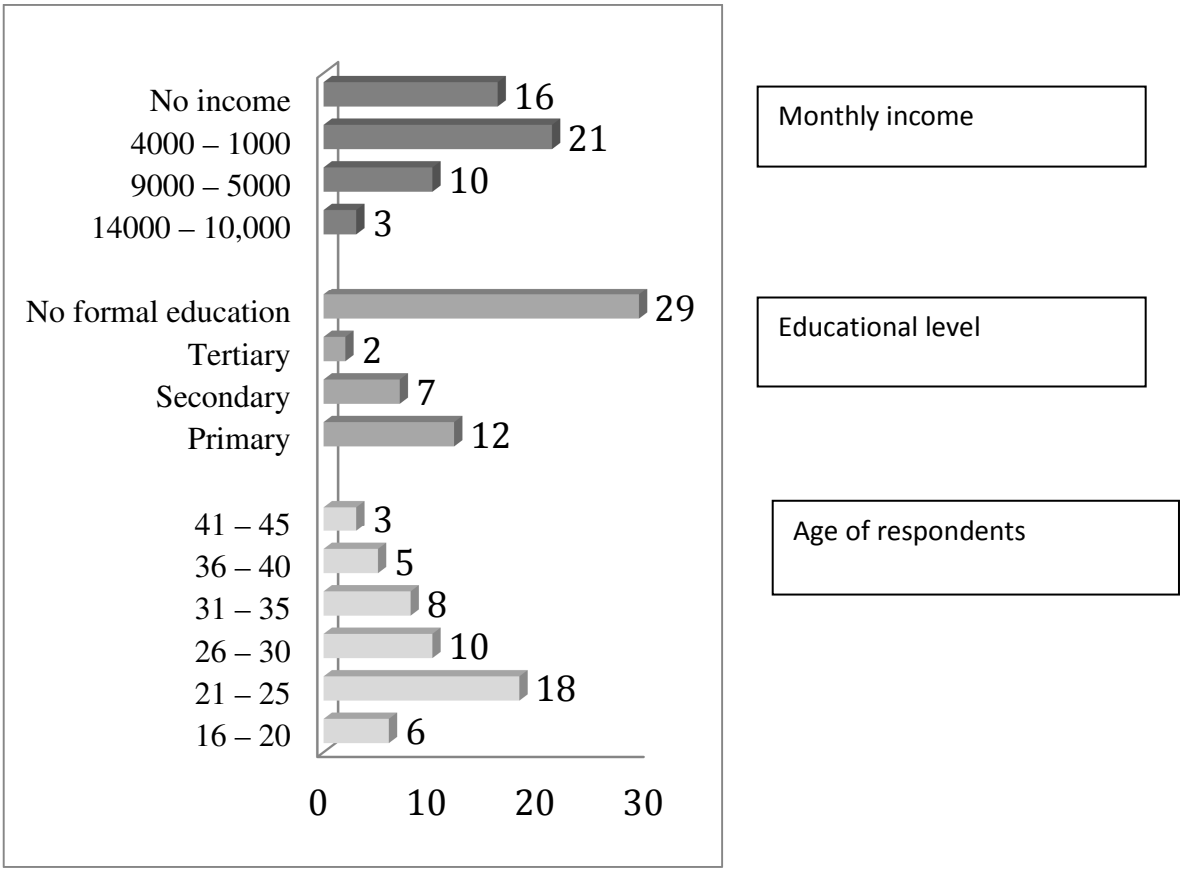

Figure 1: (Source: Field work)

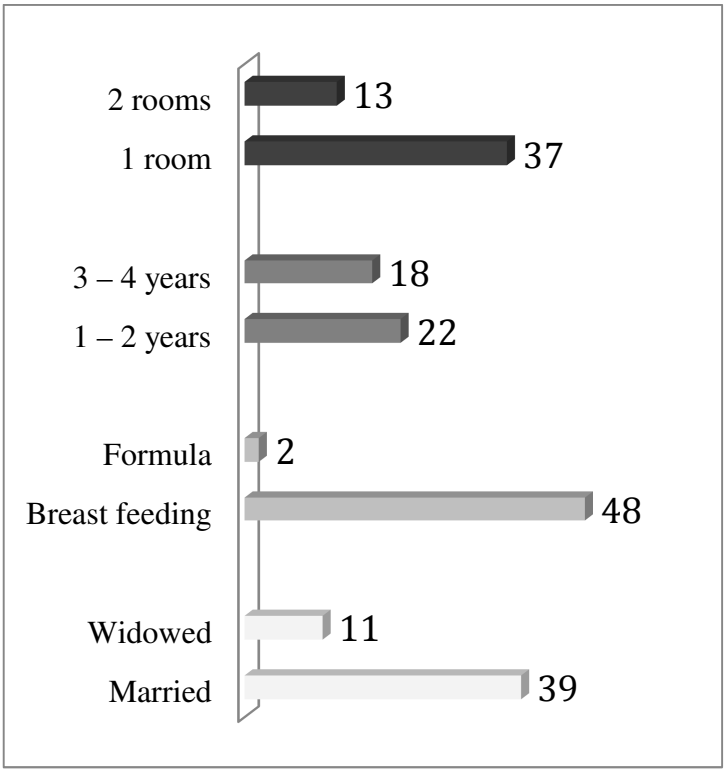

Figure 2(source: Field work)

Sanitation Facilities/ Hygiene Variables

The figures below show a summary of the various variables that were used to measure individual sanitation or hygiene levels of the respondents that participated in the interview for the study.

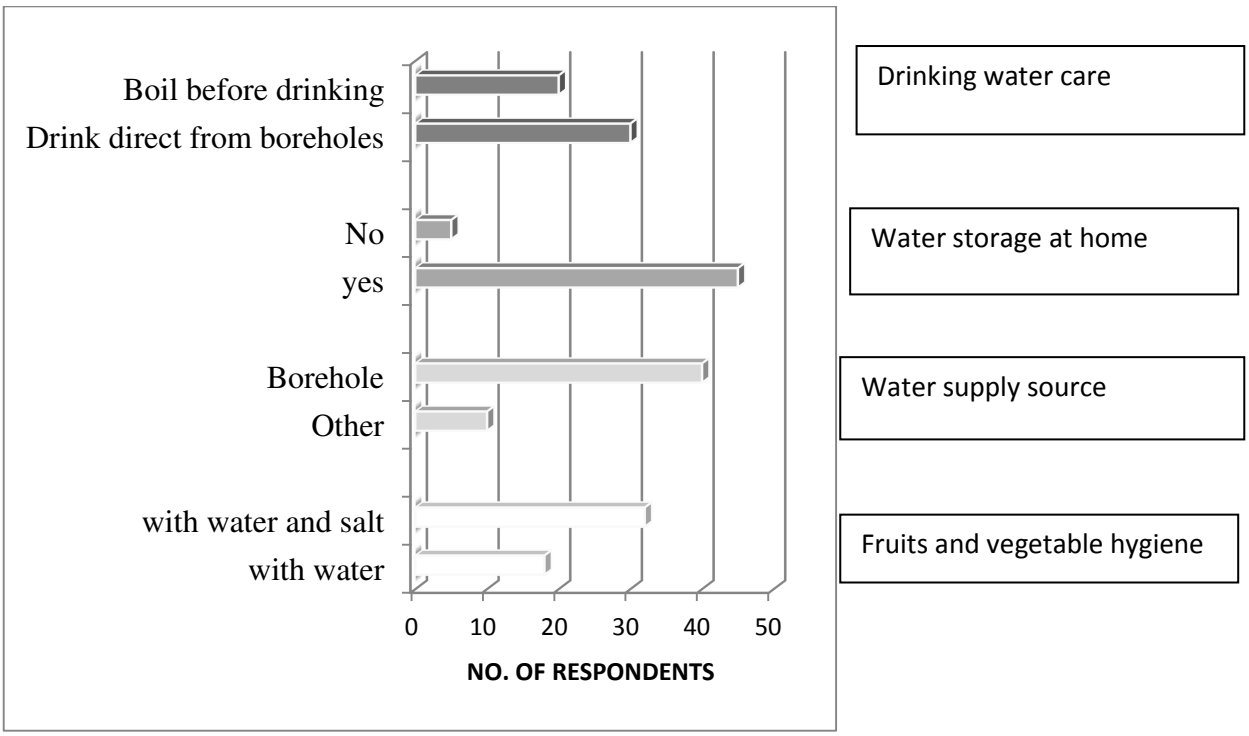

Figure 3 (source: Field work)

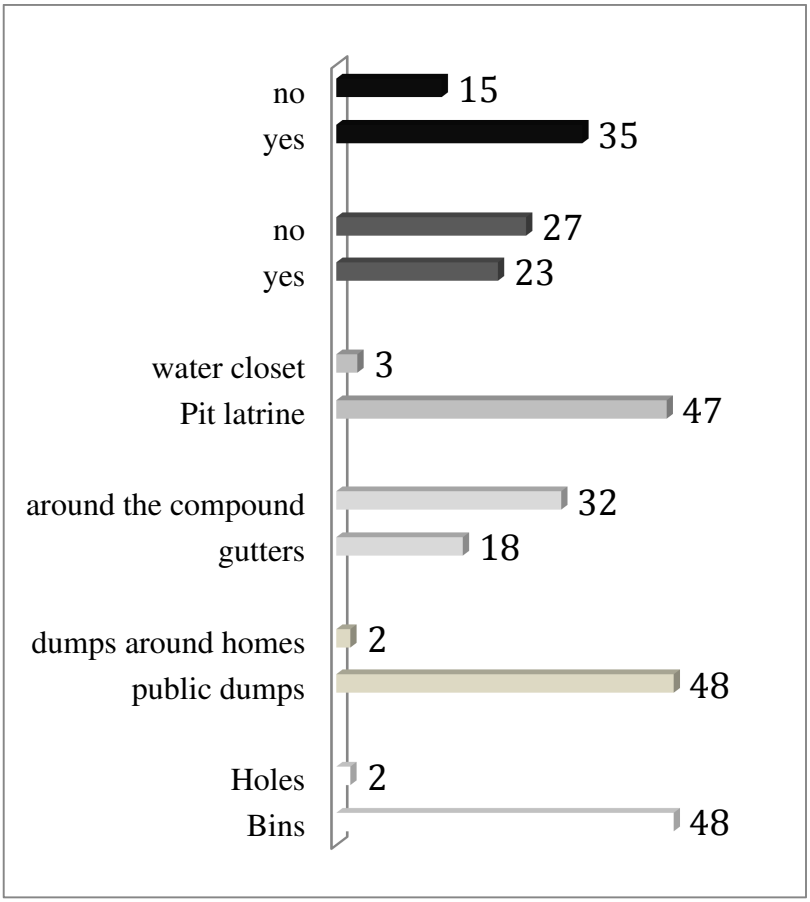

Figure 4 (source: Field work)

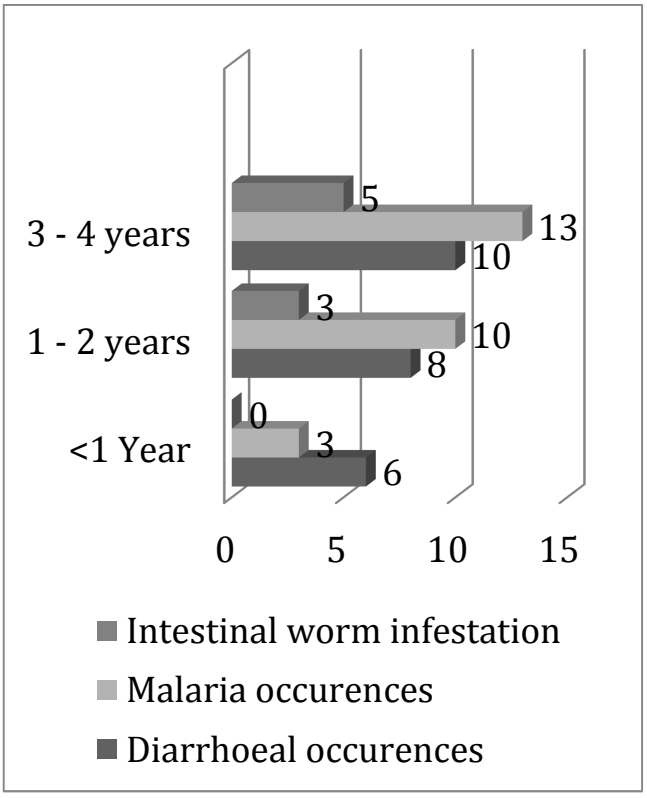

Figure 5: (Source: Field work)

The figure above shows the summary of the respondent's children age below 5years and also their diarrhea, malaria and intestinal worm episodes within the last six months

The chart below shows that there no health care facilities in the communities so a high number of them visit a chemists who diagnoses them and prescribes drugs. They usually on go to the hospital when it is something very serious or something the chemist cannot handle.

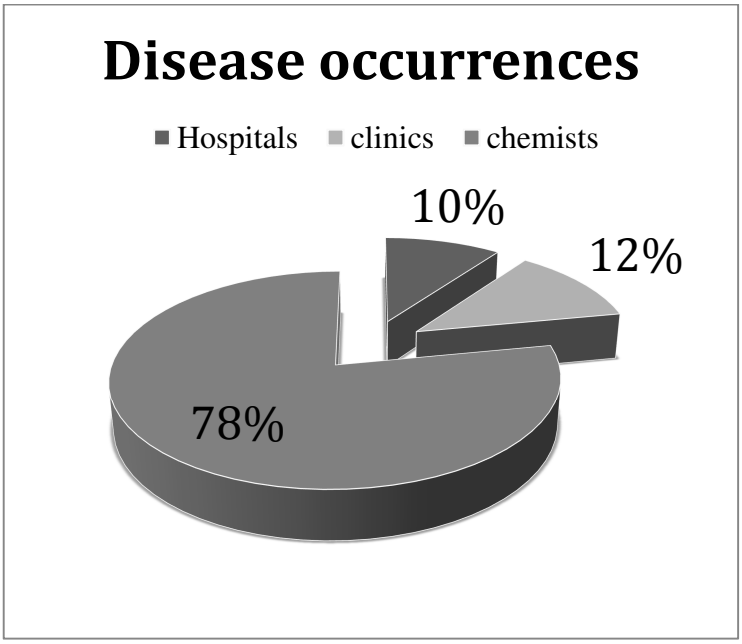

Figure 6: (Source: Field work)

DISCUSSION

This study recognized some factors that could be related to sanitation and diseases in children under 5years. Some of the factors include; drinking water care, hand-washing practices, types of toilets, solid and water waste disposal, age and educational levels of parents and income.

Results from this study show that a lot of the respondents have no formal education while not so many of them have formal education but still generally, they have some knowledge on some simple hygiene practices like encouraging their children to wash their hands even though not many of them totally understand the importance of the benefits of simple practices like that. Some studies have showed the importance of hand washing in reducing the occurrence some diseases in children.

From the interviews conducted, all the respondents mentioned that there was no health facility available in the communities so they usually visit a chemist who is a doctor at the Federal medical center (FMC) who owns a drug store whenever they have health related problem. They only make visits to the hospital when it was something serious or something the chemist couldn't handle. Quite a number of them were interested in what the research was about because they felt it would lead to some changes in their communities like the provision of a primary health care center in the area.

During the interviews, the mothers who had a child or children under the age of five were asked for the diarrhea, malaria and intestinal worm infestation occurrences in the children from the last six since the data couldn't be gotten from any other source like a health care center. The symptoms of each of the diseases were described to them so they would really understand what they were being asked for. From the responses gotten, it was seen that the diseases weren't really a high rate that could be

linked to an inadequate or poor sanitary practice or facility therefore my hypothesis null since the information gotten doesn't show a link between sanitation and the diseases in the children.

A lot of the mothers claim to perform several sanitation and hygiene practices therefore making it difficult to link the diseases to socio-economic or environmental conditions. Also there were no records that could show the real number of the disease occurrences in the children from the last six months, all that was available was from the memory of the respondents.

The results from this study does not support or go in line with some other studies that have been conducted which show links with poor sanitation and hygiene practices, lack of health care facilities and low standard of living and some diseases occurrences in children under the age of five in rural areas.

Limitations

Time was one of the limitations to the study. There was really not enough time to gather reasonable information that would have be important for the study. For example, if there was enough time more information would have been gotten from daily observations of the communities and also a daily follow up on the health of the children with the disease occurrences.

Another problem the study encountered was issue of the small sample size. The study covered only fifty respondents which were only mothers. Also there were some inconsistencies with some answers from the respondents because some of them were not really sure but just answered and some just answered some questions in a particular way to look good.

The issue of differences in language was another problem the study encountered. Majority of the respondents speak only Hausa or Fulani but even with the help of translators to explain or interpret the questions from English to them and back some things got left out due to the back and forth translations.

Lack of records from health care facilities that weren't available in the communities was a problem for the study since most of the data gotten was dependent on only what the mothers could remember with no hospital or clinic records to back it up.

CONCLUSION

Adequate water supply and proper sanitation are very important to life and the lack of these things can be quite harmful to human life and health and also the environment. The communities that were visited currently have a stable and according to them a reliable source of water supply. Even with low income, low educational levels and not very improved facilities like toilets and no available health care facility close to them they have basic knowledge on how to keep their surroundings clean in order to avoid diseases.

Finally based on the data I obtained and my results, I can conclude that my hypothesis which was that "There is a relationship between the health of a child and the level of sanitation, water quality and low income in rural areas" was not confirmed. This is mainly because the sanitation variables did not really have any relation to the diseases in the children based on my sample size and other limitations to the study.

RECOMMENDATIONS

The governments of developing countries for example Nigeria, should try to learn and understand from a lot of studies and researches that have been conducted on the impacts of poor sanitary facilities and the benefits of sanitation and they should be able to work on investing more in sanitation facilities. According the Water and Sanitation Program (WSP), a lot of Nigerians about 70 million share and make use of unsanitary latrines and 32 million Nigerians do not have and latrine and have to defecate in bushes or open areas. The government can therefore make investments in the country's sanitation facilities by providing facilities like toilets in very poor areas that lack them, good water supply in communities that lack reliable water supply and also health care centers in areas where there are none.

People should be enlightened generally on how to maintain and practice both personal and environmental hygiene. Also more awareness should be done for people generally on simple hygienic practices like hand washing, proper waste disposal and good food hygiene; their importance and benefits. The ministries of health and environment, NGOs, schools, clinics or hospitals can all take up these roles of enlightening people about the importance and benefits of sanitation.

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INTERVIEW GUIDE

INTERVIEW CONDUCTED ON THE IMPACTS OF INADEQUATE SANITATION ON CHILD HEALTH IN RURAL AREAS: CASE STUDIES OF DANDU AND WURO CHEKKE COMMUNITIES, YOLA SOUTH, ADAMAWA STATE.

BY: CHRISTIANA OKPE WITH ID NUMBER A00014884, A FINAL YEAR STUDENT IN THE AMERICAN UNIVERSITY OF NIGERIA.

A) SOCIO-ECONOMIC/ FAMILIAL STRUCTURE

i) Respondent's age

ii) Respondent's educational status [illiterate, primary level, secondary level, tertiary level]

iii) Income [ ]

iv) Number of children under 5 [ ]

v) Number of rooms for the children [ ]

vi) Infant feeding methods [breastfeeding, formula, other

B) SANITATION FACILITIES/ HYGIENE VARIABLES

i) Fruits/ greens hygiene [with water, with water and salt, other]

ii) Water supply source [wells, taps, boreholes] [public, private]

iii) Home water storage [yes, no]

iv) Existing conditions of well water [yes/ no]

v) Presence of waste water around homes[yes, no]

vi) Refuse storage systems [holes, bins, yard, other]

vii) Refuse disposal [public dumps, dumps around the homes]

viii) Waste water disposal [gutters, yard, other]

ix) Bathroom existence [yes, no] [public, private, bush]

x) Toilet existence[yes, no]

xi) Toilet type [pit latrine, water closet, bush]

xii) Hand hygiene after defecation [yes, no] [with soap, no soap]

xiii) Hand hygiene before eating [yes, no] [with soap, no soap]

xiv) Drinking water care [yes, no]

C) HEALTH CARE FACILITIES AND DISEASE VARIABLES

i) Availability of a health care facility in the community [yes, no]

ii) Signs of malnutrition in the children [yes, no]

iii) Child' s age [ ]years/months

iv) Child's gender [male, female]

v) How many diarrhoeal occurrences in the last 6 months[ ]

vi) How many malaria occurrences in the last 6 months[ ]

vii) How many intestinal worm infestation in the last 6 months [ ]

viii) How were they treated

D) SUGGESTIONS OR COMMENTS REGARDING THE INTERVIEW