PERCEPTION OF MOTHERS ON ENVIRONMENTAL RISK FACTORS FOR CHILDHOOD DISEASES IN KEBBI STATE OF NIGERIA

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ABSTRACT

Background: This study examined the perception of mothers on environmental risk factors for childhood diseases in Kebbi State of Nigeria. The study adopted the Environment-Agent-Host chain of germ theory.

Methods: The study employed the cross-sectional survey research design. The household constituted the unit of analysis. Data on demographic and socio-economic characteristics of the respondents such as mother's educational attainment, income, occupation, marital status and religion as well as data on environmental risk factors of inhabitants were obtained using structured and semi-structured questionnaires and multi-stage sampling technique was employed to select respondents. Koko-Bese and Yauri LGA were sampled for the study and five of the 15 wards were sampled using the 2006 census locality and enumeration area list. Using table of random numbers 47 women aged 15-49 years for Yauri and Koko/Besse were selected. Tabulation involving frequencies and percentage was employed to analyze the socio-economic characteristics and environmental risk factors of women. Chi square was use ascertain dependency of child's death on as mother's educational attainment, income, occupation and marital status.

Results: Findings show that incidences of childhood diseases were linked to mothers' age, education, income, social and religious affiliation in Kebbi State. The critical environmental risk factors for childhood diseases were food contamination, indoor and outdoor air pollution. **P**oor water sources, poor hygiene of water storage containers, **unreliable** methods of purification and treatment of water, and poor toilet facilities **increase the risk of transmitting childhood diseases.** Poor waste disposal, water pollution, climate change, use of pesticides, housing type/quality and community housing facilities were perceived as not conspicuous environmental risk factors to childhood diseases in Kebbi State. All null hypotheses postulated in this study were accepted meaning that mother's age, educational level, occupation, average monthly income, ethnic group, marital status are independent of the child's cause of death as seen from the samples.

Conclusion: There is need to create awareness on environmental risk factors of childhood diseases through radio programmes and through community health workers in Kebbi State. There is a strong need for improving existing quality of health/sanitation with particular reference to environment risk factors of childhood diseases by conveying such concern to the stakeholders and policy makers in Kebbi State.

Keywords: Childhood diseases, Environmental risk factors, Outdoor pollution, Indoor pollution, Kebbi

INTRODUCTION

Child mortality as a result of childhood diseases is a vital indicator of child health and well-being (UNICEF, 2016). In the year 2000, world leaders agreed on the Millennium Development Goals (MDGs). MDG 4 called for reducing the under-five mortality rate by two thirds between 2000 and 2015 through tackling of childhood diseases. Despite the substantial gains in improving child survival the 53% decline of the under-five mortality rate globally is far from the two-thirds reduction required to meet the MDG 4 target. If current trends continue, the world as a whole would reach the MDG 4 target in 2026 – more than 10 years behind schedule. The toll of under-five deaths over the past two decades is staggering: between 1990 and 2015, 236 million children worldwide died before their fifth birthday (United Nations, 2015).

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In the year 2010, the Global Strategy for Women's and Children's Health launched by the United Nations Secretary General and Every Child Movement boosted global momentum in improving newborn and child survival as well as maternal health. This drive towards reducing childhood diseases and mortality to the barest level was renewed in June 2012 by concerned world leaders during the global launch of Committing to Child Survival: A Promise Renewed, aiming for a continued post-2015 focus to end preventable child deaths as a result of preventive childhood diseases.

At the elapsing of the MDGs in 2015 and its failure to meet the MDG 4 target of reducing the under-five mortality rate by two thirds between the year 2000 and 2015 through tackling childhood diseases, the international community again agreed on a new framework considered to be the Sustainable Development Goals (SDGs). The SDG 4 is to consider Good Health and Well-Being for people (children under five years of age inclusive). The target is to put an end to preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births and under-five mortality to at least as low as 25 deaths per 1,000 live births (United Nations, 2015).

Ashley (2015) observed **that 5.9 million** children under age five died in 2015 and nearly 16, 000 every day. Eighty-three percent of deaths in children under age five are caused by infectious, neonatal or nutritional conditions. The overall child mortality declined significantly in the 1990s into the 2000s, but environmental risk factors still kill at least 3 million children under age 5 every year. Such young children make up to approximately 10% of the world's population, but comprise more than 40% of the population suffering from health problems related to the environment (UNEP, 2010). Due to their size, physiology, and behavior, children are more vulnerable than adults to environmental risk factors. Children are more heavily exposed to toxins from the environment in proportion to their body weight and have more years of life ahead of them in which they may suffer long-term effects from early exposure.

Perinatal conditions, which can be influenced by environmental conditions, cause 20 % of deaths worldwide in children under age five (UNEP, 2010). Children under age 5 breathe more air, drink more water, and eat more food per unit of body weight than adults do, so they experience higher rates of exposure to pathogens and pollutants. Typical childhood behaviors, such as crawling and putting objects in the mouth, can also lead to increased environmental risks due to exposure to pathogens and pollutants. Many children particularly in the developing countries live in environment with poor sanitary facilities, making them more likely to be infected with childhood diseases.

Numerous environmental risk factors such as air pollution, exposure **to hazardous chemicals**, unsafe drinking water, poor sanitation and hygiene, exposure to indoor allergens, including pollens, fur of pets, and heating systems instigate childhood diseases (Asher & Dagli, 2004). Prevalence of childhood diseases are also associated with living in areas of lower altitude (<1,000 m), areas with higher mean annual temperature (>15°C), and higher atmospheric humidity (Kurt *et. al.,* 2007). Geographical location and features such as rivers/streams, flood plains, forest, swamps are associated with the development of some childhood diseases (Lindgren *et. al.,* 2013; Zuraimi *et. al.,* 2008).

To an untrained person, communicable

diseases are mostly environmentally instigated diseases whose risk factors dwell in the surrounding environment. This study adopted the Environment-Agent-Host chain of germ theory. The "Environment-Agent-Host" chain of germ theory stresses that the agent (the germ) interacts with the environment and human host and gets transmitted and communicated from host to host in the form of infection. The emerging infections from environment which cause disease are mostly parasitic/bacterial/viral.Aside from the mutually beneficial coexistence of human with micro-organisms, disease-causing organisms breed in unhygienic conditions of air, water and soil created by human activities. Children of the poor are those who are weak, with low immunity and living in unhygienic conditions that makes them at greater risk towards contracting childhood diseases from the environment.

This study aimed at identifying the environmental risk factors of childhood diseases in Kebbi State of Nigeria toward reducing childhood diseases and mortality in Kebbi State. The objectives were to determine the perception of mothers on impacts of energy source for cooking/heating and childhood diseases in Kebbi State, determine the perception of mothers on sources of water, sanitation facility and childhood diseases in Kebbi State and also determine the perception of mothers on the relationship between environmental risk factors and incidences childhood diseases and mortality in the study area.

2. The Study Area
Kebbi State, located in north-western Nigeria, covers an area of 36,800 km². was created out of Sokoto State on August 27, 1991 with Birnin-Kebbi as its capital. It has 21 Local Government Areas with four emirate councils (Gwandu, Argungu, Yauri and Zuru).

The State is dominated by two geological formations; the Cambrian Basement Complex in the south and south east and young sedimentary rocks in the north. The high plains in the south and south east, the plain landscape in the north and the riverine lowland of the Niger and lower Rima valleys are the major relief in the state(**Aliyu, 2015).**

In the south and southeast of the State, Northern Guinea Savannah dominates with medium sized trees such as *Parkia Clappertoniana* (locust bean tree) and *Bytyrosfperrrium* (Shea butter tree) and *Combretum* species. The Sudan Savannah vegetation dominates the northern part of the State consisting of open woodland with scattered trees such as acacia aibi da (gawo), Parkia *Clappertoniana, Porassus* and dum palms. The natural vegetation has however been altered in many areas by intensive cultivation, grazing, fuelwood harvesting and bush burning, giving rise to a form of parkland dominated by trees like *Piliostigma, Ziziphus, Mangifera Indica* and *Tamarindus*, especially in the south. River Rima makes up the drainage system with major tributaries like Gawon, Zarnfara and Gubin Ka. These tributaries start from the Basement Complex region of Sokoto State and flow westward to join the Rima River. There are other less important rivers such as Danzaki, Soda and Kasanu, all of which flow to join the River Niger to the south of the State (Danboyi, 2006).

Tropical Continental type of climate which is largely controlled by the Tropical Maritime wind from the Atlantic and Tropical Continental blowing from the Sahara Desert dominate the state. These two winds determine the wet and dry dominant seasons. The wet season lasts from April to October in the south and May to September

in the north; while the dry season lasts for the remaining period of the year. Over the years, the mean annual rainfall is about 800mm in the north and 1000mm in the southern part of the state. Temperature is generally high with mean annual temperature of about 26^0C in all locations. However, during the harmattan season (December to February) the temperature can go down to about 21^0C and up to 40^0C during the months of April to June. Relative humidity is generally low (40%) for most of the year except during the wet season when it reaches an average of 80% (Danboyi, 2006; **Aliyu, 2015).**

The state has a total population of 3,137,989 in 2017 as projected from the 2006 census with an agricultural viable environment as it is endowed with fertile soils, vast farm lands and economically viable rivers nourished by tropical climate. Agriculture over the years, has remained the major source of revenue and the major occupation of the inhabitants of the state. The main crops produced are millet, guinea corn, maize, cassava, potatoes, rice, beans, onions and vegetables, wheat, soya beans, ginger, sugarcane, groundnuts and tobacco (**Aliyu, 2015).**

METHODOLOGY
The study employed the cross-sectional survey research design. The research determined the relationships between environmental factors and childhood diseases in Kebbi State. Two weeks reconnaissance survey was carried out to acquaint the researcher with the study area and get first-hand information, particularly the general site view of the study area and to get familiar with the tradition and culture of the people.

Data were obtained for this study from primary sources using structured and semi-structured questionnaires:

i. Data on the demographic and socio-economic characteristics of the respondents such as mother's age, marital status, religion, ethnicity, educational attainment, occupation and income; and

ii. Data on environmental risk factors such as respondents' methods of solid waste disposal, domestic water sources, water treatment methods, types of toilet facility, and types of animals domesticated, housing conditions and solid fuel use.

SAMPLING PROCEDURE AND SAMPLING SIZE SELECTION
The study population included all women aged 15-49 years in Kebbi State. Multi-stage sampling technique was employed to select respondents. The random selection was employed to give all the local government areas the chance of being selected in the first stage of sampling and Koko-Bese and Yauri LGA were sampled.

Wards were selected from each of the sampled Local Government Areas based on INEC ward and locality list. Yauri LGA has 10 wards while Koko-Besse LGA has 12 wards. In each LGA, one-fourth of the wards were randomly selected using random numbers table. The third stage of sampling involved the random selection of one fourth of the settlements in each of the selected wards using table of random numbers. In sampling of respondents, one woman/mother from each sampled households were randomly sampled.

Table 1: Sample LGAs, Wards and Respondents (Women aged 15-49).

Sampled LGAs	Sampled Localities	Sample Household	Sampled Women	Total Sampled
Koko/Besse	Samanji	9	9	9
	Basse	9	9	9
	Tungan Magaji	9	9	9
Yauri	Tungan Itau	10	10	10
	Hibirabu	10	10	10
Total	5	47	47	47

Source: Researchers Sampling, 2017.

Questionnaire design and administration
Structured and semi-structured questionnaires were designed and administered by female research assistants to the respondents who were females aged 15-49 years. The questionnaire centered on environmental factors of childhood diseases. Ethical clearance was got from Kebbi State Ministry of Health which were presented to village heads/community leaders before the administration of questionnaire.

Methods and Techniques of Data Analysis
The data were analyzed using Statistical Package for Social Science (SPSS) 23. Tabulation involving frequencies and percentages was employed to analyze the socio-economic characteristics and environmental risk factors of respondents. Chi square was use ascertain dependency of child's death on as mother's educational attainment, income, occupation and marital status.

Results
Demographic and Socio-economic Characteristics of Respondents
The data presented in Table 2 show that more than half (57.4 %) of respondents were below 35 years. Majority (76.6%) of the women were married and all (100.0%) were Muslims.

Table 2: Demographic, Socio-economic Characteristics of Respondents

Characteristic	Frequency (No=47)	Valid % (100.0)	Cumulative %
Age group (years)			
15-19	9	19.1	19.1
20-24	5	10.6	29.8
25-29	5	10.6	40.4
30-34	8	17.0	57.4
35-39	5	10.6	68.1
40-44	2	4.3	72.3
45-49	13	27.7	100.0
Marital status			
Married	36	76.6	76.6
Single	6	12.8	89.4
Divorced	4	8.5	97.9
Widowed	1	2.1	100.0

Religion

Islam	47	100.0	100.0
Christianity	0	0.00	0.00

Ethnicity

Baginbana	1	2.1	2.1
Barebari	4	8.5	10.6
Fulfulde	3	6.4	17.0
Gobarawa	4	2.1	19.1
Hausa	35	74.5	100.0

Educational attainment

No formal	32	68.1	68.1
Primary	10	21.3	89.4
Secondary	4	8.5	97.9
Tertiary	1	2.1	100.0

Occupation

1,001–10,000	34	72.3	85.1
N10,001–50,000	2	4.3	89.4
>50,000	5	10.6	100.0

Source: Researchers Fieldwork, 2017.

Regarding ethnicity, majority (74.5%) were Hausa. On education, more than two-thirds (68.1%) of the respondents had no formal education. Only 2.1% had a tertiary education. Based on occupation, more than ¾ (85.1%) were petty traders and housewives with only 10.6% in civil service. The data on monthly income show that more than ¾ (97.9%) of the respondents earn less than N10,001.00 ($ 27.8) a month.

Environmental Risk Factors as Causes of Childhood Diseases
As a prelude to understanding the environmental risk factors as perceived causes of childhood diseases, respondents were asked if there was link between environmental factors and childhood diseases. Majority(n= 40, 85.1%) of respondents believe that there are links between environmental risk factors and

childhood diseases. Only 14.9% (n=7) do not believe. Table 3 presents data on respondents' perception of environmental risk factors of childhood diseases.

It was asserted by 28.6% of the respondents that outdoor air pollution (air pollution from traffic, waste burning/ incineration and dust) are the foremost environmental risk factor to major causes of childhood diseases. Next to outdoor air pollution are food contamination and indoor pollution (burning of wood and other solid fuels, tobacco smoke, allergens in the household) are the environmental risk factor to major causes of childhood diseases as opined by 27.4% of the respondents respectively while 7.1% of the respondents were of the view that poor waste disposal were paramount environmental risk factors to the causes of childhood diseases. In another vein, very low percentage of the respondents

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considered water pollution 4.8%, climate change 2.4%, housing type/quality and community housing facilities 1.2% and use of pesticides 1.2% as environmental risk factors to the causes of childhood diseases in Kebbi State (see table 3).

Table 3: Environmental risk factors of Childhood Diseases

Respondents Opinion on Link between environmental risk factors and childhood diseases			
	Frequency	%	Cumulative %
No	7	14.9	14.9
Yes	40	85.1	100.0
Total	47	100.0	
Respondents Opinion of the Major Environmental risk factors of childhood diseases			
Climate change (Temperature and Rainfall anomalies)	2	2.4	2.4
Food contamination	23	27.4	29.8
Housing type/quality and community housing facilities	1	1.2	31.0
Indoor air pollution (burning of wood and other solid fuels, tobacco smoke, allergens in the household)	23	27.4	58.3
Outdoor air quality (air pollution from traffic, waste burning/ incineration, dust and others)	24	28.6	86.9
Use of pesticides	1	1.2	88.1
Poor waste disposal	6	7.1	95.2
Water pollution (biologic and chemical)	4	4.8	100.0
Total ticked	84	100.0	

Source: Researchers Fieldwork, 2017.

Result shows that 17.5% of the respondents were of the view that sources of information on the environmental risk factors was from community health workers, majority (80%) of the respondents obtained their information from the radio and insignificant number of the respondents (2.5%) mentioned that the television is their major sources of information (see table 4).

Most respondents (47.5%) dump their generatedsolid waste by the road side, followed by 45.7% who dump their solid waste in any available open space,5%dump their solid waste in drainage/water channels while only, 2.5%of respondents disposed of solid waste anywhere (see table 4).

With regards to disposal of waste water, most of the respondents (87.5%) dispose of their generated waste water into simple pits, 7.5% of the respondents dispose of waste water into infiltration pits while only 5% of the respondents dispose of waste water into any available open space (see table 4).

Table 4: Respondents opinion on sources of information on environmental risk factors and Method Waste Disposal

Respondents' sources of information on the environmental risk factors	Frequency	Percent	Cumulative Percent
Community health worker	7	17.5	17.5
Radio	32	80.0	97.5
Television	1	2.5	100.0
Total	40	100.0	

Methods of solid waste disposal by respondents			
Anywhere	1	2.5	2.5
By road side	19	47.5	50.0
In drainage/water channels	2	5.0	55.0
In the open field	18	45.0	100.0
Total	40	100.0	
Respondents method of waste water disposal			
Into infiltration pit	3	7.5	7.5
Into open field	2	5.0	12.5
Into simple pit	35	87.5	100.0
Total	40	100.0	

Source: Researchers Fieldwork, 2017.

Most (95%) of the respondents were aware that poor water quality could transmit childhood diseases while 5% of the respondents were not aware that poor water quality could transmit childhood diseases. It was observed that only 7.5% of the respondents were not aware of any way(s) of purifying water while a considerable majority i.e 92.5% knew of way(s) of purifying water. Boiling of water was considered by 15% of the respondents as their key method for water treatment in their homes, chlorination was practiced by 35% of the respondents and 50% used decantation as their major method of water treatment(see table 5).

With reference to sources of water supply, 3% of the respondents obtained their water from boreholes, 40% of them sourced their water from rivers while 22.5%) of the respondents obtained their water from wells. The time it took majority i.e 50.% of the respondents to fetch water from their source to their houses was less than 15 minutes, 42.5% of the respondents took between 15 to 30 minutes, 2.5% spent between 31 to 60 minutes while 5% were not certain of the time taken to get domestic water (see table 5).

Most i.e. 95% of the women stored water for domestic uses at home in jars/plastic containers with covers while only 5% of them did not respond concerning method of water storage. Cleaning of water storage containers were done once in a month as opined by 15% of the respondents, 12.5% of the respondents cleaned their containers twice in a month, 30% of the respondents washed their water containers twice in a week, 40% of the respondents washed their containers once in a week while 2.5% of the respondents weren't certain of how often water storage container were washed as it only washed when observed to be dirty. Majority i.e. 57.4% of the respondents collect drinking water from storage facility using cup with handle, 40% dipped any container into the storage facility while 2.5% of the respondents were undecided. It was observed that 95% of the respondents kept their drinking water storage facility inside their houses while only 5% of the respondents kept theirs outside (see table 5).

Table 5: Respondents opinion on domestic water quality

Respondents opinion if poor water quality could transmit childhood diseases			
	Frequency	**%**	**Cumulative %**
No	2	5.0	5.0
Yes	38	95.0	100.0
Total	40	100.0	

Respondents' opinion on purification water before usage			
No	3	7.5	7.5
Yes	37	92.5	100.0
Total	40	100.0	
Method(s) used for water treatment in the household			
Boiling	6	15.0	15.0
Chlorination	14	35.0	50.0
Decantation	20	50.0	100.0
Total	40	100.0	
Major source(s) of domestic water			
No response	1	2.5	2.5
Borehole	14	35.0	37.5
River	16	40.0	77.5
Well	9	22.5	100.0
Total	40	100.0	
Time taken to fetch water from nearest source to house			
Uncertain	2	5.0	5.0
< 15 minutes	20	50.0	55.0
15-30 minutes	17	42.5	97.5
31-60 minutes	1	2.5	100.0
Total	40	100.0	
Methods of storage of water for domestic use			
No response	2	5.0	5.0
Jar /plastic container with cover	38	95.0	100.0
Total	40	100.0	
Respondents opinion on how often water storage container are washed			
Uncertain	1	2.5	2.5
Monthly	6	15.0	17.5
Twice a month	5	12.5	30.0
Twice a week	12	30.0	60.0
Weekly	16	40.0	100.0
Total	40	100.0	
Method of drinking water collection from the storage facility			
No Response	1	2.5	2.5

Cup with handle	23	57.5	60.0
Dipping in any container	16	40.0	100.0
Total	40	100.0	
Location of where drinking water storage facility is kept			
Outside the house	2	5.0	5.0
Inside the house	38	95.0	100.0
Total	40	100.0	

Source: Researchers Fieldwork, 2017.

Most 82% of the respondents had toilet facilities while only 17.5% live without toilets facilities in their homes. Majority (77.7%) of the toilets facilities were open pits with covers, 19.1% of the toilets were open pits without covers while only 5% of the respondents were undecided. According to 10% of the respondents, they washed their toilets monthly, 7.5% washed their toilets twice a month, 50% washed their toilets twice in a week, 27.5% washed their toilets weekly while 5% of the respondents were indifferent (see table 6).

Findings show that 35% of the toilets had doors, 2.5% of the toilets had doors and soap for washing hands, and 50% of the respondents stated that their toilets have walls, 2.5% of the respondents assert that their toilets has soap for washing hands and 10% of the respondent assert that their toilets lacks doors, toilet wall and soap for washing hands (see table 6).

Table 6: Respondents opinion on toilet facilities

Availability of toilet facilities in respondents houses	Frequency	%	Cumulative %
No	7	17.5	17.5
Yes	33	82.5	100.0
Total	40	100.0	
Type of toilets in respondents houses			
Anywhere	2	5.0	5.0
open pit with cover	31	77.5	82.5
open pit without cover	7	17.5	100.0
Total	40	100.0	
Respondents opinion on how often toilet were cleaned			
Uncertain	2	5.0	5.0
Monthly	4	10.0	15.0
Twice a month	3	7.5	22.5
Twice a week	20	50.0	72.5
Weekly	11	27.5	100.0
Total	40	100.0	
Respondents opinion on conditions of their toilets			
None of the above	4	10.0	10.0
Has Latrine doors.	14	35.0	45.0
Has Latrine doors and Has soap for washing hands.	1	2.5	47.5
Has Latrine walls.	20	50.0	97.5
Has soap for washing hands.	1	2.5	100.0
Total	40	100.0	

Source: Researchers Fieldwork, 2017.

It was observed that 15% of the respondents could not recall the number of times they bathed their children in a day, 17.5% bath their children more than twice in a day, 32.5% was once in a day while 35% was twice in a day. It was observed that 22.5% of the respondent bath their children anywhere, 2.5% by the well side, 72.5% in the bathroom while only 2.6% bath their children within the compound (see table 7).

As regards the practice of hand washing, 5% of the respondents washed their hands before handling a defecated child, 55% used water and soap/ash in washing their hands before feeding their children, 15% used water and soap/ash to wash their hands before preparing food, 12.5%) of the respondents washed hands with water and soap/ash before preparing food and before feeding the children while 12.5% of the respondents were indifferent in the washing of hands with water and soap/ash before preparing food and before feeding the children (see table 7).

It was observed also that 45% of the respondents had clogged drainages around or near their houses while 50% did not. Result obtained show that 92.5% of the respondents keep pets/domestic animals near/around the house, 2.5% of the respondents did not while 5% of the respondents did not respond (see table 7).

With reference of keeping of domestic animals in and around the house, 2.5% of the respondents keep cat, goats/sheep and poultry, 2.5% keep dog, goats/sheep and poultry, 30% keep goat/sheep, 40% keep goats/sheep and poultry, 12.5% keep poultry while 12.5% do not domesticate animals (see table 7).

It was observed that 75% of the respondents visit the chemist for medical attention 5% visit the clinic, only 2.5% of the respondents visit the hospital while 17.5% rely on traditional medicine/herbs (see table 7).

With regards to death of child, 77.5% of the respondents had lost at least a child in the past. Most (32.5%) of the respondents were not aware of the cause of death, 15% sees witchcraft as the cause of child death, 12.5% of the respondents respectively assert that diarrhea as well as fever were the major cause of death of the children. Insignificant (2.5%) respondents saw malnutrition as a cause of death of their children (see table 7).

Table 7: Respondents opinions on children hygiene

Number of times a child receive bath daily	Frequency	%	Cumulative %
More than twice	7	17.5	17.5
Couldn't remember	6	15.0	32.5
Once a day	13	32.5	65.0
Twice a day	14	35.0	100.0
Total	40	100.0	
Place of child bath			
Anywhere	9	22.5	22.5
By the well side	1	2.5	25.0
In the bathroom	29	72.5	97.5
Within the compound	1	2.5	100.0
Total	40	100.0	
Respondents general hygiene			
Indifferent	5	12.5	12.5
Wash hands after child defecation before handling a child	2	5.0	17.5
Wash hands with water and soap/ash before feeding the child	22	55.0	72.5
Wash hands with water and soap/ash before preparing food	6	15.0	87.5
Wash hands with water and soap/ash before preparing food; Wash hands with water and soap/ash before feeding the child	5	12.5	100.0
Total	40	100.0	

Respondents' opinion on present of clogged drainage around or near the house.			
	Frequency	%	Cumulative %
Uncertain	2	5.0	5.0
No	20	50.0	55.0
Yes	18	45.0	100.0
Total	40	100.0	
Respondents' opinion on present pets/domestic animals near/around the house.			
No response	2	5.0	5.0
No	1	2.5	7.5
Yes	37	92.5	100.0
Total	40	100.0	
Type of domestic animals respondents keeps			
None	5	12.5	12.5
Cat, Goats/Sheep and Poultry	1	2.5	15.0
Dog, Goats/Sheep and Poultry	1	2.5	17.5
Goats/Sheep	12	30.0	47.5
Goats/Sheep and Poultry	16	40.0	87.5
Poultry	5	12.5	100.0
Total	40	100.0	
Place of medical attention when a child is sick			
Traditional medicine/herbs	7	17.5	17.5
Chemist	30	75.0	92.5
Clinic.	2	5.0	97.5
Hospital	1	2.5	100.0
Total	40	100.0	
Lost a child in your family			
No	9	22.5	22.5
Yes	31	77.5	100.0
Total	40	100.0	
The cause of death			
Diarrhea	5	12.5	12.5
Fever	5	12.5	25.0
I don't know	13	32.5	57.5
Malnutrition	1	2.5	60.0
Miscarriage	1	2.5	62.5
Not Applicable	9	22.5	85.0
Witchcraft	6	15.0	100.0
Total	40	100.0	

Source: Researchers Fieldwork, 2017.

Test of Hypothesis and Decision Rules

The Null hypotheses (H$_o$) of Chi-square of dependency among variables "Cause of child death vs Mother's age" returns a p-value is 0.668 which is greater than the 0.05(5%) level of significance, the dependency among variables "Cause of child death vs Mother's educational level" returns a p-value is 0.722 which is greater than the 0.05(5%) level of significance, the dependency among variables "Cause of child death vs Mother's occupation" returns a p-value is 0.826 which is greater than the 0.05(5%) level of significance, the dependency among variables "Cause of child death vs Mother's secondary occupation" returns a p-value is 0.378 which is greater than the 0.05(5%) level of significance, the dependency among variables "Cause of child death vs Mother's average monthly income" returns a p-value is 0.834 which is greater than the 0.05(5%) level of significance, the dependency among variables "Cause of child death vs Mother's

ethnic group" returns a p-value is 0.646 which is greater than the 0.05(5%) level of significance, and the dependency among variables "Cause of child death vs Mother's marital status" returns a p-value is 0.826 which is greater than the 0.05(5%) level of significance (see table 8).

Table 8: Chi-Square Tests Results

H₀: Mother's age is independent of the child's cause of death.			
Pearson Chi-Square	21.430a	25	.668
Likelihood Ratio	20.585	25	.715
N of Valid Cases	22		
H₀: Mother's educational level is independent of the child's cause of death.			
Pearson Chi-Square	7.040a	10	.722
Likelihood Ratio	6.169	10	.801
N of Valid Cases	22		
H₀: Mother's occupation is independent of the child's cause of death.			
Pearson Chi-Square	5.867a	10	.826
Likelihood Ratio	5.766	10	.835
N of Valid Cases	22		
H₀: Mother's secondary occupation is independent of the child's cause of death.			
Pearson Chi-Square	16.065a	15	.378
Likelihood Ratio	16.785	15	.332
N of Valid Cases	22		
H₀: Mother's average monthly income is independent of the child's cause of death.			
Pearson Chi-Square	9.761a	15	.834
Likelihood Ratio	12.175	15	.666
N of Valid Cases	22		
H₀: Mother's ethnic group is independent of the child's cause of death.			
Pearson Chi-Square	17.111a	20	.646
Likelihood Ratio	17.710	20	.607
N of Valid Cases	22		
H₀: Mother's marital status group is independent of the child's cause of death.			
Pearson Chi-Square	5.867a	10	.826
Likelihood Ratio	5.766	10	.835
N of Valid Cases	22.		

Source: researcher analysis, 2018.

DISCUSSION

This study examined the perception of women on environmental risk factors for childhood diseases in Kebbi State of Nigeria. Majority (68.1%) of the respondents had no formal education. Most (80.8%) were engaged in petty trading/businesses but with low monthly income of between N1,000 to N10,000 while majority of their spouses were more engaged in farming and trading/businesses. Parent's occupation, income and education status influences the vulnerability of children to childhood diseases through improved nutritional status, better sanitation, improved living standards, and reduction of psychological stress and susceptibility to infections (Filmer, Hammer and Pritchett, 2002).

Most of the women were Hausas and all of them were Muslims. Their social and religious affiliations might have influenced their perceptions. Of factors affecting

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childhood diseases. Abdulraheem and Parakoyi, (2009)[1] concur that incidences of childhood diseases are linked to mothers' age, income, education, religion and way of life which differ with the findings of this study that mother's age, educational level, occupation, average monthly income, ethnic group, marital status are independent of the child's cause of death.

The majority of the mothers believed that there are links between environmental risk factors and childhood diseases. This finding is in agreement with Kedir (2015) who established the relationship between environmental risk factors and the occurrence of childhood diseases in Ethiopia in general and in Soddo Town in particular.

Food contamination, indoor air pollution (burning of wood and other solid fuels, tobacco smoke, allergens in the household), and outdoor air pollution (air pollution from traffic, waste burning/incineration and dust) were considered as the major environmental risk factors to childhood diseases. Poor waste disposal, water pollution (biologic and chemical), climate change (Temperature and Rainfall anomalies), use of pesticides, housing type/quality and community housing facilities were perceived as not conspicuous environmental risk factors to childhood diseases in Kebbi State. Some previous studies also observed that outdoor and indoor air pollution were associated with a variety of health effects, including increased morbidity and mortality from acute lower respiratory infections (Smith *et. al.*, 2000), an increased incidence of exacerbated asthma (Asher and Dagli, 2004), low child weight (Dejmek *et. al.*, 2000) and congenital anomalies (WHO, 2004). The most direct source for food contamination is from mother's milk which is linked to mother's hygiene, and mother's prior exposure to contaminant sources.

Majority of the respondents reported that their solid waste was dumped by the road side and any available open space. These indiscriminate disposals of solid and waste water have significant linked to the prevalence of diarrhea and fever as an environment with such characteristics is usually a perfect breeding ground for, pathogens and parasites which are major carriers of such diseases. Godana and Mengiste, (2013) asserted that open disposal of waste around the house was an environmental risk factor for childhood diseases as diarrhea and fever.

The participants were aware that poor water quality could transmit childhood diseases and most of them knew way(s) of purifying/treating water. Chlorination and decantation were considered the most preferred methods of treatment of water for domestic consumption. Household water treatment and safe storage, such as boiling, filtering, or chlorination have been shown to be the most effective methods of eradicating pathogens in drinking water (Sobsey, 2002, WHO, 2010).

Many mothers opined that their principal sources of water were from the borehole, rivers and wells. Though the distance/time taken to source for water was not extreme with most mothers taking less than 15 minutes. In this study, access to safe, palatable, reliable and affordable water to every household which should be an essential goal of every government because of its vital role in sanitation and related health benefits were far from being achieved which is not farfetched from the findings of WHO (2010).

Water for domestic use was stored in jars/plastic containers with covers. Washing of drinking water containers were

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carried out twice weekly by 30% and weekly by 40.4% of the women. Another important observation was that 95% of mothers kept their drinking water storage facilities inside the house and collection of water from the storage facilities were mostly done using cups with handle and by dipping in any container into the drinking water storage facilities. Storing water in jars/plastic containers with covers is quite safe against pathogens but this also depends on how often drinking water containers are being washed, stored and method of collection of water for consumption from the container. The practices of using cups with handle reduces the risks of transmitting germs but dipping any container into drinking water storage facilities enhances chances of transmission of diseases which is common among the respondents. There are tendencies for drinking water to be contaminated at the storage point.

This study revealed that toilets facilities were present in most of the homes but most were open pits toilets though with covers. Only 50% of the toilets were washed twice in a week while 27.5% were washed weekly. This portrays poor sanitary conditions of the toilets studied. Only 55% of the mothers washed their hands with soap/ash before handling a defecated child but with little attention given to washing of their hands with soap/ash before preparing food and feeding the children. The findings from this study are similar to that of Bui (2006) who identified the risk factors for childhood diseases such as diarrhea and fever were observed irregular hand-washing by mothers after going to toilet, no hand-washing by mothers before feeding children, unsafe storage of food for later use, irregular kitchen cleaning, infrequent cleaning/emptying of storage container before refilling it with fresh water and irregular toilets cleaning, toilets-sharing among more than five people.

Pets/domestic animals were kept around houses in Kebbi State with the main ones being goats, sheep and poultry. Only few of the homes kept dogs and cats. Furs from pets/domestic animals constitute a serious environmental risk factor for childhood diseases as also observed by Asher & Dagli, (2004).

This study found that the radio was the major source of information on environmental risk factors of childhood diseases in Kebbi State. Though Community health workers are involved in information dissemination on environmental risk factors for childhood diseases, their effort was not perceived as being as intense as that from the radio broadcast. Studies conducted in Ado-Ekiti by Ezekiel and Peter (2014) revealed that radio is the most important instrument for information dissemination because it reaches a larger audience irrespective of their location. Ashenafi (2014) concurred that radio came second both in terms of popularity and credibility, whereas the health officer was ranked third in popularity but first in credibility. Television, print media, social network were the less patronized methods of information dissemination. Accessing information through radio is inexpensive while that of internet, satellite and cable television are expensive and require high level of education.

Illiteracy, attitude and perception towards information providers and ignorance related religion, traditional and cultural barriers were identified as the major bottlenecks of information dissemination, seeking and usage regarding environmental risk factors of childhood diseases.

Based on the results obtained, all the null hypotheses were accepted and therefore

conclude that mother's age is independent of the child's cause of death, mother's educational level is independent of the child's cause of death, mother's occupation is independent of the child' cause of death, mother's secondary occupation is independent of the child's cause of death, mother's average monthly income is independent of the child's cause of death, mother's ethnic group is independent of the child's cause of death and mother's marital status is independent of the child's cause of death as seen from the samples.

The results of this study is contrary to the findings of Ayotunde *et. al.,* (2009); which assert that under-5 death due to childhood diseases was significantly pronounced among younger mothers (less than 20 years). Rabbani and Abdul (2015) observed that mothers' education and income significantly determined child mortality in Pakistan which is at variance with the finding of this study. In another hand, Sonalde and Soumya (2008) findings depicts negative relationship between maternal education and of child death concurring with the findings of this study while differ to this is the observation of **Adetoro and Amoo (2014)** *that education and occupation of mothers were statistically significant to reduction in child mortality rate. The result also revealed that mothers' wealth index, age at first birth and usual of place of residence have substantial impact on child mortality in Nigeria.*

In relation to the adopted theory of this study (Environment-Agent-Host) which stresses that the agent (the germ) interacts with the environment and human host and gets transmitted and communicated from host to host in the form of infection. Based on the pronounced environmental risk factors of childhood diseases in Kebbiranging from outdoor and indoor pollution, poor **water quality, poor**

personal hygiene, poor environmental sanitation it is obvious that infections from environment which transmits childhood diseases that are mostly parasitic/bacterial/viral will comfortable breed in such an environment and circumstances. Obviously, the habitation of poor people in an unhygienic conditions and their children who are weak, with low immunity due to poor nutritional intake conditions makes them at greater risk towards contracting childhood diseases from the environment.

6.0 Conclusions

This study provides a valuable understanding of environmental risk factors for childhood diseases in Kebbi State of Nigeria. The main environmental risk factors for childhood diseases were food contamination, indoor air pollution, and outdoor air pollution. P**oor water sources, poor hygiene of water storage containers, unreliable** method of purification and treatment of water, and poor toilet facilities **increase the risk of transmitting childhood diseases.** Poor waste disposal, water pollution, climate change, use of pesticides, housing type/quality and community housing facilities were perceived as not conspicuous environmental risk factors for childhood diseases in Kebbi State.

To reduce the environmental risk factors for childhood diseases, there is need for a radical drive towards creating awareness through radio programmes, and educating mothers through community health workers. It is important to improve the existing quality of health/sanitation with particular reference to environmental risk factors for childhood diseases by conveying such concerns to all stakeholders and policy makers in Kebbi State.

REFERENCES

1. Abdulraheem, I.S and Parakoyi, D.B (2009)Factors affecting mothers' healthcare-seeking behaviour for childhood illnesses in a rural Nigerian setting. *Early Child Development and Care*. Vol. 179 (5).

2. **Adetoro G. W and Amoo E. O. (2014). A Statistical Analysis of Child Mortality: Evidence From Nigeria**. *Journal of Demography and Social Statistics,Maiden* Edition (2014), 110-120.

3. **Aliyu Z. A. (2015) Effects Of Urbanization On Landuse/Landcover Changes In Birnin Kebbi, Kebbi State, Nigeria. An Unpublished** M.Sc, **Thesis Submitted to the School of Post Graduate Studies, Ahmadu Bello University, Zaria/Department of Geography, A.B.U Zaria, Nigeria**

4. **Ashenafi B. T. (**2014) **Seeking Health Information In Rural Context: Exploring Sources of Maternal Health Information in Rural Ethiopia.** Thesis submitted in partial fulfilment of the requirements for the degree Master of Philosophy in Health Promotion University of Bergen, **Faculty of Psychology** Department of Health Promotion and Development.

5. Asher, I. and Dagli E. (2004) Environmental influences on asthma and allergy. *Journal of Chemistry Immunology Allergy.* Vol. 84 (36) Pp. 101-107.

6. Ashley S., (2015) World Health Organization Integrated Management of Childhood Illness (IMCI) 14 October 2015

7. Ayotunde T, Obiyan M., Agunbiade O. M and Fasina F. F. (2009) Maternal Age At Birth and Under-5 Mortality in Nigeria. *East African Journal of Public Health*. 6 (1).11-14.

8. **Bui Viet Hung** (2006) **The most common causes of and risk factors for diarrhea among children less than five years of age admitted to Dong Anh Hospital, Hanoi, Northern Vietnam Student: Bui Viet HungA thesis submitted to University of Oslo as a partial fulfilment for the degreeMaster of Philosophy in International Community Health.**

9. Danboyi, A.J. (2006) Reclamation of Derelict ponds of Birnin Kebbi. An Unpublished M.Sc Dissertation Department of Geography F.U.T. Minna, Nigeria.

10. Dejmek J, Solansky I, Beneš I, Leníček J, Šrám R.J. (2000) The impact of polycyclic aromatic hydrocarbons and fine particles on pregnancy outcome. Environ Health Prospective. Vol. 2 (108) Pp1159–1164.

11. Ezekiel B. T. Peter O. O. (2014) An Assessment of the Use of Radio and other Means of Information Dissemination by the Residents of Ado-Ekiti, Ekiti-State, Nigeria. *Library Philosophy and Practice (e-journal)*. Libraries at University of Nebraska-Lincoln.

12. Filmer D, Hammer JS, Pritchett LH. "Weak Link in Chains: A Diagnosis of Health Policy in Poor Countries". World Bank Research Observer. 2002; (15) Pp.199–224.

13. Godana W, and Mengiste B, (2013) Environmental Factors Associated With Acute Diarrhea among

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Children Under Five Years of Age in Derashe District, Southern Ethiopia. *Science Journal of public Health,* Vol. 1, (3), Pp51-57

14. **Kedir A. A. (2015) The Prevalence of Diarrheal Disease in under Five Children and associated Risk Factors in Wolitta Soddo Town, Southern, Ethiopia. *ABC Research Alert*. Vol 3, (2) Pp.1-7.** Published Online: 30 November, 2015http://abcreal.weebly.com/

15. Lindgren, A., Stroh, E., Björk, J. and Jakobsson, K. (2013) 'Asthma incidence in children growing up close to traffic: a registry-based birth cohort', *Environmental Health. Vol.*12(1), Pp. 91-7.

16. National Population commission (2010) Census 2006 Priority Tables (LGA), by Sex and age, VOL IV. Available at www.population.gov.org

17. Rabbani S. and Abdul Q. (2015) *Comparative Analysis of Factor Affecting Child Mortality in Pakistan.* Institute of Development Economics (PIDE) Pakistan. Online at https://mpra.ub.uni-muenchen.de/66533/MPRA Paper No. 66533, posted 11. September 2015 05:07 UTC

18. Smith A.H., Lingas E.O., and M. Rahman (2000). Contamination of drinking water by arsenic in Bangladesh: a public health emergency. *Bulletin of the World Health Organization*. Vol. 78(9).

19. Sobsey M.D. 2002. Managing water in the home: accelerated health gains from improved water supply. WHO, Geneva, Switzerland.

20. Sonalde D. and Soumya A. (2008). Maternal education and child health: is there a strong causal relationship? Demography, 35 (1), 71-81.

21. UNICEF (2016) Committing to child survival: A promise renewed. Progress report 2016. Available at: <www.apromiserenewed.org.

22. United Nations (2015) Levels and Trends in Child Mortality Report 2015. Estimate Development by UN Inter-agency Group for child mortality Estimation.

23. United Nations Environment Programme (UNEP), **World Health Organization (WHO)** (2010) Healthy Environment for Healthy Children: Key messages for action. **United Nations Environment Programme and World Health Organization 2010.**

24. **World Health Organization (WHO) (2004) Burden of disease attributable to selected environmental factors and injuries among Europe's children and adolescents** *Environmental Burden of Disease Series, No. 8*World Health Organization Regional Office for Europe European Centre for Environment and Health, Rome Protection of the Human Environment, Geneva 2004

25. **World Health Organization (2009) Global Health Risks: Mortality and burden of disease attributable to selected major risks.** WHO Library Cataloguing-in-Publication Data

26. **World Health Organization (WHO)** (2010). Healthy Environments for Healthy Children. (http://www.who.int/ceh/publications/hehc_booklet_en.pdf)

27. Yamane, T. (1967). *Statistics, an Introductory Analysis*, 2nd Ed., New York: Harper and Row.

28. Zuraimi, M. S., Tan C. O., Kwok W. T., Fook T. C., (2008) Determinants of indoor allergens in tropical child care centers. Journal of Pediatric Allergy and Immunology Vol. 19 (8) pP 746-755.

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