Home Based Health Hazards and Associated Health Problems Among Rural Dwellers In Yakurr Local Government Area Of Cross River State, Nigeria

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Abstract: *A safe, settled home is the cornerstone on which individuals and families build a better quality of life, access the services they need and gain greater independence and yet the home can also be the source of wide range of hazards. This study assessed the home based health hazards and associated health problems among rural dwellers in Yakurr Local Government Area of Cross River State, Nigeria. Five objectives and three hypotheses were posed to guide the study. The study adopted a cross sectional descriptive survey design.Asample of 422 participants were drawn from the target population of 66969 men and women from the ages of 20 – 70 years using Lesile Kish's 27 formula.The instruments for data collection were a questionnaire that served as an interview schedule and observational check list constructed by the researcher. Reliability of the instrument using a test re-test method gave a co-efficient value of 0.78. Data were analysed using descriptive statistics of frequency, percentage, mean, standard deviation and chi-square test of association was the inferential statistic used to test the hypotheses at 5% level of significance. The findings show that the most common home based hazards were: physical/structural hazards (lack of fire extinguisher 3.27±0.90), biological hazards (drinking unboiled water from the stream 3.31±1.09), chemical hazards (generator kept inside the house after use 3.43±0.87) and behavioural hazards (3-4 persons staying in a room 2.98±1.05). There was an overall moderate level of hazards: physical/structural hazards (74.3%), biological hazards (67.6%), chemical hazards (65.5%) and behavioural hazards (23.7%). Health problems also had significant association with each health hazards: physical/structural hazards (p=.003), biological hazards (p<.001), chemical hazards (p=.003), behavioural hazards (p<.001). However, the highest observed hazards were the physical/structural hazards (74.3%) and chemical hazards (65.5%) with high associated health problems; increase in the level of the hazards consistently increased the proportion of people highly associated with health problems. It is, therefore, recommended that while healthcare workers, especially Nurses and environmental officers, channel more effort and resource to establishing workable health education programs, the Government should empower therural dwellers with jobs which would improve their living conditions.*
Keywords: *Home based, Health hazards, Rural area*

I.   Introduction

Home is one of the traditional areas of concern for public health. It is the environment in which most people spend the majority of their time (Marsh, 2011). The home is important for psychological reasons as well as protection against risk and associated health problems (WHO, 2013). The quality of the home has substantial impact on health; a warm, dry and secure home is associated with better health (Krieger &Higgin, 2011).

A healthy home needs to have sound structure, provide adequate facilities for sleeping, personal hygiene, the hygienic preparation and storage of food. The home is expected to be an environment for comfortable relaxation for privacy, and to provide the facility for social exchange with friends, family and others. Most importantly it has to be free from hazards (Langley, May et al, 2011).

A hazard is a situation that poses a level of threat to life, health, property or environment. Hazards can be dormant or potential, with only a theoretical risk of harm; however, once a hazard becomes "active" it can

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create an emergency. A hazardous situation that has come to pass is called an incident. Hazards and possibility interact together to create risk (Saegart, Klitzman et al, 2011).

Home hazards are those conditions or agents at home that pose risk to safety at home or cause actual harm or expose people to health problems (WHO, 2010). Home based health hazards include dust, allergens, mold and pests such as insects and rodents. They also include toxic materials such as lead, asbestos and chemical pesticide and poisonous gases such as carbon monoxide, radon which is found in outdoor air and in indoor air of building of all kinds via cracks and other holes in the building foundation. These hazards can be grouped into physical/structural, chemical, biological and behavioural hazards. Since some of these hazards are odorless and colorless, they cannot be detected by human sense, monitory devices, check list, observation etc.(Centers for Disease and Prevention, 2013).

There is a general consensus that the achievement of holistic health should transcend mere biomedical considerations and accommodate other factors such as housing (Usen& Joseph, 2013).With this in mind researchers, have turned their attention to housing impacts where they seek to understand the link between housing and health (Usen and Joseph, 2013). Study by Habib, Mayfond et al, (2009) has linked inadequate provision of water, electricity, sewage and waste facilities, drainage and ventilation in the home to increased incidence of chronic diseases. In the same vein, humidity, crowding, poor ventilation and insect/pest's infestation have been associated with failing respiratory health. Usen and Joseph, (2013), found that the presence of mold and pest proved to increase the risk of asthma and bronchitis. In another study by Danzig, Short and Collin (2010), overcrowding and poor neighborhood environment were found to be critical to the health of occupiers of households. Furthermore, indoor air pollution, arising from cooking stove, mold and fungi growth, mosquito repellant, burning, tobacco smoking and insecticide spray in the home showed significant effects on the respiratory symptoms (cough, wheezing, pneumonia, bronchitis and asthmas) among rural dwellers. Typhoid and tuberculosis experiences showed that basic sanitation, ventilation, reduced household crowding and other improvements in living conditions made a powerful contribution to conquering hazards in homes.

The connection between health and home has many factors that influence individual safety in homes, including structural and safety aspects of the home (that is, how the home is designed, constructed, and maintained; its physical characteristics; and the presence or absence of safety devices); quality of indoor air; water quality; chemicals; resident behaviour; and the house's immediate surroundings. The link between these housingfeatures and illness and injury is clear and compelling. Homes' structural and safety features can increase risk for injuries, elevate blood lead levels, and exacerbate other conditions. Poor indoor air quality contributes to cancers, cardiovascular disease, asthma, and other illnesses. Poor water quality can lead to gastrointestinal illness and a range of other conditions, including neurological effects and cancer. Some chemicals in and around the home can contribute to acute poisonings and other toxic effects (National Center for Healthy Housing, 2010). Inadequate ventilation is also associated with a higher risk of airborne infectious disease transmission, including tuberculosis, as well as the indoor pollutants and dampness, which are factors in the development of allergies and asthma. Poor housing quality and design also can exacerbate the health impacts from exposure to temperature extremes, which are occurring more frequently due to climate change (WHO, 2010). Home based health hazards can result in a multitude of health effects, including poisonings, fire and fall-related injuries, and lung diseases such as cancer and asthma (Matte & Jacobs 2010). Residents of homes with significant upkeep problems and structural and safety defects, such as lack of specific safety devices, deferred maintenance, moisture, and pest infestation, are also at increased risk for housing-related illness, injury, and disability (The Healthy Home Initiative, 2009). All these issues are influenced both by the physical environment of the home and by the behaviour of the people living in the home.

Although, a greater number of the population is potentially at risk of home hazards, some populations are disproportionately affected by home based health hazard and its related housing issues. For people with disabilities, certain design elements and construction characteristics of homes, such as stairs or narrow doorways, can limit an entire range of housing options and adversely affect ease of access to and within the house. A home's design features can either exclude or enhance the ability of a person with disabilities to participate in the community. Appropriate housing design and construction, on the other hand, can allow the elderly to remain at home and function independently rather than move to an assisted living facility or nursing home, (Jacobs, Ritz, Brown et al, 2010).

Each year in the United States about 13.5 million nonfatal injuries occur in and around the home, 2900 people die in house fires, and 2 million people make emergency room visits for asthma. One million young children in the United States have blood lead levels high enough to adversely affect their intelligence, behaviour, and development. Two million Americans occupy homes with severe physical problems, and an additional 4.8 million live in homes with moderate problems (American Industrial Hygiene Association, 2012).

In Akwalbom State, Nigeria about 92.3% of the total population were reported to suffer from respiratory symptom as a result of poor house conditions, 84.8% of the same population suffer from pneumonia incidence as a result of building condition and environmental quality (Usen& Joseph, 2013).

Knowledge of potential hazards in the home is important in the assessment, prevention and treatment of the medical conditions they can cause and equally, important in keeping individuals and families healthy. Hence the aim of this study is to ascertain the home based health hazards and associated health problems among rural dwellers in Yakurr Local Government Area of Cross River State.

Significance of the Study

The finding from this study will provide information on the common home based health hazards and associated health problems among the rural dwellers.

It will provide the nurses more specially the community health nurses with the knowledge and understanding of the identified home based health hazards and associated health problems suffered by the families and the community at large, when this research work is published and made accessible to all. With this knowledge, they will educate and counsel rural dwellers on home based health hazards at homes and the possible ways of reducing the risk or eliminating its health consequences.

It will serve as a guide to policy makers when published and made accessible to them, to make effective legislation on ways to reduce or eliminate harmful practices and actions that pose risk to individuals at home and the community such as, restriction of living in an uncompleted building, cracked house structures with inadequate ventilation. These will create a better understanding of the scientific link between home based hazards and associated health problems.

This study when made available to the public will enable the housing and environmental health professional to effectively monitor and carryout lay down guideline made by the policy makers on how housing structure will be regulated and the supervision of environment for effective drainage and sanitation, ensure proper refuse disposal, environmental sanitation, proper ventilation and house spacing to promote healthy lives among rural dwellers or eliminate home based hazards and associated health problems.

When all the above are implemented they will reduce home hazards and reduce associated health risks and increased healthy population and reduce the cost of hospitalization among rural dwellers, hence improving quality of life/care.

The findings of this study will also be of relevance to future researchers who are interested in working in this field.

Aim of the Study

The purpose of this study is to assess the home-based health hazards and associated health problems among rural dwellers of Yakurr Local Government Area of Cross River State, Nigeria.

Research Questions

1.   What are the physical/structural homes based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
2.   What are the biological homes based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
3.   What are the chemical home based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
4.   What are the behavioural home base health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
5.   What are the health problems associated with home hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

Hypotheses

1.   There is no significant association between demographic characteristic and identified health problems among rural dwellers of Yakurr LGA, CRS, Nigeria.
2.   There is no significant differences between the categories of home based health hazards and identified health problems among rural dwellers in Yakurr LGA, CRS, Nigeria.
3.   There is no significant difference in the findings on home based hazards between respondents' responses to the questionnaire and researcher's observation among rural dwellers in Yakurr LGA, CRS, Nigeria.

II. Materials

Research Design

Cross sectional descriptive survey design was used for the study. This is a non-experimental scientific method that involves the study of a relationship or association between two or more variables, it is very relevant to this study because, it is the design that identifies the interrelationship among variable of interest without any active intervention by the researcher on manipulating the independent variables (Akpabio, 2011). The design will be appropriate in this study to determine the status of the phenomenon as it exists at the time of study which is home based health hazards and associated health problems among rural dwellers. This design was successfully used by Qiu, Wacharasin et al, (2012), to carry out a study on characteristics and predictors of home injury hazards among toddlers in Wenzhou China. Therefore, it is deemed appropriate for the study

Area of Study

The study was carried out in Yakurr Local Government Area of Cross River State; Yakurr LGA was created out of Obubra LGA in 1987. Yakurr LGA is one of the Local Government Areas that make up central senatorial district of Cross River State and is made up of two constituencies namely; Yakurr 1 and 2 constituencies. It has thirteen council wards divided politically across the two constituencies namely; Iyima, Idomi, Abanapai, Assiga, Ajere, Ntan, Ikpakapit, Mkpani/Agoi, Ijom-ugep, Nkponno/Ukpawen, Ijiman, Epenpi, Bikobikoi wards. Yakurr LGA is made up of about one hundred and ninety six thousand, two hundred and seventy one people (196,271], (National population Commission of Nigeria, 2006). It lies between latitude 50 401 and 60 101 North of the equator and longitudes 80 21 and 60 101 East of the Greenwich meridian and 120km (75miles) Northwest of Calabar, Yakurr constitutes the largest ethnic group in the state. it shares its northern and eastern boundaries with Obubra Local Government Area, the southern boundary with Biase Local Government Area and the western boundary with Abi Local Government Area. The researcher wishes to use this Local Government Area because Yakurr constitute the largest ethnic group in Cross River State were majority of residents are farmer, civil servants and public servant; their cultural belief is Kakurr. Yakurr is made up of males and females, young and old with primaries/secondary and tertiary schools within its environ.

Population of Study

The population of Yakurr is one hundred and ninety six thousand two hundred and seventy one (196, 271) according to National Population of 2006. The target population of study were males and females from the age of 20 – 70 years which was 66969. This number was obtained from the town council register of males and females residing in this council wards. This represents 42% of the total population.

Sample

A sample of 422 men and women from Yakurr Local Government Area, Cross River State was used for the study. The sample size was calculated using the Leslie Kish's 27, (1965) formula for single proportions which

stated: sample size = n/1+(n/population), where $n = \dfrac{z^2 pq}{d^2}$.

n = minimum sample size;
z = standard normal deviate of 1.96 when the critical limit is set at 95% confidence interval;
p = 50%, prevalence of home based hazards; According to Ejemot-Nwadiaro, (2009) if p and q are not known or not available from previous studies, 50% should be used for both 'P' and 'q' as these are the values which will give the largest sample size");
d= degree of accuracy desired or maximum allowable margin of error set at 5% (0.05);
q = 1- p (1-0.50) = 0.50
From the calculations using this formula the Sample size = 382
10% attrition rate = 38 (See Appendix 3 for calculations)
Sample size +10% attrition rate = 420

Inclusion Criteria

Males and females for the study will be those who are:
* Resident in the council wards of study
* Aged 20 – 70 years
* Physically and emotionally stable enough to participate in the study
* Present at the time of the study
* Willing to participate in the study

Sampling Procedure

A multi-stage sampling technique was used in the study. Stage 1: Yakuur has two (2) constituencies and thirteen (13) council wards. The thirteen council wards are divided politically into the two constituencies; Yakurr 1 and 2. Yakurr one has eight (8) council wards, while Yakurr two has five (5) council wards, using simple random sampling technique method (Balloting with replacement) four (4) council wards were selected from Yakurr one constituency namely: Idomi, Bikobikoi, Ijiman and Ajere, and two council wards were equally selected from Yakurr two constituencies namely: Assiga and Iyima. Therefore six (6) council wards were randomly selected for the study.

Stage 2: Since each council ward has a known population size, the sample size was proportionately allocated to males and females in each council ward using the proportionate sampling technique (Amogu, 2001) with the formula:

$$ns = \frac{NS \times n}{N}$$

Where,

ns	=	Sample size of the council ward
NS	=	Population size of the council ward
N	=	Total population for the study
n	=	Sample size for the study (Amogu, 2001).

Therefore, from Yakurr one constituency, the first council ward is Idomi with a population size of 8870 of both males and females from the ages of 20 – 70 years, the sample size was 56. From the second council ward Ajere with a population size of 11149 of both males and females from the ages of 20 – 70 years, the sample size was70, etc. (see Table 1 for more details).

Stage 3: To reach each respondent, household systematic sampling technique was used, putting into consideration the inclusion criteria. In each council ward, systematic sampling technique was used to locate the houses. The sampling interval width was every 15th house determined by dividing the population of men and women (N) by the sample size (n). Using the simple random sampling, the first household which was the 9th household was selected and used as the starting point. One person in each household that met the inclusion criteria and is aged 20 – 70 years was selected based on their willingness to participate.

Table 1: Showing the number of males and females in each village and their sample size.

S/N	WARDS	MALE	FEMALE	TOTAL	S/SIZE FOR MALE	S/SIZE FOR FEMALE	TOTAL S/SIZE	%
		POPULATIONOFADULT (20-70)						
1	Idomi	4400	4470	8870	25	31	56	13.3
2	Ajere	5418	5731	11149	32	38	70	16.6
3	Bikobikoi	6210	6360	12570	36	43	79	18.7
4	Ijiman	5238	6478	11716	34	40	74	17.5
5	Assiga	6219	5821	12040	42	34	76	18.0
6	Iyima	4861	5763	10624	32	35	67	15.9
	Total	32346	34623	66969	201	221	422	100

Instrument for Date Collection

The instrument for data collection was a questionnaire that served as an interviewschedule and observational check list constructed by the researcher. Questions and observations were generated from literature relating to home based health hazards and associated health problems among rural dwellers based on the five objectives of the study. The questionnaire has four sections (A-D).

Section A comprises of questions on socio-demographic information (questions 1-9), with mainly close ended questions. Section B comprises questions on home based health hazards: questions10-19 addressed physical/structural home hazards; questions 20-27 addressed chemical home based health hazards; questions 28-36 addressed biological home based health hazards while questions 37-42 addressed behavioral home based health hazards. The questions in section B are formulated on a four point rating scale of Always [4] often [3] sometime [2], and Never [0]. The higher the total score, the more rural dwellers affirm the presence of home based health hazards in their homes. Section C comprises of questions on identification of health problems associated with home based health hazards among rural dwellers and this is tapped by questions43–53. This section has "Yes or No" answers in which respondents have to choose from as it applies to them.

Section D is the observational check list that has forty (40) items divided into four categories according to variable of study (physical/structural, biological, chemical and behavioural home hazards) with three (3)

options: Yes, No and Remarks. The remark option is for items in the instrument that are not either visible or accessible by the researcher and are not in line with the Yes and No options.

Validity Instrument

In establishing the validity of the instruments for data collection, the designed research instrument was face and content validated by the researcher's supervisor and two other experts in Community Health NursinNursing both from the Department of Nursing Sciences, University of Nigeria Enugu Campus by evaluating the relevance of the content and clarity of statement. The necessary suggestions from the validators were effected by the researcher in the final refinement of the instrument.

Reliability of the Instrument

Two reliability tests were done for the instruments;

First a pre-test of the respondent questionnaire instrument was conducted in order to get the reliability of the instrument using 10% of the sample size which is 42. Forty-two (42) copies of the questionnaire were used to obtained data from men and women in Mkpani/Agoi council ward, which is not the area of study, who met the inclusion criteria. In testing the reliability of the instrument, the test-retest method of reliability was used. Forty (40) respondents were interview using questionnaire, comprising 20 males and 20 females. After an interval of two (2) weeks, the same process was repeated on the same respondents in the same council ward. The results obtained from the separate instrument administration were correlated using Pearson's Product Moment Correlation (r) Coefficient. The result obtained was 0.78. This result (0.78) indicates that reliability of the test instrument is very strong.

Secondly, for the reliability of the observational checklist, the data were collected through observation at the same time (test-retest) that data for the reliability of the questionnaire were collected with the aid of a research assistant who did the observation. The collected data were subjected to a reliability test using Kuder Richardson20 method of reliability estimate. This method was employed because the items were dichotomously scored (Yes or No). That is, 1 for "Yes" and 0 for "No". The reliability coefficient for each sub-scale ranges from .89 to 0.92 which the researcher considers highly reliable for the study. Statistically, an instrument with a reliable coefficient of .75 and above is considered reliable for data collections in a study. Thus, the current instrument is reliable.

Ethical Consideration

To obtain ethical clearance, a copy of the proposal consisting of the chapters one to three and the instrument for data collection was submitted to Health Research Ethics Committees of Ministry of Health, Cross River State. Attached to it was an identification letter from the Head of Department of Nursing, University of Nigeria, Enugu Campus. After due considerations the ethical approval was granted. Administrative permission to carry out the study in the villages was obtained from the various clan heads Ova/Obal and chiefs of the six council wards for the study after presenting an introductory letter from the Head, Department of Nursing Science University of Nigeria, Enugu Campus. The purpose of the study was explained to the respondents and an informed oral consent was obtained. Voluntary participation, confidentiality, anonymity of respondents and right to decline/withdraw were maintained throughout the study.

Procedure for Date Collection

Data collection was done with the aid of five (5) instructed research assistants who helped in the interview, observation, collection, selection of respondents and the interpretation of the questions, after explaining the procedure to them and obtaining their consent. The researcher and the research assistants went to each council wards to interview the respondents and observed the respondents environment

It is a household method of data collection. To reach each respondent, household systematic sampling technique was used, putting into consideration the inclusion criteria. In each council ward, systematic sampling technique was used to locate the houses. The sampling interval width was every 15th house determined by dividing the population of men and women (N) by the sample size (n). Using the simple random sampling, the first household which was the 9th household was selected and used as the starting point. One person in each household that met the inclusion criteria and is aged 20 – 70 years was selected based on their willingness to participate.

The researcher and a research assistant or two research assistants visited each household, while one carried out the interview with the questionnaire, the other did the observation of the home based hazards using the observational checklist. This was done with a lot of discretion. The English version of the questionnaire was used for the interview for respondents that spoke English well while the vernacular version was used for those who did not understand English. Collection was done late in the evenings when respondents have come back home from their different businesses of the day and must have rested and eaten. This enabled the research and

the assistants to collected the data calmly and peacefully. The interview/collection of data in the six council wards lasted for Three (3) months.

Method of Data Analysis

The collected data were analysed using both descriptive and inferential statistics and the results were presented in tables. The descriptive statistics- frequency, percentage, mean and standard deviation were used to summarise the items of the questionnaire. Specifically, the mean and standard deviation were used for the Likert scale items. Conclusions made on these items were thus: item with mean of 2.5 and above was considered to be a home-based health hazard among the rural dwellers. An overall summary of each health hazard and health problems were computed by scoring (for health hazards: never = 1, sometime = 2, often = 3 and always = 4; for health problems: yes = 1 and no = 2) and summating the extent of occurrence and classifying the summated scores into levels: physical hazards (low: score 13-25, moderate: 26-38 and high: 39-52), chemical hazards (low: 9-17, moderate: 18-26 and high: 27-36), biological hazards (low: 8-15, moderate: 16-23 and high: 24-32), behavioural hazards (low: 6-11, moderate: 12-17 and high: 18-24) and health problems (low: 0-5 and high: 6-11).

The Chi-Square Test of Association was the inferential statistics used. It was used to test the hypotheses. Conclusions of these were made at 5% level of significance: thus significant association at $p < .05$; and otherwise, it does not exist. The data used for the inferential statistics were the demographics variables and the overall summaries.

These statistics were done with the aid of Statistical Package for Social Science (SPSS) version 23 and Microsoft Excel 2007.

III. Presentation Of Results

The chapter deals specifically with the presentation of results; interpretation and summary of findings in line with the research questions and hypotheses. The return rate of the administered questionnaire was 100.0%

Table 2: Demographic Characteristics of the Rural Dwellers   n = 417

	Frequency	Percent	Range	M±SD
Age (in years)			20-79	39.99±15.49
20-29	143	34.3		
30-39	83	19.9		
40-49	74	17.7		
50-59	46	11.0		
60+	71	17.0		
Sex				
Male	203	48.7		
Female	214	51.3		
Religion				
Christianity	390	93.5		
Islam	4	1.0		
Traditional religion	20	4.8		
Others	3	0.7		
Marital status				
Single	113	27.1		
Married	223	53.5		
Separated/Divorced	54	12.9		
Widowed	27	6.5		
No. of children			0-10	3±2
None	100	24.0		
1-2	129	30.9		
3-4	80	19.2		
5+	108	25.9		
Educational status				
No formal education	71	17.0		
Primary education	54	12.9		
Secondary education	153	36.7		
Technical education	41	9.8		
Tertiary education	98	23.5		
Occupation				
Civil servant	60	14.4		
Private employee	17	4.1		

Self-employed	236	56.6
Unemployed	54	12.9
Student	39	9.4
Full housewife	4	1.0
Others	7	1.7
Type of house		
Flat	162	38.8
Single room	130	31.2
One room self-apartment	95	22.8
Uncompleted building	24	5.8
Bungalow	6	1.4
No. of people sharing room with respondent in the house		
None	85	20.4
1	53	12.7
2	116	27.8
3	73	17.5
4	34	8.2
5	37	8.9
6+	19	4.6

Table 2 presents the demographic characteristics of the rural dwellers that participated in the study. Their age ranged from 20-79 years with mean and standard deviation of 39.99±15.49 and modal age group of 20-29 years (34.3%). The females (51.3%) were slightly more than the males (48.7%). In religion, the participants were predominantly Christians (93.5%) while in marital status, it was the married (53.5%) followed by the singles (27.1%). The participants had number of children that ranged from 0-10 with mean and standard deviation of 3±2 and distributed thus: none (24.0%), 1-2 (30.9%), 3-4 (19.2%) and 5 and above (25.9%). The educational status of these was majorly secondary (36.7%) and tertiary education (23.5%) while their occupation was mostly self-employed (56.6%).

For their housing condition, most of the dwellers either lived in a flat (38.8%), single room (31.2%) or one room self-apartment (22.8%). For the number of people sharing a room with the respondent, majority had 2 persons (27.8%) followed by none (20.4%), 3 (17.5%) and 1 person (12.7%) respectively.

Research question 1: What are the physical/structural home-based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
The items in the questionnaire in this table are ordered based on the results of the analysis of data which were placed in a descending order. Following this order, there items correspond to the questions 20, 13, 19, 22, 10, 16, 14, 15, 11, 21, 12, 18 and 17 in the questionnaire.

Table 3: Physical/Structural Home-Based Health Hazards of the Rural Dwellers n = 417

How often do you have or do the following occur in your house in the past (1) one year?	Always (4) F(%)	Often (3) F(%)	Sometime (2) F(%)	Never (1) F(%)	M±SD
Lack of fire extinguisher	321 (77.0)	40 (9.6)	25 (6.0)	31 (7.4)	3.56±0.90*
Sharp object like knife, broken bottles/glasses pins, needles, razor blade, etc.	207 (49.6)	128 (30.7)	69 (16.5)	13 (3.1)	3.27±0.85*
Visible crack in walls at home.	214 (51.3)	99 (23.7)	57 (13.7)	47 (11.3)	3.15±1.04*
Poor ventilating system	188 (45.1)	103 (24.7)	86 (20.6)	40 (9.6)	3.05±1.02*
Slippery surfaces in the house/compound	166 (39.8)	137 (32.9)	65 (15.6)	49 (11.8)	3.01±1.01*
Too many things packed in: rooms, kitchen, corridors, etc.	175 (42.0)	117 (28.1)	75 (18.0)	50 (12.0)	3.00±1.04*
Noisy environment	156 (37.4)	136 (32.6)	71 (17.0)	54 (12.9)	2.94±1.03*
Not well lit/lightened rooms even during the day	167 (40.0)	66 (15.8)	118 (28.3)	66 (15.8)	2.80±1.13*

Storage of fuel and kerosene	81 (19.4)	40 (9.6)	147 (35.3)	149 (35.7)	2.13±1.10
Unsafe carpet (uneven, torn, curled up)	59 (14.1)	43 (10.3)	122 (29.3)	193 (46.3)	1.92±1.06
Exposure of electric wires/ appliances	32 (7.7)	30 (7.2)	141 (33.8)	214 (51.3)	1.71±0.90
Steeply Stair-case.	53 (12.7)	29 (7.0)	69 (16.5)	266 (63.8)	1.69±1.06
Stair-case without rails.	72 (17.3)	18 (4.3)	33 (7.9)	294 (70.5)	1.68±1.16
Grand mean					2.61±1.22

Item with Mean (M) > 2.5 is accepted by the respondents to be a physical/structural home-based hazard within the household

Table 3 presents the physical/structural home-based health hazards among the rural dwellers. The most prominent health hazard was that of lack of fire extinguisher (3.56±0.90). Other prominent hazards were use/availability of sharp objects like knife, broken bottles, etc. (3.27±0.85), visible crack in the walls (3.15±1.04), poor ventilating system (3.05±1.02), slippery surfaces in the house/compound (3.05±1.02) and too many things packed in rooms, kitchen, etc. (3.00±1.04). Noisy environment (2.94±1.03) and 'not well lit/lightened rooms even during the day' (2.80±1.13) were also among the physical health hazards among the rural dwellers, however, Unsafe carpet (1.92±1.06), Exposure of electric wires/appliance (1.71±0.90) and Stair-case without rails (1.68±1.16) were not among the physical/structural home based health hazards.

Table 4: Summary on Physical/Structural Home-Based Health Hazards   n = 417

Classification of hazard level	Frequency	Percent
Low	34	8.2
Moderate	310	74.3
High	73	17.5

Overall classification: Low = score 13-25; Moderate = score 26-38; High = score 39-52

Table 4 present the summary on physical/structural home based health hazard level, hence, the above average physical/structural hazards among rural dwellers was(2.61±1.22)   with majority of them associated with moderate hazard level (74.3%), only 17.5% were associated with high hazard level.

Research question 2: **What are the biological home-based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?**
The items in the questionnaire in this table are ordered based on the results of the analysis of data which were placed in a descending order. Following this order, there items correspond to the questions 37, 36, 35, 32, 33, 38, 34 and 39 in the questionnaire.

Table 5: Biological Home-Based Health Hazards of the Rural Dwellers   n = 417

How often do you have or do the following occur in your house in the past (1) one year?	Always (4) F(%)	Often (3) F(%)	Sometime (2) F(%)	Never (1) F(%)	M±SD
Drink unboiled water from the stream and river	275 (65.9)	50 (12.0)	37 (8.9)	55 (13.2)	3.31±1.09*
Insects such as scorpion, mosquito, bees, spider etc. seen at home	219 (52.5)	101 (24.2)	71 (17.0)	26 (6.2)	3.23±0.95*
Your hands not washed after defecating or using the toilet	217 (52.0)	82 (19.7)	65 (15.6)	53 (12.7)	3.11±1.08*
Cockroaches and rodents around the house especially in the kitchen	156 (37.4)	175 (42.0)	32 (7.7)	54 (12.9)	3.04±0.98*
Snakes seen around your home environment	0 (0.0)	198 (47.5)	152 (36.5)	67 (16.1)	2.31±0.73
Mold/fungi growing on food stuffs/food	78 (18.7)	55 (13.2)	100 (24.0)	184 (44.1)	2.06±1.15
Rat faces/urine seen in your food stuffs	47	40	105	225	1.78±1.02

	(11.3)	(9.6)	(25.2)	(54.0)	
Eat sour/overnight food that has gone bad with unpleasant odour	28 (6.7)	35 (8.4)	47 (11.3)	307 (73.6)	1.48±0.91
Grand mean					2.54±1.20

Item with Mean (M) > 2.5 is accepted by the respondents to be a biological home-based hazard within the household

Table 5 presents the biological home-based health hazards among the rural dwellers. The most prominent hazard was that of drinking unboiled water from the stream and river (3.31±1.09). Other prominent health hazards were that of insects such as scorpion, mosquito, etc. seen at home (3.23±0.95), not washing of hands after defecating or using the toilet (3.11±1.08) and rodents and cockroaches seen around the house especially in the kitchen (3.04±0.98).

Table 6: Summary on Biological Home-Based Health Hazards   n = 417

Classification of hazard level	Frequency	Percent
Low	59	14.1
Moderate	282	67.6
High	76	18.2

Overall classification: Low = score 8-15; Moderate = score 16-23; High = score 24-32

Table 6 present the levels of biological home based health hazards among rural dwellers which was slightly above average (2.54±1.20) with majority being associated with moderate hazard level (67.6%), only 18.2% were associated with high hazard level.

Research question 3: What are the chemical home based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

The items in the questionnaire in this table are ordered based on the results of the analysis of data which were placed in a descending order. Following this order, there items correspond to the questions 29, 23, - , 27, 26, 30, 31, 25 and 24 in the questionnaire.

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Table 7: Chemical Home-Based Health Hazards of the Rural Dwellers   n = 417

How often do you have or do the following occur in your house in the past (1) one year?	Always (4) F(%)	Often (3) F(%)	Sometime (2) F(%)	Never (1) F(%)	M±SD
Generator kept inside the house after use	267 (64.0)	80 (19.2)	51 (12.2)	19 (4.6)	3.43±0.87*
Smoky environment/kitchen through cooking with firewood and stove	186 (44.6)	131 (31.4)	60 (14.4)	40 (9.6)	3.11±0.98*
Odour/smell from surrounding gutter	196 (47.0)	108 (25.9)	48 (11.5)	65 (15.6)	3.04±1.10*
Keep drugs or medicine at the reach of every family members (both young and old)	136 (32.6)	89 (21.3)	178 (42.7)	14 (3.4)	2.83±0.93*
Use insecticide or pesticides spray at home	140 (33.6)	88 (21.1)	166 (39.8)	23 (5.5)	2.83±0.96*
Use air freshener's and cleaning agents like (Izal, bleach, homemade liquid soap etc) at home	180 (43.2)	78 (18.7)	67 (16.1)	92 (22.1)	2.83±1.20*
Use of candles in your house	66 (15.8)	211 (50.6)	101 (24.2)	39 (9.4)	2.73±0.84*
Drink harvested water from asbestos roof or thatched roofs, early dusty water	86 (20.6)	33 (7.9)	96 (23.0)	202 (48.4)	2.01±1.18
House odour/smell from paint	11 (2.6)	81 (19.4)	139 (33.3)	186 (44.6)	1.80±0.84
Grand mean					2.73±1.11

Item with Mean (M) > 2.5 is accepted by the respondents to be a chemical home-based hazard within the household

Table 7 presents the chemical home-based health hazards among the rural dwellers. 'Generator kept inside the house after use' (3.43±0.87) was the most prevalent health hazard. Smoky environment/kitchen

through cooking with firewood and stove (3.11±0.98) and odour/smell from surrounding gutter (3.04±1.10) were also highly prevalent. Other health hazards amongst them included: keeping drugs or medicine at the reach of every family members- both young and old (2.83±0.93), use of insecticide or pesticides spray at home (2.83±0.96), use of air freshener and cleaning agents like Izal, bleach, etc. at home (2.83±1.20) and use of candles in the house (2.73±0.84).

Table 8: Summary on Chemical Home-Based Health Hazards   n = 417

Classification of hazard level	Frequency	Percent
Low	11	2.6
Moderate	273	65.5
High	133	31.9

Overall classification: Low = score 9-17; Moderate = score 18-26; High = score 27-36

Table 8 present the level of chemical home based health hazard among rural dwellers, there was an above average chemical health hazards among the rural dwellers (2.73±1.11) with majority of them associated with moderate (65.5%) and high (31.9%) hazard level respectively.

Research question 4: What are the behavioural home base health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?
The items in the questionnaire in this table are ordered based on the results of the analysis of data which were placed in a descending order. Following this order, there items correspond to the questions 44, 43, 41, 42, 40 and 45 in the questionnaire.

Table 9: Behavioural Home-Based Health Hazards of the Rural Dwellers   n = 417

How often do you have or do the following occur in your house in the past (1) one year?	Always (4) F(%)	Often (3) F(%)	Sometime (2) F(%)	Never (1) F(%)	M±SD
3 to 4 persons stays in a room	178 (42.7)	104 (24.9)	85 (20.4)	50 (12.0)	2.98±1.05*
Stressed up by daily activities/events	123 (29.5)	164 (39.3)	91 (21.8)	39 (9.4)	2.89±0.94*
Refuse/sewage disposed around the home environment	128 (30.7)	109 (26.1)	82 (19.7)	98 (23.5)	2.64±1.15*
Leave electrical appliances on at home, especially when light are taken and when going out for work	71 (17.0)	75 (18.0)	147 (35.3)	124 (29.7)	2.22±1.05
Members of the family and others smoke around in your household environment	23 (5.5)	90 (21.6)	139 (33.3)	165 (39.6)	1.93±0.91
Cigarette product present in the house	75 (18.0)	40 (9.6)	79 (18.9)	223 (53.5)	1.92±1.16
Grand mean					2.43±1.13

Item with Mean (M) > 2.5 is accepted by the respondents to be a behavioural home-based hazard within the household

Table 9 presents the home-based health hazards among the rural dwellers. The most prevalent behavioural health hazard was that of 3-4 persons staying in a room (2.98±1.05) followed by being stressed up by daily activities/events (2.89±0.94) and refuse/sewage disposal around the home environment (2.64±1.15).

Table 10: Summary on Behavioural Home-Based Health Hazards   n = 417

Classification of hazard level	Frequency	Percent
Low	78	18.7
Moderate	240	57.6
High	99	23.7

Overall classification: Low = score 6-11; Moderate = score 12-17; High = score 18-24

Table 10 show that the behavioural home based health hazard level of rural dweller was slightly below average among the rural dwellers (2.43±1.13) of which 57.6% had moderate hazard level, 23.7% had high hazard level while 18.7% had low hazard level.

Research question 5: **What are the health problems associated with home hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?**

Table11: Health Problems Associated with the Hazards among the Rural Dwellers   n= 417

Health problems	Frequency	Percent
Running nose/cough/common cold/sneezing	348	83.5
Injury to the skin (wound)	340	81.5
Headache	317	76.0
Insects sting/bite	310	74.3
Emergency visit to a hospital for any home accident, sudden illness, asthma, pneumonia, severe diarrhea, food poisoning	287	68.8
Abdominal pain/discomfort	279	66.9
Difficulty in breathing	267	64.0
Watery stool (more than 3 times a day)	215	51.6
Sprain, dislocation, fracture from falls	205	49.2
Inability to sleep (sleeplessness)	157	37.6
Inability to hear well	52	12.5
Overall Classification of Health Problems		
High	296	71.0
Low	121	29.0

Overall Classification: Low = 0-5 health problems; High = 6-11 health problems

Table 11 presents the health problems associated with home-based hazards among the rural dwellers. The health problems with highest prevalence were running nose/cough/common cold/sneezing (83.5%) and injury to the skin (81.5%). This was followed by headache (76.0%) and insect sting/bite (74.3%) respectively. Emergency visit to a hospital for home accident, sudden illness, asthma, pneumonia, etc. (68.8%), abdominal pain/discomfort (66.9%) and difficulty in breathing (64.0%) were also highly prevalent among the dwellers. Prevalence of watery stool of more than 3 times a day (51.6%) and sprain, dislocation, fracture from falls, etc. (49.2%) was middling; that of sleeplessness (37.6%) was quite below average while that of inability to hear well was least (12.5%). In general, majority of the rural dwellers were associated with high health problems (71.0%).

Table 12: Researcher's Observation on Physical/Structural Hazards

	Yes (%)	No (%)	Remark
Physical/structural hazards			
Lack of railing or unstable rails	238(57.1)	179(42.9)	Common
Unsafe steps (too steep/cracked)	326(78.2)	91(21.8)	Very common
Uneven/cracked pavement	401(96.2)	16(3.8)	Very common
Uneven or slippery flooring	398(95.4)	19(4.6)	Very common
Cluster environment/house	405(97.1)	12(2.9)	Very common
Dark or poor lighting	-	-	Not observed
Presence of electric cords across the floor	-	-	Not observed
Not enough space to move around	-	-	Not observed
Presence of unstable furniture	401(96.2)	16(3.8)	Very common
Using stool or chair to reach things	403(96.6)	14(3.4)	Very common
Unsafe carpet (uneven, torn, curled up)	-	-	Not seen
Height of bed (too low/high) if possible	-	-	Not observed
Not well lit/lightened environment	-	-	Not observed
Poor ventilating system	405(97.1)	12(2.9)	Very common
Lack of fire extinguisher	406(97.4)	11(2.6)	Very common
Slippery surfaces in the house/compound	405(97.1)	12(2.9)	Very common
Visible cracks in walls at home	402(96.4)	15(3.6)	Very common
Presence of sharp objects at home	406(97.4)	11(2.6)	Very common
Noisy environment	280(67.1)	137(32.9)	Common

Overall classification: < 30 (not very common), 30-49 (not common), 50-69 (common), 70 and above (very common)

Table 12 presents the researcher's observation on physical/structural hazards. Physical hazards that were very common included: lack of fire extinguisher (97.4%), presence of sharp objects at home (97.4%), cluster environment (97.1%), poor ventilating system (97.1%), slippery surfaces in the house/compound (97.1%), use of stool or chair to reach things (96.6%), visible cracks in the walls (96.4%), uneven/cracked pavement (96.2%), presence of unstable furniture (96.2%), uneven or slippery flooring (95.4%) and unsafe steps (78.2%).

Table13: Researcher's Observation on Chemical, Biological and Behavioural Hazards

	Yes (%)	No (%)	Remark
Chemical hazards			
Pesticide spraying at home (if possible)	-	-	Not possible
Air freshener used at home (if possible)	-	-	Not possible
The use of candle at home	-	-	Not seen
Cooked on firewood/stove in the house	409(98.1)	8(1.9)	Very common
Paint odour smells at home	402(96.4)	15(3.6)	Very common
Gutter odour from environment	401(96.2)	16(3.8)	Very common
Presence of asbestos roof	278(66.7)	139(33.3)	Common
Presence of generator/use of generator	413(99.0)	4(1.0)	Very common
Location of generator (where it's placed/kept when in use and after use)	-	-	Not seen
Biological hazards			
Insects such as mosquito, bees, cockroaches, spider etc seen at home	401(96.2)	16(3.8)	Very common
Mould growing on the wall	401(96.2)	16(3.8)	Very common
Damp environment/surrounding	401(96.2)	16(3.8)	Very common
Presence of human faces around the environment	401(96.2)	16(3.8)	Very common
Behavioural hazards			
Cigarette product present at home/environment	367(88.0)	50(12.0)	Very common
Noisy environment	264(63.3)	153(36.7)	Common
Keep drugs or medicine at the reach of every family members (both old and young)	-	-	Not possible
Leave electrical appliances on at home	-	-	Not seen
Refuse/sewage disposed around the home environment	405(97.1)	12(2.9)	Very common
How many people live in the house	-	-	Not possible
Number of rooms	-	-	Not possible
Leaking roof	-	-	Not possible

Overall classification: < 30 (not very common), 30-49 (not common), 50-69 (common), 70 and above (very common)

Table 13 presents the researcher's observation on chemical, biological and behavioural hazards. The very common ones were; for chemical hazard: presence/use of generator (99.0%), cooked on firewood/stove in the house (98.1%), paint odour smells at home (96.4%) and gutter odour from environment (96.2%); for biological hazards: insects seen at home (96.2%), mould growing on the wall (96.2%), damp environment (96.2%) and presence of human faces around the environment (96.2%); and for behavioural hazards: refuse/sewage disposed around the home environment (97.1%) and cigarette product present at home/environment (88.0%).

Hypothesis 1: There is no significant association between demographic characteristics and identified health problems among rural dwellers of Yakurr LGA, CRS, Nigeria.

Table 14: Association between Demographic Characteristics and Health Problem of the Dwellers

	Health Problem		Total	Chi-Square	Df	p-value
	High (n = 296)	Low (n = 121)				
Age (in years)				30.888	4	< .001
20-29	92(64.3)	51(35.7)	143			
30-39	79(95.2)	4(4.8)	83			
40-49	52(70.3)	22(29.7)	74			
50-59	29(63.0)	17(37.0)	46			
60+	44(62.0)	27(38.0)	71			
Sex				7.760	1	.005
Male	157(77.3)	46(22.7)	203			
Female	139(65.0)	75(35.0)	214			
Marital Status				11.695	3	.009
Single	89(78.8)	24(21.2)	113			
Married	143(64.1)	80(35.9)	223			
Separated/Divorced	41(75.9)	13(24.1)	54			

Widowed	23(85.2)	4(14.8)	27			
No. of children				11.132	3	.011
None	61(61.0)	39(39.0)	100			
1-2	104(80.6)	25(19.4)	129			
3-4	54(67.5)	26(32.5)	80			
5+	77(71.3)	31(28.7)	108			
Educational status				24.961	4	< .001
No formal	52(73.2)	19(26.8)	71			
Primary	35(64.8)	19(35.2)	54			
Secondary	113(73.9)	40(26.1)	153			
Technical	40(97.6)	1(2.4)	41			
Tertiary	56(57.1)	42(42.9)	98			
Occupation				18.185	5	.003
Civil servant	36(60.0)	24(40.0)	60			
Private employee	10(58.8)	7(41.2)	17			
Self-employed	170(72.0)	66(28.0)	236			
Unemployed	40(74.1)	14(25.9)	54			
Student	33(84.6)	6(15.4)	39			
Full housewife	0(0.0)	4(100.0)	4			
**Others (clergy, contractor)	7(100.0)	0(0.0)	7			
House type				11.808	4	.019
Single room	94(72.3)	36(27.7)	130			
One room self-apartment	75(78.9)	20(21.1)	95			
Flat	113(69.8)	49(30.2)	162			
Bungalow	3(50.0)	3(50.0)	6			
Uncompleted building	11(45.8)	13(54.2)	24			
No. in a room with respondent				26.594	6	< .001
None	55(64.7)	30(35.3)	85			
1	31(58.5)	22(41.5)	53			
2	78(67.2)	38(32.8)	116			
3	64(87.7)	9(12.3)	73			
4	32(94.1)	2(5.9)	34			
5	23(62.2)	14(37.8)	37			
6+	13(68.4)	6(31.6)	19			

Table 14 presents the result on the association between demographic characteristics and health problems of the rural dwellers. There was a significant association between each demographic characteristic and health problem: age (p < .001), sex (p = .005), marital status (p = .009), number of children (p = .011), educational status (p < .001), occupation (p = .003), house type (p = .019) and number of people that share a room with the respondent (p < .001).

Specifically, for age, health problems were mostly associated to those aged 30-39 years than other age groups: 40-49 years (70.3%), 20-29 years (64.3%), 50-59 years (63.0%) and 60 years and above (62.0%). For sex, males (77.3%) were associated with health problems than females (65.0%).

For marital status, the health problems linked least to the married (64.1%) and most to the widowed (85.2%) with the singles (78.8%) and the separated/divorced (75.9%) middling. Those with no children were least associated with the health problems (61.0%); those with 1-2 children were most associated (80.6%) followed by 5 children and above (71.3%) and those with 3 -4 children (67.5%).

For educational status, the health problems were mostly linked to those with technical education (97.6%) while those with tertiary education were linked least (57.1%); other statuses were at intermediate: no formal education (73.2%), primary education (64.8%) and secondary education (73.9%). For occupation, the students had highest cases of health problems (84.6%), followed by the unemployed (74.1%), self-employed (72.0%), civil servants (60.0%) and private employees (58.8%) respectively; full housewives had none and hence were least (0.0%).

For the house type, those living in one room self-apartment (78.9%) were associated with highest health problems followed by those living in single room (72.3%) and flat (69.8%); those living in uncompleted building (45.8%) and bungalow (50.0%) respectively were least associated. The health problems were mostly associated with respondents sharing room with 4 people (94.1%) and 3 people (87.7%) respectively; others were thus distributed: 6 people or more (68.4%), 2 people (67.2%), no person (64.7%), 5 people (62.2%) and 1 person (58.5%).

Hypothesis 2: There is no significant relationship between the categories of home-based health hazard and identified health problems among rural dwellers in Yakurr LGA, CRS, Nigeria.

Table 15: Relationship between Categories of Home-Based Health Hazard and Health Problem of the Rural Dwellers

Health Hazards	Health Problem		Total	Chi-Square	Df	p-value
	High (n = 296)	Low (n = 121)				
Physical Health Hazard				11.738	2	.003
Low	17(50.0)	17(50.0)	34			
Moderate	219(70.6)	91(29.4)	310			
High	60(82.2)	13(17.8)	73			
Biological Health Hazard				17.546	2	< .001
Low	31(52.5)	28(47.5)	59			
Moderate	200(70.9)	82(29.1)	282			
High	65(85.5)	11(14.5)	76			
Chemical Health Hazard				11.315	2	.003
Low	4(36.4)	7(63.6)	11			
Moderate	187(68.5)	86(31.5)	273			
High	105(78.9)	28(21.1)	133			
Behavioural Health Hazard				22.783	2	< .001
Low	40(51.3)	38(48.7)	78			
Moderate	173(72.1)	67(27.9)	240			
High	83(83.8)	16(16.2)	99			

Table 15 presents the results on the relationship between home-based health hazards and health problems among the rural dwellers. Health problem had significant relationship with each health hazard: physical hazard (p = .003), biological hazard (p < .001), chemical hazard (p = .003) and behavioural hazard (p < .001). Specifically, for each hazard, increase in the level of the hazard consistently increased the proportion of people highly associated with health problem: physical hazard- low (50.0%), moderate (70.6%) and high (82.2%); biological hazard- low (52.5%), moderate (70.9%) and high (85.5%); chemical hazard- low (36.4%), moderate (68.5%) and high (78.9%) and behavioural hazard- low (51.3%), moderate (72.1%) and high (83.8%). Furthermore, physical/structural home based health hazard (p=.003) such as Lack of fire extinguisher (3.56±0.90), sharp object like; knife, broken bottles/glass, pins, needles, razor blade (3.27±0.85), visible crack in walls at home(3.15±1.04) and chemical home based health hazards (p =.003) such as generator kept inside the home after use (3.43±0.87), smoky environment/kitchen through cooking with firewood and stove (3.11±0.98), odour/smell from surrounding gutter (3.04±1.10) created more health problems than biological and behavioural home based health hazard.

Hypothesis3: There is no significant difference in the findings on home based hazards between respondent's responses to the questionnaire and researcher observation among rural dwellers in Yakurr LGA, CRS, Nigeria

Table 16: Comparison of result between Respondents Questionnaire and Researcher Observational Checklist Items

	Questionnaire Response	Checklist Observation		Total	McNemar (p-value)
		Yes	No		
Physical/Structural Hazards					
Lack of fire extinguisher	Yes	376(90.2)	10(2.4)	386(92.6)	.002
	No	30(7.2)	1(0.2)	31(7.4)	
	Total	406(97.4)	11(2.6)	417(100.0)	
Presence of sharp object like knife, broken bottles, glasses, pins, etc	Yes	393(94.2)	11(2.6)	404(96.9)	.839
	No	13(3.1)	0(0.0)	13(3.1)	
	Total	406(97.4)	11(2.6)	417(100.0)	
Visible crack in walls at home	Yes	357(85.6)	13(3.1)	370(88.7)	< .001
	No	45(10.8)	2(0.5)	47(11.3)	
	Total	402(96.4)	15(3.6)	417(100.0)	
Poor ventilating system	Yes	367(88.0)	10(2.4)	377(90.4)	< .001
	No	38(9.1)	2(0.5)	40(9.6)	
	Total	405(97.1)	12(2.9)	417(100.0)	
Slippery surfaces in the house/compound	Yes	356(85.4)	12(2.9)	368(88.2)	< .001
	No	49(11.8)	0(0.0)	49(11.8)	
	Total	405(97.1)	12(2.9)	417(100.0)	

Noisy environment	Yes	248(59.5)	115(27.6)	363(87.1)	< .001
	No	32(7.7)	22(5.3)	54(12.9)	
	Total	280(67.1)	137(32.9)	417(100.0)	
Steeply staircase	Yes	117(28.1)	34(8.2)	151(36.2)	< .001
	No	209(50.1)	57(13.7)	266(63.8)	
	Total	326(78.2)	91(21.8)	417(100.0)	
Staircase without rails	Yes	73(17.5)	50(12.0)	123(29.5)	< .001
	No	165(39.6)	129(30.9)	294(70.5)	
	Total	238(57.1)	179(42.9)	417(100.0)	
Biological Hazards					
Insects such as mosquito, bees, etc. Seen at home	Yes	378(90.6)	13(3.1)	391(93.8)	.132
	No	23(5.5)	3(0.7)	26(6.2)	
	Total	401(96.2)	16(3.8)	417(100.0)	
Chemical Hazards					
Cooked on firewood/stove in the house	Yes	370(88.7)	7(1.7)	377(90.4)	< .001
	No	39(9.4)	1(0.2)	40(9.6)	
	Total	409(98.1)	8(1.9)	417(100.0)	
Odour/smell from surrounding gutter	Yes	337(80.8)	15(3.6)	352(84.4)	< .001
	No	64(15.3)	1(0.2)	65(15.6)	
	Total	401(96.2)	16(3.8)	417(100.0)	
Water from asbestos roof	Yes	142(34.1)	73(17.5)	215(51.6)	< .001
	No	136(32.6)	66(15.8)	202(48.4)	
	Total	278(66.7)	139(33.3)	417(100.0)	
House odour/smell from paint	Yes	221(53.0)	10(2.4)	231(55.4)	< .001
	No	181(43.4)	5(1.2)	186(44.6)	
	Total	402(96.4)	15(3.6)	417(100.0)	
Behavioural Hazards					
Refuse/sewage disposed around the home environment	Yes	309(74.1)	10(2.4)	319(76.5)	< .001
	No	96(23.0)	2(0.5)	98(23.5)	
	Total	405(97.1)	12(2.9)	417(100.0)	
Cigarette product present in the house	Yes	169(40.5)	25(6.0)	194(46.5)	< .001
	No	198(47.5)	25(6.0)	223(53.5)	
	Total	367(88.0)	50(12.0)	417(100.0)	

Statistics Used: McNemar Test

Table 16 presents a comparison between the questionnaire response of the rural dwellers and the observation checklist, using McNemar test to measure compares the information provides by the respondents and the observations done by the researcher. The comparison revealed a significant difference for all the compared items except for presence of sharp objects like knife, broken bottles/glasses, etc (p = .839) and insects such as mosquito, bees, cockroaches, etc. seen at home (p = .132). For the items that were significant, the observation checklist significantly reported more hazards than the questionnaire response except for noisy environment which was otherwise; that is, less was in the observation checklist than the questionnaire response.

IV. Summary of Findings
1.   The physical/structural home-based health hazards among the rural dwellers were mainly lack of fire extinguisher, use/availability of sharp objects, visible crack in the walls, poor ventilating system, slippery surfaces in the house/compound and too many things packed in rooms, kitchen, etc.
2.   Drinking unboiled water from the stream and river, insects at home, not washing of hands after defecating or using the toilet and rodents and cockroaches around house were the biological health hazards among the rural dwellers.
3.   Generator kept inside the house after use, smoky environment/kitchen through cooking with firewood and stove and odour/smell from surrounding gutter were the main chemical health hazard among the dwellers.
4.   3-4 persons staying in a room, being stressed up by daily activities/events and refuse/sewage disposal around the home environment were the behavioural health hazards among the rural dwellers.

5.   There was an above average physical (2.61±1.22), biological (2.54±1.20) and chemical (2.73±1.11) health hazards among the rural dwellers with majority of them associated with moderate hazard level: physical (74.3%), biological (67.6%) and chemical (65.5%); high hazard level was thus distributed: chemical (31.9%), biological (18.2%) and physical (17.5%).
6.   The behavioural health hazard was slightly below average among the rural dwellers (2.43±1.13) of which 57.6% had moderate hazard level, 23.7% had high hazard level while 18.7% had low hazard level.

7.   Majority of the rural dwellers were associated with high health problems (71.0%). The commonest health problems were running nose/cough/common cold/sneezing, injury to the skin, headache and insect sting/bite respectively.

8.   There was a significant association between each demographic characteristic and health problems: age (p < .001), sex (p = .005), marital status (p = .009), number of children (p = .011), educational status (p < .001), occupation (p = .003), house type (p = .019) and number of people that share a room with the respondent (p < .001).

9.   For age, health problems were mostly associated to those aged 30-39 years than other age groups while for sex; it was associated more to males than females. For marital status, health problems were least among the married and among the widowed. Those no children were least associated with the health problems while those with 1-2 children were most associated.

10.   For educational status, health problems were mostly associated to those with technical education while those with tertiary education were least associated. For occupation, the students had highest cases of health problems, followed by the unemployed and self-employed respectively while full housewives had least (no) cases.

11.   For the house type, health problems were associated most to those living in one room self-apartment followed by those living in single room and flat respectively; those living in uncompleted building and bungalow were least associated. The health problems were also mostly associated with respondents sharing room with 4 and 3 people respectively and least associated with sharing the room with 1 person.

12.   Health problems had significant association with each health hazard: physical hazard (p = .003), biological hazard (p < .001), chemical hazard (p = .003) and behavioural hazard (p < .001), however, the most associated health problems are: Physical/structural hazards (p=.003) and chemical hazards (p=.003). Specifically, for each hazard, increase in the level of the hazard consistently increased the proportion of people highly associated with health problems.

V. Discussions

Research Question 1: What are the physical/structural home-based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

General evaluation shows that physical/structural home-based health hazards were above average (2.61±1.22)among the rural dwellers in Yakurr LGA, CRS, with majority (74.3%)found to be associated with moderate hazard level. The physical/structural home-based health hazards were mostly: lack of fire extinguisher, use/availability of sharp objects like knife, broken bottles, etc.

All of the reported physical/structural home based health hazards by respondents were also seen with the aid of observational checklist. However, the observational checklist indicated higher degree/level of hazards than what was reported by respondents except for noisy environment. This actually emphasises the presence and extent of these physical/structural home-based health hazards and this may have possible serious health implications if nothing is done about it as soon as possible. The reasons for these physical/structural home based health hazards in rural setting could be inadequate knowledge on what constitutes this hazards and the appropriate safety measures to avoid them. Though 70% of the respondents are educated (secondary school and above), as shown in Table 2, most of them were self-employed and probably did not have access to adequate information and resources considering the rural setting where they live and probably work. However, some of the hazards maybe related to the type of house most of the respondents live in. Majority (59.8%) live in single room, one room apartment and uncompleted building. The type of house again may determine the economic status of the rural dwellers as some may not afford fire extinguisher though some respondents may also be ignorant of its importance in the home. The slippery surfaces could be due to the presence of more than two to three kids sharing the same room with others while the cracked pavement and unsafe steps could be as a result of lack of fund to renovate the house since majority of the respondents are self-employed.

The result is similar to the study by Carrillo (2011) that examined the physical/structural hazards among rural dwellers. The results revealed that majority of the respondents were experiencing moderate level of home based hazards. Another similar result is from a study by U.S Department of Housing and Urban Development (2011) assessing the home based hazards among the elderly in South Texas Colonias; it was revealed that most of the respondents experienced moderate level of home based hazards. The reason for result being similar to that of the current study might be because both studies were carried out in rural setting where there may be inadequate information on home based hazards. There are some misconceptions about home based hazards especially in the rural setting, for instance some respondents believe that home based hazards do not exist and have no idea about what home based health hazards are.

The result of this study is however slightly contrary to a report by Armour, Wollery et al, (2007) which revealed that rural dwellers in Mangalore city experienced high level of home based health hazards. Specifically Armour, Wollery et al, (2007) reported that older participants experienced higher level of home based hazards

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than their younger counterparts while this study revealed higher rate among the young then the elderly.

Research Question 2: What are the biological home-based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

The results of the study from both research questionnaire and observation checklist showed that biological home-based health hazards among the rural dwellers in Yakurr LGA were above average (2.54±1.20) with majority (67.6%) found to be associated with moderate hazard level. The biological home based health hazards were; drinking unboiled water from the stream/river, which could be as a result of ignorance about the health hazards associated with drinking untreated/unboiled water from the streams/river and unavailability of portable water from a safe source. This explanation is in line with the report by Centre for Disease Control and Prevention (2016) that inadequate information, socio-economic status and unavailability of portable drinking water within the rural communities of rural dwellers increases the risk of biological hazards.

Presence of rodents/insects such as scorpion, mosquito, bees, spiderin the homes of respondents revealed in this study could be as a result of poor housekeeping and the type and condition of houses the respondents live in, which are conductive habitant for the rodent/insect. As seen in Table 2 most of the respondents live in single rooms and uncompleted buildings which had cracked walls and are packed with too many things. The cracked walls of the houses they live could provide a path way for entry and exit of insects and rodents while the rooms or kitchens that are packed with too many things may make a conductive living environment for insects and rodents as they hide, reproduce and survive in the packed materials.

Not washing of hands after defecating or using the toilet/presence of human feces around the environment, maybe as a result of poor personal hygiene and ignorant about health problems associated with it among the rural dwellers, which may be consequent to lack of information. This finding correlates with the study by Cohn, Arbes et al (2010) which revealed that 63% of respondents in rural setting have biological home hazards such as bees, spiders, rodent/insect, cockroaches, mosquitoes and scorpions as a result of the living condition of respondents' houses, poor personal hygiene and inadequate fund etc. Further findings revealed mould growing on the wall, damp environment/surrounding which could be as a result of lack of proper draining system within the home environment, topography of the environment and inadequate fund to afford a proper drainage system within the home environment since majority of the respondents are self-employed.

The above finding agrees with Jacob, Ritz et al (2010) and Usen and Jacobs (2013) in a study conducted in Uyo, Nigeria which showed that respondents within the rural setting suffer moderate level of biological home hazards due to their socio-economic status and inadequate information about the risk associated with it. The similarity with the present study could be attributed to the fact that both studies were carried out in a rural setting where it is expected that respondents may not be adequately enlightened. However, Robert and Jewel (2010) in their study also revealed that socio-economic factor is a major factor that predisposes rural dwellers to having moderate to severe biological home hazards. This finding was contrarily to the report by Institute of Medicine (2000) and that of Cohn, Arbes, Cohn et al (2009) whose report revealed that socio-economic factor is not a predisposing factor to the risk of having either high or low biological hazards but cultural belief and practices among the people.

Research Question 3: What are the chemical home based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

The result of the study from the research questionnaire and observation check list showed that chemical home-based health hazards among rural dwellers in Yakurr LGA were above average (2.73±1.11) with majority (65.5%) found to be associated with moderate hazard level. The chemical home based health hazards were; keeping of generator inside the house after use, Smoky environment/kitchen through cooking with firewood and stove, and odour/smell from surrounding gutter. Other include: keeping drugs or medicine at the reach of every family members- both young and old, use of insecticide or pesticides spray at home, use of air freshener and cleaning agents like Izal, bleach, etc. at home, paint odour smell at home and use of candles in the house. The reports from the observational checklist, however, showed a significant higher level of chemical hazards than the respondents reported especially in the areas of odour/smell from surrounding gutter and paint, cooking on firewood's and stove in the house. This implies that the respondents are not fully aware of the degree of risks they are exposed to and may not take appropriate measures to remedy them.

The keeping of generators inside the house after use may be attributed to the type of houses respondents live. As shown in Table 2, most of them (59.8%) lived in single rooms, single self-apartments and uncompleted buildings and as such, may have no other place like a store room to secure their generators after use except the single rooms they live. This predisposes the respondents to inhaling the carbon monoxide that comes out of the generator and the risk of storing fuel in the same room. As Markanen, Quinn, Galligan et al (2007) reported that carbon monoxide is mainly inhaled from storage of generator in living homes and from faulty cars.

The smoky environment/kitchen through cooking with firewood and stove may be partly due to poor ventilation system of the houses respondents live, unavailability of fund to afford gas cookers and any other means of cooking. This may compound the risk to health already caused by generators n the houses. These is similar to the study by Modebelu and Duvie (2015) which revealed that smoky environment as a result of cooking on firewood and stove increased the risk of having health problems such as respiratory tract infection, cancer etc among respondents with low income earning.

The pattern of drug storage among respondents in rural setting reflects ignorance on the effect of keeping drugs at the reach of every family member and poor knowledge of drug use/storage procedures by adults or parents within the home. On the other hand, the use of insecticides may be aimed at killing the insects that may have gained entrance into their houses through cracked walls which is one of the physical/structural health hazards identified in Table 2. The use of candles in the house may be due to unavailability of electricity, high cost of kerosene to light up their lamp tin and unavailable fund to afford rechargeable lamp. These explanations agree with the study by Environmental Perfection Agency (2010) and Centre for Disease Control and Prevention (2009) which revealed that drugs stored at the reach of children and others members of the family cause drugs abuse, while CDCP (2009) equally reported that the use of insecticides and candle in poor ventilated homes increases the risk of respiratory tract infection mostly among people in rural setting.

All these have the implication of exposing the children to wrong drugs usages and abuse, inhalation of the insecticides by family members and a possibility of setting the house on fire which on their own compounds the health problems of the respondents. These may have accounted for why most of the respondents reported having such health problem as respiratory tract infections, burns, adverse drugs reaction etc.

Odour/smell from surrounding gutter might be due to ignorance to personal/environment hygiene and poor knowledge and attitude towards environmental sanitation, block/poor drainage system around the home environment, Parmeswaran (2016)hold this view in his report about odours and smell within the home environment as a result of poor environmental sanitation and poor drainage system.

Research question 4: What are the behavioural home based health hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?

The result of the study from the research questionnaire showed that behavioural home-based health hazards among the rural dwellers in Yakurr LGA were below average (2.43±1.13) with slightly above average respondents (57.6%) found to be associated with moderate hazard level. The most prevalent behavioural home based health hazards were: 3-4 persons staying in a room, stress which derives from daily activities/events and refuse/sewage disposal around the home environment, Cigarette product around the home environment, noisy environment and refuse/sewage disposal around the house were also observed using the checklist and this were found to be significantly higher than reported by the respondents (P < .001).

Over populated rooms or home maybe due to respondents' inability to afford bigger or more spacious apartment as the result in Table 2 shows that most of the respondents (56.6%) are self-employed and a notable proportion are non-income earners [104 (25.0%)].This agreed with the study by Buckner (2008) who also reported overcrowding within the home environment and indicated that it predisposed individuals to having communicable diseases mostly in the rural setting.

Disposal of refuse/sewage around the home could be as a result of poor personal hygiene, poor environmental sanitation and inadequate knowledge towards refuse disposal among the rural respondents; as well unavailability of waste bills and toilets around the home environment. This findings is similar to that of Gielen (2012) who revealed that lack of waste management policy and the provision of waste bills within the environment of respondents result in sewage and refuse disposal around the home environment. Same was the view of Frost and Hartl (2006) in Wenzhora, China who affirm that poor personal hygiene/environmental sanitation result in refuse and sewage disposal around the home environment. The poor refuse disposal which was observed to be very common in this study may have a serious health impact on these rural dwellers. The findings suggest that the government and Non-governmental organizations should provide waste bills and safe and comfortable toilets for those living in rural areas to prevent the above mentioned home based health hazards and their possible health implications

Research question 5: **What are the health problems associated with home hazards among rural dwellers in Yakurr LGA, CRS, Nigeria?**

The findings of the study show that majority of the rural dwellers were associated with high health problems (71.0%) resulting from home based health hazards within the rural setting. The health problems were: running nose/cough/common cold/sneezing, injury to the skin, headache, insect sting/bite, sudden illness, asthma, pneumonia, abdominal pain/discomfort and difficulty in breathing. Others were watery stool of more than 3 times a day and sprain, dislocation, fracture from falls, sleeplessness and inability to hear well.

Some of the hazards reported/observed in the home environment of the respondents may have contributed to

such health problems as running nose/cough/common cold/sneezing, difficulty in breathing, headache, asthma and pneumonia. These are symptoms/illness that may result from such home hazards as smoky environment/kitchen, dusty home, populated indoor air resulting from the use of firewood and stove for cooking, keeping of generator inside the house after use as resulting in inhalation of carbon monoxide, overcrowding in the house, poor ventilating system in the house, used of candle, insecticide/pesticide spray at homes to kill insect, mosquito, bees, cockroaches etc. For example, smoke is known to contain numerous carbon products such as soot and carbon dioxide which interfere with gaseous exchange, thereby initiating respiratory tract infections which manifest as running nose, sneezing etc.

These findings are in line with the study by Centre for Disease Control and Prevention (2013) which revealed that carbon monoxide used of pesticide/insecticide and a damping environment/non ventilated home result in health problems such has asthma, cough, sneezing, headache, running nose etc among rural dwellers. Similar view was held by Dales (2009)in his study on the causes of home based respiratory tract infection among rural dwellers. Dale found out that respiratory infections among rural dwellers were as a result of use of strong air fresheners among prone respondents, poor ventilated homes, change in weather condition, populated indoor air by cooking on stove and firewood etc. Same was the findings from Kamel and Hoppin (2008) and Thom, Bhopale et al (2008) studies which revealed that health problems among rural dwellers are associated with unidentified home based health hazards.

Another study by Robert and Jewel (2011) showed that carbon monoxide exposure in the home result in 450 deaths, 250 hospital admission and more than 15,000 emergency hospital visit in the United State of American; the reasons for these findings being similar to that of the current study might be because both studies were carried out among rural setting and respondents in both studies seemed to have had inadequate information on health problems arising from home based health hazards. This finding indicates that, the health of rural dwellers is at stake. There is, therefore, need for urgent health promotion program and disease prevention campaign by primary health care providers to reduce or eliminate associated home based health problems as revealed by the study.

Sprain, dislocation, fracture from falls and injury to the skin maybe linked to slippery home surfaces, unsafe pavement, too many thing pack within the home, sharp objects like needle, broken glasses, knife kept at the reach of children, unstable chairs or furniture, poor lit/lighten rooms and using stool or chair to reach things at home as revealed in this study. This findings agreed with the findings from a study by Centre for Disease Control and Prevention (2012) which revealed that sprain, dislocation and fracture are basic home health problems resulting from fall among rural dwellers due to slipping surfaces, unsafe pavement, unstable chairs, inadequate knowledge about home based health hazards. In another study conducted by Robert and Jewel (2011), home based health hazards such as physical, chemical, biological and behavioural hazards were found to be responsible for approximately 1,600 death, 18,000 hospitalizations and 324,000 emergency visit each year in the U.S. The home they reported, is the second most common location for fatal injuries after motor vehicle crashes; older adults and young children have the highest risk for injuries in the home setting. Centre for Disease Control and Prevention (2011) also reported that falls alone account for 53.7% of all unintentional home injury death among adults and children. This finding is in line with that of the present study where adults and children are at high risk of health problems arising from home based health hazards in rural settings. Environmental Protection Agency (2006) findings further, shows that injury to the skin could be as a result of improper use of knife, poor housekeeping of needles, broken glasses, sharp objects, falls etc among children within the home environment.

It is therefore imperative that the health care providers like nurses should always assess rural dwellers home hazards during health assessment in the hospitals/health centres as these may be contributory to the health condition they are presenting. Moreover health promotion programs and hazards/disease prevention campaign should be carried out in rural areas where asses to information and health care facilities are usually difficult/limited.

Hypothesis 1: There is no significant association between demographic characteristics and identified health problems among rural dwellers of Yakurr LGA, CRS, Nigeria.

The findings of this study reveal an association between demographic characteristics and identified health problems among rural dwellers in Yakurr LGA, CRS, Nigeria. It was observed that there was an association between demographic characteristics and identified home hazards related health problems among rural dwellers. This implies that demographic characteristics may determine the extent of health problems associated with home hazards. The result on Table 9 shows a significant association between age ($p < .001$), sex ($p = .005$), marital status ($p = .009$), number of children ($p = .011$), educational status ($p < .001$), occupation ($p = .003$), house type ($p = .019$), number of people that share a room with the respondent ($p < .001$) and the identified home hazards associated health problems.

With reference to age, the result as shown in table 9 indicated that those within the age of 30 -39 are more likely to have higher levels of health problems related to home hazards than the other age groups. This may be because, most of the identified home hazards are things those in this age group are prone to and which may lead to such reported health problems in this study as wounds, abdominal pain and discomfort, running nose/sneezing, emergency visits to hospitals etc. These health problems in fact rated the highest among the other health problems. However, the result also showed that those within the ages of 50 and above also had high level of health problem. Though not actually studied here, this age group has more tendencies to sprain, dislocation and fractures from falls, inability to sleep, inability to hear well etc as reported in this study.

Florence, Bergen et al (2018) revealed that each year there are about two million younger persons who are treated in emergency rooms in U.S for injuries that occurred in the home due to curiosity, attraction to bright and colorful substances, anxiety and high level of energy. Though, the magnitude of the health problems differ in type of home based health hazards, mostly in falls, respondents within the ages of 65 years and above are at high risk due to cluttered objects, steps that are too steep or too long, poor lighting, pet, unstable chairs, tables, extension cords across walkways etc. However, this finding differ from the study by Centre for Disease Control and Prevention, National Centre for Injuries Prevention and Control (2016) which revealed that every year, one out of every three adults age 65 or older will fall or have one health problems or another due to home based health hazards. The present study implies that young children within the home environment should be guided properly and educated by parents/care givers on how to identify and prevent home based health hazards. This will in turn reduce the level of health problem among them.

The finding from Table 12 shows that there is a significant association between gender and identified health problems among rural dwellers. Males are more likely to have higher levels of health problems than females. This is due to the extent of men's ability to show that they are male fold, to meet up with responsibilities/challenges within the home and inadequate experience and tendency of pulling risk at all time. This exposes them to more home hazards and consequently more health related problems. However, one would have expected the females to be exposed to health related problems based on the hazards they tend to be more exposed to such as slippery surfaces, smoky environment/kitchen, use of candles at home, homemade liquid soaps etc. These correlate with the study by Qiu, Chintana et al (2014) which also revealed that, there is an association between male respondents in rural setting on health problems associated to home based health hazards than the female respondents.

The results also revealed that there is a significant association between marital status and identified health problems among rural dwellers. The findings show that the widowed are more prone to health problems associated with home based health hazards than the single, married and separated/divorced. Specifically the study revealed that widowed with more children in the house are more prone to having health problems than the other respondents. This could be related to insufficient fund, inadequate knowledge to create a safe environment for the family, stress in meeting the needs of the family and single parental factor. These affirm the study by Florence, Bergen,Atherly et al (2018) which revealed that marital status is associated with health problems as a result of home based health hazards among rural respondents.

In the area of educational status, those with technical education were mostly linked to the health problems related to home hazards. This was followed by those with no formal education and primary education. The respondents with tertiary education were the least linked. Considering their level of education, this finding probably indicated inadequate access to information about home based hazards. This finding is in line with the results of the study by Carrillo (2011) which revealed that level of respondents' education and availability of information contributed to identification and prevention of home based hazards among rural dwellers. It therefore implies that primary health care workers (Nurses and Environmental health officers) should carry out an awareness program on identification and prevention of home based health hazards in rural settings and the provision of information about home based hazards especially among those with lower level of education.

Further findings of the study showed a significant association between types of house respondents live in and identified health problem among rural dwellers. The findings show that the respondents who live in self-apartment had the highest health problems followed by respondents living in single room apartment. This is similar to the study by Usen and Joseph (2013) which revealed that there is an association between type of house respondents live in and identified health problems. Both findings could be explained by the fact that this living condition exposes one to more health hazards and the consequent health problems.

Hypothesis 2: There is no significant difference between the categories of home-based health hazard and identified health problems among rural dwellers in Yakurr LGA, CRS, Nigeria.

The findings of this study reveal a relationship between categories of home based health hazards and identified health problems among rural dwellers in Yakurr LGA, CRS, Nigeria. The calculated p level of significance value of 0.025 is lower than the alpha level of 0.05 at a correlation index r level of -0.532; this means that the categories of home based health hazards of respondents influence differently the level of health

problems among rural dwellers. Each health problem had significant relationship with each health hazard: physical/structural hazard (p = .003), biological hazard (p < .001), chemical hazard (p = .003) and behavioural hazard (p <.001).That is, for each hazard, increase in the level of the hazard consistently increased the proportion of people highly associated with health problem. However, Physical/structural hazards and chemical hazards have the highest identified health problems. This may probably be due to the nature/types of these two categories of home hazards. They are hazards more commonly seen at home, to which people are more exposed to. It is not surprising then that they led to more health problems than the others. The findings is similar to the finding from a study by Katherine (2015) which revealed that the more dominant home hazards in rural areas are physical and chemical home based hazards. The present study findings equally correlate with the study by Robert and Jewel (2011) who affirm that the higher the level of home based hazards, the higher the health problem among individual and vary among homes and area of resident. The result of this study is however contrary to a study by Thom, Bhopale et al (2008) which revealed that biological hazards is the most dominating hazards among urban respondents in urban settings. The difference in result could be because Thom, Bhopale et al (2008) carried out their study in an urban setting while the present study was done in a rural setting. This is unexpected, however, since the biological hazards tend also to be more common among rural dwellers. It is imperative therefore to say that the level of hazard, whether physical/structural, biological, chemical or behavioural, proportionally predicts the level of health problems experienced by people. It became really important that community health care workers should emphasis on health education on hazards identification and disease prevention among rural dwellers.

Hypothesis3: There is no significant difference in the findings on home based hazards between respondent's responses to the questionnaire and researcher observation among rural dwellers in Yakurr LGA, CRS, Nigeria

The finding of this study reveal a significant difference between respondents' response to the questionnaire and the researcher's observation except for the presence of sharp object like knife, broken bottle/glasses and insects among rural dwellers in Yakurr LGA, CRS, Nigeria. It was observed that the reports from the observational check list showed a significantly higher levels of home based hazards than what was reported by the respondents. The result on Table 16 shows a significant difference between physical/structural hazards (p < .002), biological hazards (p < .132), chemical hazard (p < .001) and behavioural hazards (p < .001) among the instrument used. This implies that observational check list may determine better in-depth home based health hazards among rural dwellers than questionnaires. It also indicates the fact that rural dwellers are probably not aware of all the aspects of home based hazards and the degree to which they are exposed to these hazards. Lack of knowledge of these health risks may imply that they are not putting appropriate measures to remedy them. These may explain the degree of health problems associated to these risks which the respondents have already been exposed to as discovered in this study. This finding calls for special attention of community health workers to embark on health education of these rural dwellers, assessment of these hazards during home visits and routine check on the health problems associated with these hazards during health assessment of patients. The present study findings correlate with the study by Robert and Dickey, (2011) who affirm that visual assessment (observation check list) is one of the reliable ways of assessing home based health hazards among rural dwellers. The findings of this study is also in line with the study of Markkanen, Quinn, Galligan et al (2007) who combined two instruments (respondent questionnaire and observational check list) in determining hazardous home conditions and report that more potential health hazards in the home were observed. It is imperative therefore, to say that the level of hazards whether physical/structural, biological, chemical and behavioural can better be observed using an observational check list than respondents questionnaire to determine the level of home based health hazard among rural dwellers. It's however important that researchers on this topic should use both instrument to assess hazards within the home environment, as some hazards reported by respondents may actually not be observed depending on where they are located.

Implication of the Study

The study found that respondents were associated with moderate level of physical/structural home-based health hazards. Specifically, use/availability of sharp objects like knife, broken bottles, etc., were the existing physical/structural home-based health hazards among rural dwellers in Yakurr LGA, CRS. The implication of the above findings is for the community health care workers to health educate the respondents on ways to identify these hazards within their environment which will make the respondents ecologically competent and prevent health problems associated with it. Actions to be taken are: carrying out sensitization program, seminars, health campaigns and routine visitation to homes of respondents. Other physical/structural hazards were cracked walls, poor ventilating system, and lack of fire extinguisher. This has implication for the government, the private sector, and community leaders to collaboratively set up strategies to eliminate or reduce the identified physical/structural home-based health hazards to the barest minimum. Actions to be taken may

include the provision of safety information/gargets to forestall increasing risk, the introduction of low cost housing schemes and the empowerment of rural dwellers by means of job provision to increase their purchasing power.

Results of the present study also revealed habitation of insects such as scorpion, mosquito, etc., in the homes of respondents, not washing hands after defecating or using the toilet and the habitation of rodents and cockroaches in and around the house especially in the kitchen as the existing biological home-based health hazards among the rural dwellers. These implied that Community outreach and health education program/campaign aimed directly at rural dwellers can also be embarked upon by community health care workers in collaboration with community leaders to reduce the risk of biological home-based health hazards among rural dwellers. Another biological hazard is drinking of water from the stream and river without boiling it. This finding reiterates the need for government, local and international organizations, opinion leaders to renew their efforts and commitment to continuously provide safety information, portable water and housing for the rural populace. The provision of these basic social amenities may reduce the issues of drinking untreated water from streams and rivers and the habitation of insects and rodents.

Findings of the study, moreover showed that keeping of generator inside the house after use, odour/smell from surrounding gutter, keeping drugs or medicine at the reach of every family members- both young and old, use of insecticide or pesticides spray at home etc. at home were the existing chemical home-based health hazards among the rural dwellers. It is imperative that community health workers should health educate respondents (and carry out visitation to the homes of the respondents) on proper ways of drugs storage, effect of keeping generator inside the house after use, personal hygiene, need for environmental sanitation and precaution on the use of pesticide or insecticide spray. Other chemical hazards are smoky environment/kitchen through cooking with firewood and stove and use of candles in the house. This indicates the need for government, the private sector and well-meaning individuals by these findings, called to the responsibility of providing electricity, and empowering the rural dwellers with jobs which would improve their purchasing capacity for things like electric cooker etc. The provision of electricity would to a large extent, reduce the use of firewood, generators and candles.

The study observed that the most prevalent behavioural health hazard was that of 3-4 persons staying in a room followed by stress which derives from daily activities/events and refuse/sewage disposal around the home environment. This finding suggests that good housing and proper waste management programmes policies are lacking or ineffective in rural settings. The implication is, therefore, provision of good and workable housing schemes and the establishment of modern and effective waste management system for rural dwellers. This coupled with good health education by community health workers may reduce these behavioural home based health hazards and their attendant effect.

Further findings of the study show that majority of the rural dwellers were associated with high health problems (71.0%). This indicates high prevalence of health problems due to hazards among rural dwellers and reemphasizes the need to eliminate or reduce identified hazards. The implication to community health workers is to embark on community survey and comprehensively assess and treat affected rural dwellers. In fact, healthcare providers should routinely assess possible home hazards during health assessment as these may be contributory to the health challenges the patient are presenting. Government on their part should embark on environmental impact assessment and address the remote environmental contributors of these illnesses.

Since respondents exhibit moderate home based health hazards, it therefore attests that rural dwellers have moderate ecological competence because home based health hazards and its associated health problems are moderate not high or low. However, it is imperative that, health care providers mostly, the community health nurses should developed an effective plan to harness individual demographic characteristics (cognition, perception, motivation, skills, capacity and level education) to enable rural dwellers completely if not all identify, understand and prevent home based hazards within their environment and its associated health problem to promote healthy living among them.

Limitations/Strength of the Study

The study was conducted in Yakurr LGA, CRS Nigeria. Thus, the extent to which the findings of the study will be generalized to other parts of the country may be limited due to differences in culture, lifestyle, behaviour and environmental configurations. There were difficulties in observing some of the hazards which were not visible. Therefore, not all the hazards indicated by the respondents could be observed. Some of the findings were based only on the responses of the respondents which could be subjective considering the sensitive/private nature of some of the questions.

Suggestion for further Studies
Further studies could be carried out in the following areas:

- Similar study could be carried out in other LGAs across the state and country, probably using more than one village or LGA for better generalization of the findings.
- Studies should be done to investigate factors that determine or predict the prevalence of home based health hazards among rural dwellers.
- A comparative analysis should be done on home based health hazards between rural and urban dwellers.

VI. Summary of the Study

This study was conducted among rural dwellers in Yakurr Local Government Area of Cross River State (CRS), Nigeria. The purpose of the study was to assess the home-based health hazards and associated health problems among rural dwellers of Yakurr LGA, CRS Nigeria. The specific objectives of the study were to identify the physical/structural home based health hazards; determine the biological home based health hazards; identify the chemical home based health hazards; determine the behavioural home based health hazards and identify the health problems associated with home hazards among rural dwellers in Yakurr LGA, CRS, Nigeria.

Available literatures related to the study were reviewed to amplify theoretical background of the study. A cross sectional descriptive survey design was used for the study. A sample of 422 men and women from Yakurr Local Government Area, CRS were drawn from the population of 66,969 using Lesile Kish's 27 (1965) formula for single proportions. A systematic sampling technique was used to locate the respondents' houses.

The instruments for data collection were a validated interview guide and observational check list constructed by the researcher. Questions and observations were generated from literature relating to home based health hazards and associated health problems among rural dwellers based on the five objectives of the study. The test re-test method was used to establish the reliability of the instrument and yielded a Pearson's Product Moment Correlation (r) Coefficient of 0.78. Data analysis were done with the aid of Statistical Package for Social Science (SPSS) version 23 and Microsoft Excel 2007.

Descriptive statistics of frequency, percentage, mean and standard deviation were used to summarise the items of the questionnaire. Specifically, the mean and standard deviation were used for the Likert scale items. While Chi-square was used to test the null hypotheses for significance at $p \leq 0.05$. The major findings of the study include prevailing physical/structural home-based health hazards which are: lack of fire extinguisher, use/availability of sharp objects, visible cracked walls, poor ventilating system, slippery surfaces and tightly packed rooms and kitchen. Prevailing biological health hazards are: drinking untreated water from the stream and river, insects at home, not washing of hands after defecating or using the toilet and rodents and cockroaches around house; existing chemical health hazard were keeping of generator inside the house after use, smoky environment/kitchen due to firewood and stove use and unpleasant smell from surrounding gutter. Existing behavioural health hazards were 3-4 persons staying in a room, stress and indiscriminate disposal of refuse/sewage disposal around the home environment. There also existed an above average physical, biological and chemical health hazards with majority being associated with moderate hazard level. Rural dwellers were associated with high level of health problems associated with the health hazards such as physical/structural, biological, chemical and behavioural home hazards. There was a significant association between demographic characteristic and health problems; age ($p <.001$), sex ($p = .005$), marital status ($p = .009$), number of children ($p = .011$), educational status ($p < .001$), occupation ($p = .003$), house type ($p = .019$) and number of people that share a room with the respondent ($p < .001$). Moreover health problems had significant association with each health hazard: physical hazard ($p = .003$), biological hazard ($p < .001$), chemical hazard ($p = .003$) and behavioural hazard ($p < .001$). Specifically, for each hazard, increase in the level of the hazard consistently increased the proportion of people highly associated with health problems.

VII. Conclusion

Based on the findings of the study, the following conclusions were made:
1. The physical/structural home-based health hazards among the rural dwellers were mainly lack of fire extinguisher, use/availability of sharp objects, cracked walls, poor ventilating system, slippery surfaces and too many things packed in rooms, kitchen, etc.
2. Drinking untreated water from the stream and river, insects at home, not washing hands after defecating or using the toilet and rodents and cockroaches around house were the biological health hazards among the rural dwellers.
3. Generator kept inside the house after use, smoky environment/kitchen through cooking with firewood and stove and odour/smell from surrounding gutter were the main chemical health hazard among the dwellers.
4. 3-4 persons staying in a room, being stressed up by daily activities/events and refuse/sewage disposal around the home environment were the behavioural health hazards among the rural dwellers.
5. There was an above average physical (2.61 ± 1.22), biological (2.54 ± 1.20) and chemical (2.73 ± 1.11)

health hazards among the rural dwellers with majority of them associated with moderate hazard level: physical (74.3%), biological (67.6%) and chemical (65.5%); high hazard level was thus distributed: chemical (31.9%), biological (18.2%) and physical (17.5%).

6.   The behavioural health hazard was slightly below average among the rural dwellers (2.43±1.13) of which 57.6% had moderate hazard level, 23.7% had high hazard level while 18.7% had low hazard level.

7.   Majority of the rural dwellers were associated with high health problems (71.0%). The commonest health problems were running nose/cough/common cold/sneezing, injury to the skin, headache and insect sting/bite respectively.

8.   There was a significant association between each demographic characteristic and health problems: age (p < .001), sex (p = .005), marital status (p = .009), number of children (p = .011), educational status (p < .001), occupation (p = .003), house type (p = .019) and number of people that share a room with the respondent (p < .001).

9.   For age, health problems were mostly associated to those aged 30-39 years than other age groups while for sex, it was associated more to males than females. For marital status, health problems were least among the married and most among the widowed. Those with no children were least associated with the health problems while those with 1-2 children were most associated.

10.   For educational status, health problems were mostly associated with those with technical education while those with tertiary education were least associated. For occupation, the students had highest cases of health problems, followed by the unemployed and self-employed respectively while full housewives had least (no) cases.

11.   For the house type, health problems were associated most to those living in one room self-apartment followed by those living in single room and flat respectively; those living in uncompleted building and bungalow were least associated. The health problems were also mostly associated with respondents sharing room with 4 and 3 people respectively and least associated with sharing the room with 1 person.

12.   Health problems had significant association with each health hazard: physical hazard (p = .003), biological hazard (p < .001), chemical hazard (p = .003) and behavioural hazard (p <.001). Specifically, for each hazard, increase in the level of the hazard consistently increased the proportion of people highly associated with health problems.

VIII.   Recommendations

Based on the findings of the study, the following were recommended:

1.   The government and health care workers should embark on workshops, seminars and health education/motivation process that would empower rural dwellers to identify, prevent and mitigate the effects of hazards and prevent further increase in the level of hazard among rural dwellers.

2.   Government and local and international organizations should channel more resources to provide for the rural populace basic social amenities such as portable water, electricity and refuse disposals. This may reduce the issues of drinking untreated water from streams, and rivers, reduce the use of firewood/candle/generators, indiscriminate disposal of waste/feace and the habitation of insects and rodents that are capable of causing severe ill health.

3.   Community outreach and campaign by health care providers aimed directly at rural dwellers should be urgently embarked on to identify and reduce home-based health hazards among rural dwellers.

4.   Health workers especially nurse's and environmental health workers and the Local Governmental mostly political representatives should partner to provide health education, waste bills for proper waste disposal, monitory and control of proper use and storage of drugs and insecticides, residual effects of insecticides, proper waste disposal, environmental sanitation and personal hygiene.

REFERENCES

[1].   Alptekina F, Uskunb E, Kisioglub N.,&Ozturk, M. (2008) Unintentional non-fatal homerelated injuries in Central Anatolia, Turkey: frequencies, characteristics, and outcomes. InjInt J Care Injured. 39:535–546.

[2].   Arbes, S.J., Cohn, R.D., Yin, M., Muilenberg, M.L., Burge, H.A.,& Friedman, W.(2009)House dust mite allergen in US beds: results from the First National Survey of Lead and Allergens in Housing. J Allergy ClinImmunol. 111(2):408–414

[3].   Zeldin, D.C.Thorne, P.S., Cohn, R.D., &Zeldin, D.C (2008) House dust mite allergen in U.S. beds: Results from the First National Survey of Lead and Allergens in Housing. Journal of Allergy and Clinical Immunology. 111(2):408-414.

[4].   Armour, B. S., Woollery, T., Malarcher, A., Pechacek, T. F., &Husten, C. (2007). Annual

[5].   smoking-attributable mortality, years of potential life lost, and productivity lossesUnited States, 1997-2001. MMWR Weekly, 54, 625-628.

[6].   American Industrial Hygiene Association (2012) Recognition, Evaluation, and Controlof Indoor Mold.Prezant, B., Weekes, D.M., and Miller, J.D., (editors) AIHA ProductIMOM08–679. Available: https://webportal.aiha.org/Purchase/ProductDetail.aspx?Product_code=3f9e0a5a-4778-de11-96b0-0050568361fd

[7].   Bashir, S. (2002). Home is where the harm is: Inadequate housing as a Public health crisis. American Journal of Public Health, (92): 733-738.

[8]. Backinger L, Koustenis H. (2005) Analysis of needle stick injuries to health care workers providing home care. Am J Infect Control. 22:300–306.

[9]. Breysse P., Farr N., Galke W., Lanphear B., Morley R., &Bergofsky L. (2004). The relationship between housing and health: Children at risk. Environmental Health Perspectives, 112(15), 1583-1588.

[10]. Brunekreef B, Dockery W.,&Speizer E, (2010).Home dampness and respiratory morbidity in children.Am Rev Respir Dis. 140:1363–1367.

[11]. Carrillo Zunigo (2011) Home hazards Assessment among elderly in South Texas Colonias. implementation of a comprehensive approach to improving indoor environmental quality for low-income children with asthma. Environ Health Perspect. 120(suppl 2):312–326.

[12]. Centers for Disease Control and Prevention. [2013] Asthma Prevalence, Health Care Use and Mortality: United States, 2003-2005. National Center for Health Statistics. Available: http://www.cdc.gov/nchs/products/pubs/pubd/hestats/ashtma03-05/asthma03-05.htm.

[13]. Centers for Disease Control and Prevention. [2012]. Falls Among Older Adults: Figures andMaps. National Center for Injury Prevention and Control. Available: http://www.cdc.gov/ncipc/duip/adultfallsfig-maps.htm.

[14]. Centers for Disease Control and Prevention and U.S. Department of Housing and Urban

[15]. Development (2008} Healthy Housing Inspection Manual. Atlanta: U.S. Department of Health and Human Services. Available: http://www.cdc.gov/nceh/publications/books/inspectionmanual/.

[16]. Centre for Disease Control and Prevention, National Centre for injury Prevention and Control web-based injury statistics Query and Reporting System (wisQARS)(online) Acessed August 5, 2016.

[17]. Centers for Disease Control and Prevention and U.S. Department of Housing and Urban

[18]. Development (2006} Healthy Housing Reference Manual. Atlanta: U.S. Department of Health and Human Services. Available:http://www.cdc.gov/nceh/publications/books/housing/housing.htm

[19]. Centers for Disease Control and Prevention.[2005] Spotlight on Organophosphate Pesticides. CDC's Third National Report on Human Exposure to Environmental Chemicals. Available:http://www.cdc.gov/exposurereport/pdf/factsheet_organophosphate.pdf.

[20]. Centers for Disease Control and Prevention [2013] Guidelines for infection control in home care settings. [Accessed April 15, 2013]. Available at: www .cdc.gov/ncidod/dhqp/gl_home_care.html.

[21]. Cohn D., Arbes R, Jaramillo H. Reid C., &Zeldin D, [2009] National prevalence and exposure risk for cockroach allergen in U.S. households. Environmental Health Perspectives, 114(4):522-526.

[22]. Collins KJ (2008) Low indoor temperatures and morbidity in the elderly.Age Ageing. 15:212–220.

[23]. Colt J, Lubin, J, Camann D, Davis S, Cerhan J.,& Severson K, (2009) Comparison of pesticide levels in carpet dust and self-reported pest treatment practices in four US sites. Journal Exposure Analysis and Environmental Epidemiology, 14(1), 74-83.

[24]. Coronado G, Thomas E, Sattin W.,& Johnson L (2005) The CDC traumatic brain injury surveillance system: characteristics of persons aged 65 years and older hospitalized with a TBI. J Head Trauma Rehabil. 20(3):215–28.

[25]. Croxford, B, Leonardi, G.,&Kreis, I, (2008) Self-reported neurological symptoms in relation to CO emissions due to problem gas appliance installations in London: a cross-sectional survey. Environmental Health, 7: 34

[26]. Dales R, Burnett R.,&Zwanenburg H. [2012] Adverse health effects among adults exposed to home dampness and molds. Am Rev Respir Dis. 143:505–509.

[27]. Dales E, Zwanenburg H.,& Burnett R, [2008].Respiratory health effects of home dampness and molds among Canadian children.Am J Epidemiol. 134:196–203.

[28]. Danzig E, ShortJ.,& Collins K, [2009] Bloodstream infections associated with a needleless intravenous infusion system in patients receiving home infusion therapy. JAMA. 273:1862–1864.

[29]. Danzig LE, Short LJ.,& Collins K,(2010). Bloodstream infections associated with a needleless intravenous infusion system in patients receiving home infusion therapy. JAMA. 273:1862–1864.

[30]. Darby S, Hill D, Auvinen, A, Barros-Dios M., Baysson H.,&Bochicchio F. (2008). Radon in homes and risk of lung cancer: collaborative analysis of individual data from 13 European case-control studies. British Medical Journal, 330(7485), 223

[31]. David MacCollum [2013] Construction Safety Engineering Principles: Designing and Managing Safer Job Sites. McGraw-Hill Professional.ISBN 978-0-07-148244-8.Retrieved 2015-07-10.

[32]. Environmental Protection Agency. (2005). Indoor air pollution: An introduction for health professionals, American LungAssociation, American Medical Association, U.S. Consumer Products Safety Commission. Washington, DC: Author.

[33]. Environmental Protection Agency. (2006). Indoor air pollution: An introduction for health professionals, American LungAssociation, American Medical Association, U.S. Consumer Products Safety Commission. Washington, DC: Author.

[34]. Environmental Protection Agency. (2009). Indoor air pollution: An introduction for health professionals, American LungAssociation, American Medical Association, U.S. Consumer Products Safety Commission. Washington, DC: Author.

[35]. Environmental Protection Agency. (2010). Indoor air pollution: An introduction for health professionals, American LungAssociation, American Medical Association, U.S. Consumer Products Safety Commission. Washington, DC: Author.

[36]. Evans J, Hyndman S, Stewart-Brown S, Smith D.,& Petersen S. (2007) An epidemiological study of the relative importance of damp housing in relation to adult health. J Epidemiol Community Health. 54:677–686.

[37]. Florence C.S, Bergen G, Atherly A, Burns ER, Stevens J., & Drake C.(2018) Medical cost of fatal and Nonfatal falls in Older Adults. Journal of the American Geriatrics Society Dol:10.1111/jgs.15304.

[38]. Frost, R.O., Hartl, T.L (2010) A cognitive behavioral model of compulsive hoarding.Behav Res Ther. 34(4):341-350.

[39]. Geiger-Brown J, Muntaner C.,&McPhaul K, (2007). Abuse and violence during home care work as a predictor of worker depression. Home Health Care Serv Q. 26:59–77.

[40]. Gergen, J, Turkeltaub P.,&Kaovar M, [2009] The prevalence of allergic skin reactivity to eight common allergens in the U.S. population: results from the second National Health and Nutrition Examination Survey. Journal of Allergy and Clinical Immunology. 800:669-79.