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A Comparative Assessment of Household Flood Disaster Preparedness in Flood-prone Rural and Urban Communities in Kaduna State, Nigeria

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Keywords

Flood disaster preparedness;

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ABSTRACT

Background: Households are important elements in flood disaster preparedness and play important role in its management. This study compared household flood disaster preparedness in flood-prone rural and urban communities in Kaduna State.

Methods: The comparative cross-sectional study was conducted among households in flood-prone rural and urban communities in 2019. The study population were household heads. The sample size for the study was 202 each for the rural and urban communities. Respondents were selected by multi-stage sampling technique. A structured questionnaire was used for data collection. Community members, community leaders and staff of Kaduna State Emergency Management Agency (SEMA) were also purposively selected for focus group discussions and key informant interviews. The quantitative data was analyzed using SPSS 23.0 and the qualitative data using content analysis.

Results: The mean ages (+SD) of the household heads in the rural and urban communities were 39.4±12.9 years and 43.7±13.9 years, respectively. Ten (2.5%) of the households in the urban communities were very prepared against floods but none in the rural communities.
The most available household disaster preparedness elements in the rural communities were radio 150 (74.3%), flashlight 139 (68.8%) while house flood insurance was non-existent. For the urban communities, the most available elements were availability of non-perishable food 147 (72.8%), household evacuation destination 147 (72.8%) while the least was house flood insurance 2 (1.0%).

Conclusion: The household flood disaster preparedness was poor in both the rural and urban communities. There is need for effective flood disaster education and training by SEMA for both communities.

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INTRODUCTION

Flood is the most common of all natural hazards and globally 70 million people are exposed to floods and more than 800 million are living in flood-prone areas.[1] It is estimated that the average annual number of people affected by flood is likely to increase from 1 million in 1990 to 25 million by 2050[2] due to climate change, increased human vulnerability and poor capacities, among others.[3]

Globally, in the last three decades flood increased in frequency, intensity and magnitude[4] probably from anthropogenic activities, rapid

urbanization, settlement in flood-prone areas and climate change, among others.[5,6] Flood disaster has gained global attention due to the huge impact it has on human lives, economies and sustainable environments and it has also contributed to poverty in Africa.[7-9]

In the last decade, flooding has been the most frequent natural hazard in Africa[10,11] thereby constituting a threat to sustainable development goals especially in the Sub-Saharan Africa (SSA). Most parts of SSA are vulnerable to flooding with East, South and Central Africa regions having the most prevalence followed by West Africa.[12] Countries affected in West Africa include Nigeria, Ghana and Burkina Faso, among others.[6,13]

In southern Africa, floods are a common feature and their occurrence poses a threat, which cannot be eradicated but has to be managed.[14] Malawi, Mozambique, Madagascar, Zimbabwe and Namibia had their share of flooding with loss of life, crops, displacement of persons and animals and damage to infrastructure.[15] In addition, it has impacted negatively on individuals, households and communities and flood management agencies have been focusing on relief activities, and are reactive instead of proactive.[16,17]

Flood has become a developmental issue especially in developing countries where systematic and institutional constraints have increase social, economic and physical vulnerabilities to flood risk, thereby reducing flood disaster resilience.[11,18]
Between 1985 and 2014, flooding in Nigeria has affected more than 11 million lives with a total of 1100 deaths and property damage above US$ 17 billion.[19] A study identified the main causes of flooding in Lagos metropolis to include blockage of canals, rapid urbanization, inadequate drainage systems, torrential rain and encroachment, poor urban governance and weak planning institutions.[20]

Researchers reviewed Nigeria's emergency management legislation and found it lacking in terms of development of action plans, empowering resource mobilisation, risk management strategies and in specifying responsibilities of stakeholders.[21]
Disaster preparedness is defined as the state of taking measures to reduce to the minimum level possible, the loss of human lives and other damages from flood disasters through prompt and efficient actions of response and rehabilitation.[18] Malkina-pykh described disaster preparedness in three categories namely: physical materials (availability of food, water, first aid kit), planning activities (relocating to safe places), knowledge and skills preparedness (information, capacity).[21]

Studies have showed poor households flood disaster preparedness in Nigeria[22], Ghana[13], Kenya[23], Namibia and Zambia.[9] Disaster relief agencies and donors in Kaduna State mainly focus on rescue and supply of relief materials to victims and less on preparedness.[24,25]
Historically, households and communities were seen as passive entities whose involvement in emergency management was only as receivers of assistance when disasters occurred.[16]

In recent times, there has been a paradigm shift in research from 'top-down' to 'bottom-up' approach.[26] There is not yet a national framework on flood risk management.[27] Nigeria has a National Disaster framework, with section five with do with disaster prevention, preparedness and mitigation. Nationally, there is no flood preparedness plan.[27] Therefore, the need for developing countries such as Nigeria and their states to key in to this new shift. There is a dearth of information on the level of household flood disaster preparedness in Kaduna State and the state has no flood preparedness plan. This study assessed household flood disaster preparedness in flood-prone rural and urban communities in Kaduna State.

METHODOLOGY

Study area

Kaduna State shares borders with Katsina, Zamfara, Kano, Niger, Bauchi, Plateau States and Abuja. The State is located between latitude 10°31" N and longitude 7°26' 25" E, has 23 Local Government Areas (LGAs), 255 wards and a projected population of 8,446,317 in 2018.[28]

Kaduna rainfall ranges between 1600mm in the southern fringes to about 1100mm per annum in the northern fringes. The rains are spread over a period from mid-May to mid-October and it is heaviest between mid-August and mid-September.[29] Fourteen out of the 23 LGAs in the state have been classified as flood-prone LGAs.[30] these flood-prone rural LGAs in Kaduna State include- Jaba, Kachia, Kudan, Kauru, Lere, Sanga and Soba; while that for the urban LGAs are Birnin Gwari, Chikun, Jema'a, Kaduna north and Kaduna south, Sabon Gari and Zaria.[30] National Water Research Institute, Mando and Centre for Disaster Risk Management and Development Studies, Ahmadu Bello University, Zaria are relevant institutions in the state that are involved in capacity building on disaster management.

Study design

The study was a comparative descriptive study with quantitative and qualitative components conducted between September and November, 2019.

Study population

For the quantitative component, the study population comprised household heads that were 18 years and above and have been living in the selected flood-prone communities for at least 1 year. While the study population for the qualitative component were members of the communities (males and females), community leaders in the six selected communities (one in each community) and the monitoring and evaluation (M & E) officer of Kaduna State Emergency Management Agency (SEMA). Residents that were seriously ill or having mental challenge during the study were excluded.

The desired minimum sample size for the quantitative component was calculated using formula for comparative study.[31]

$$n = \frac{2(Z\alpha + Z\beta)^2 [P_1(1-P_1) + P_2(1-P_2)]}{(P_1 - P_2)}$$

Where n = desired minimum sample size,

Z_α = Standard normal deviate at 95% confidence interval = 1.96

Z_β = Standard deviate at 80% power = 0.84,

P_1 = Flood disaster preparedness in an urban area=24.4 %[32]

P_2 = Food disaster preparedness in a rural area= 9 %[33]

The calculated minimum sample size (n) was 184 and with inclusion of 10% non-response rate, it became 184 + 18= 202 per arm. That is minimum of 202 heads of households in the flood-prone rural communities and 202 heads of households in the flood-prone urban communities in Kaduna State were administered the household questionnaire.

Sampling technique

A multistage sampling technique was used to select the participants for the quantitative component.

Stage I - Selection of Local Government Areas: The identified flood prone LGAs in the state were compiled and classified into rural and urban. Simple random sampling using balloting was used to select one from the seven rural LGAs in which Soba was selected. Similarly, Kaduna North was selected from the list of the 7 urban LGAs.

Stage II – Selection of communities: From the list of the 6 communities in Soba LGA, 3 communities were selected by balloting, and these were Garu, Takalafiya Garu and Soba police station communities. Similarly, from the list of the 6 communities in Kaduna North LGA, three communities were selected using simple random sampling by balloting in which Ungwan Rimi, Kabala and Abubakar Kigo New Extension were selected.

Stage III – Selection of houses: Selection of houses in the respective communities in both the selected rural and urban communities was done using systematic random sampling after generating the sampling frame from the number of houses in the communities, and calculation of the sampling interval. The houses in the selected rural and urban communities were separately listed and numbered to create the sampling frames for the respective rural and urban communities.

The 202 houses (from the calculated minimal desired sample size) selected in three selected rural communities were proportionately allotted depending on the size of each community. The sampling interval was calculated by dividing the total number of houses in the communities by 202. The index house was selected using random number table from numbers within the sampling interval. The next was obtained by addition of the sampling interval to the index house number, and this continued until the required sample size was attained.

In the selected houses, all the household heads were identified and those who met the eligibility criteria were recruited into the study. Where there was more than one eligible household head in a house, one of them was selected for interview using balloting.

The study instruments were questionnaire for the quantitative survey while an observational checklist, FGD and KII guides were for the qualitative component.

For the qualitative component, eight female and eight male community members were purposively selected in each of the six selected communities for the female and male FGDs respectively, making a total of 12 FGDs. For the KII, the community leader in each of the six selected communities (3 rural and 3 urban) and the M & E officer of SEMA were interviewed, making a total of 7 KIIs conducted.

The questionnaire was a 25-item, structured, interviewer-administered and contained mainly closed-ended questions adapted from other studies[9, 32] to fit the objectives of the study. It covered the socio-demographic characteristics of the household heads and characteristics of the houses. Assessment of household flood disaster preparedness was done using an observational checklist. The elements used to assess household flood disaster preparedness were availability of drinking water and non-perishable food, first aid box and receiving training on first aid, member of the household being a trained health personnel, participating in disaster drills, awareness of community early warning system, household evacuation plan and having phone number of any emergency first responders, among others.
In order to ascertain the validity and reliability, relevant adjustment of the data collection instruments, 10% of the sample size was pretested in Sabon Gari and Giwa LGAs of Kaduna representing urban and rural LGAs respectively. The questionnaire and checklist were conscripted into Open Data Kit (ODK version 1.8.1) software adapted from open data kit training guide.

Interview guides were used for the FGD and KII. Both guides were designed by the researcher and pretested in Sabon Gari and Giwa LGAs. The FGD and KII were both complementary and explanatory. The FGD guides were pretested by conducting two FGD sessions (for males and for females) with a set of purposively selected eight to ten members of each community, who met the eligibility criteria for inclusion in the study.

The male and female participants for the FGD were those living in their respective flood affected communities. Their general characteristics included living there for at least one year, could communicate in Hausa or English and having any educational qualification. The community leaders for the KII were those leaders that have been saddled with leadership responsibilities and have been staying there for at least 1 year, could communicate in Hausa or English. The M and E officer from Kaduna SEMA has been in that position for about 3 years and a graduate.

A total of 12 FGDs were conducted in the 6 selected communities (in each community, one male and one female FGD was conducted**).** Each session lasted 45-60 minutes and the language for the discussion were English and Hausa depending on the community. The principal researcher was the moderator of the sessions while 2 others served as the note taker and operator of the digital recorder after permission was obtained for the discussions to be recorded. In each case, the venues for the FGDs were collectively decided by the participants and the researchers. The FGDs were subsequently transcribed.

Six KIIs for the community leaders in the 6 selected communities and one KII for the monitoring and evaluation officer of SEMA were conducted. The developed pre-tested KII guides were used. A researcher served as a moderator while 2 others served as the note taker and operator of the digital recorder. The languages for the KIIs were English and Hausa, depending on the community and each session lasted 45 - 60 minutes.

Measurement of Household flood disaster preparedness

This was assessed using 15 questions. Responses were Yes, No and Don't know. Correct responses awarded 1 point, No and Don't know awarded 0 point. Minimum and maximum scores were 0 and 15 respectively. Each respondent's score was converted to percentage by dividing the respondent's score by maximum score (15) and multiplying it by 100. The scores were adapted and categorized as <49.9% (not prepared), 50-69.9% (partially prepared) and ≥70% (very prepared).[9,34]

Statistical analysis

Data was imported into Statistical Package for Social Sciences (SPSS) version 23 (SPSS Inc., Chicago, Illinois USA) and analyzed. Univariate analysis was computed using the mean and standard deviation (for a normally distributed data) for continuous variables such as age, and frequencies and percentages for categorical variables such as sex, religion, marital status and educational status, among others. Data were presented using tables and charts constructed using Microsoft Excel 2016 version.

Findings from the FGD and KII (Qualitative data) were transcribed and then translated from Hausa to English language. The findings were based on the thematic areas using content analysis. All texts were read several times and condensed to identify statements that related to the topic of analysis. The condensed statements were categorized based on the content. The findings were then presented in narrative form as prose.

Ethical considerations

Ethical approval to carry out the study was sought and obtained from the Health and Research Ethics Committees of Kaduna State Ministry of Health (MOH/ADM/744/Vol. 1/718). Permissions were also obtained from the LGAs and the community leaders. The benefits of the research to the communities and the state at large were explained to the respondents and they were assured that the study will not have any harmful effects and no member of the communities will be excluded based on his/her social status. Written informed consent was obtained from the participants and they were informed of their rights to withdraw from the study at any state. Confidentiality was also ensured.

RESULTS

Most of the respondents, 147 (72. 7%) in the rural and 153 (75.7%) in the urban communities were within the age bracket of 25- 54 years. Majority of the respondents in the rural 195 (96.5%) and urban 144 (71.3%) communities were males. One hundred and twelve (55.0%) of the respondents in the rural communities had no formal education while 74 (36.6%) of those in the urban communities had tertiary education. More than half of the rural 111 (55%) and urban 133 (65.8%) respondents earned monthly income of N18,000 and above. Most of the rural respondents 187 (92.6%) have been staying in the communities for more than 10 years, compared with 112 (55.4%) of the urban respondents. Seven (3.5%) of the rural respondents and 5 (2.5%) urban respondents had persons with disability. There was statistical significant difference for all the socio-demographic variables except disability (Table 1).

Almost all the houses in the rural communities 200 (99.0%) and urban communities 197 (97.5%) were built with mud blocks and cement blocks, respectively, p=0.001. The predominant source of water was well 196 (97.0%) in the rural communities and bore hole 78 (38.6%) in the urban communities, p=0.001. The commonest methods of sewage disposal in the rural and urban communities were pit latrine 174 (86.1%) and water closet 157 (77.7%), respectively, p=0.001. Open dumping is the most common method of refuse disposal in both the rural 168 (83.2%) and urban 120 (59.4%) communities, p=0.001. (Table 2).

In the rural communities, the most available elements of household disaster preparedness were radio with extra-batteries 150 (74.3%), flash light with extra-batteries 139 (68.8%), non-perishable food that will last 3 days 109 (54.0%), households having evacuation destinations 86 (42.6%), discussion with household members on what to do in case of flood disaster 76 (37.6%); and the least available elements were availability of first aid kits 3 (1.5%) and household practice of flood safety drills 1 (0.5%). Households whose member (s) have participated in flood disaster drills, households with awareness of early warning signs 0 (0%) and those with house flood insurance were non-existent. For the urban communities, the top available elements were non-perishable food that will last 3 days 147 (72.8%), households with evacuation discussion 147(72.8%), radio with extra-batteries 122 (60.4%), households with daily 1 gallon of drinking water per person 119 (58.9%) and flash light with extra-batteries 114 (56.4%). The least available elements were households with health personnel 20 (9.9%), having household member that participated in flood drills 12 (5.9%), households that have participated in flood safety drills 11 (5.4%), awareness of early warning signs 6 (3.0%) and having house flood insurance 2 (1.0%).

The relationships between most elements in the households in the rural and urban communities showed significant statistical differences except for house flood insurance (p= 0.499), discussion with household members what to do in case of flood disaster (p= 0.757) and having telephone number for emergencies (p= 0.136) where the differences were not significant (Table 3).

Only 10 (2.5%) of the households in the urban communities were very prepared against flood disaster but none 0 (0.0%) in the rural communities, and this was statistically significant p=0.001 (Table 4).

Table 1: Socio-demographic characteristics of the respondents

Socio-demographic characteristics	Rural (n=202) n (%)	Urban (n=202) n (%)	Test statistics
Age (years)			
15- 24	20 (9.9)	8 (4.0)	χ^2 = 13.835
25- 34	63 (31.2)	51 (25.2)	p = 0.008
35- 44	51 (25.2)	59 (29.2)	
45- 54	33 (16.3)	43 (21.3)	
55- 64	27 (13.4)	23 (11.4)	
≥65	8 (4.0)	18 (8.9)	
Mean age (years)	39.4±12.9	43.7 ±13.9	
Sex			
Male	195 (96.5)	144 (71.3)	χ^2= 47.688
Female	7 (3.5)	58 (28.7)	p =0.001
Religion			
Christianity	2 (1.0)	53 (26.2)	χ^2= 54.744
Islam	200 (99.0)	149 (73.8)	p =0.001
Ethnic group			
Hausa	200 (99.0)	114 (56.4)	χ^2= 133.929
Ibo	2 (1.0)	28 (13.9)	p = 0.001
Yoruba	0 (0)	26 (12.9)	
Others	0 (0)	34 (16.8)	
Marital status			
Single	21 (10.4)	35 (17.3)	χ^2= 4.063
Married	181 (89.6)	167 (82.7)	p = 0.044
Educational status			
No formal	112 (55.4)	32 (15.8)	χ^2 =111.640
Primary	43 (21.3)	25 (12.4)	p =0.001
Secondary	39 (19.3)	71 (35.1)	
Tertiary	8 (4.0)	74 (36.6)	
Occupational status			
Unemployed			
Business	9 (4.5)	23 (11.4)	χ^2= 105.848
Civil servant	36 (17.8)	43 (21.3)	p = 0.001
Farmer	96 (47.5)	10 (5.0)	
Fisherman	4 (2.0)	29 (14.4)	
	57 (28.2)	97 (48.0)	
Estimated monthly income of household head			χ^2= 5.009
<N18,000	91 (45.0)	69 (34.2)	p = 0.025
≥N18,000	111 (55.0)	133 (65.8)	
Duration of stay in the community (in years)			
1-5	6 (3.0)	66 (32.7)	χ^2=75.631
6-10	9 (4.5)	24 (11.9)	p <0.001
>10	187 (92.6)	112 (55.4)	
Disability			χ^2= 0.344
No disability	195 (96.5)	197 (97.5)	p = 0.558
Has disability	7 (3.5)	5 (2.5)	

Table 2:Characteristics of the houses in rural and urban communities

Characteristics of houses	Rural (n=202) Frequency (%)	Urban (n=202) Frequency (%)	Test statistics
Building materials			
Mud block	200 (99.0)	5 (2.5)	χ^2 = 376.568
Cement block	2 (1.0)	197 (97.5)	p =0.001
Main source of drinking water			
Community/Household tap			
Well	3 (1.5)	72 (35.6)	χ^2= 400.270
Borehole	196 (97.0)	16 (7.9)	p =0.001
Buy water	0 (0)	78 (38.6)	
	3 (1.5)	36 (17.8)	
Type of toilet			
No toilet	24 (11.9)	13 (6.4)	χ^2 =246.551
Pit latrine	174 (86.1)	32 (15.8)	p =0.001
Water closet	4 (2.0)	157 (77.7)	
Main method of refuse disposal	168 (83.2)	120 (59.4)	χ^2 =85.515
Open dumping	32 (15.8)	19 (9.4)	p =0.001
Open burning	2 (1.0)	39 (19.3)	
Land fill	0 (0.0)	24 (11.9)	
Dump in river/paying boys to pack			

Table 3: Flood disaster preparedness of households in rural and urban communities

Indices	Rural n=202 n (%)	Urban n=202 n (%)	Test Statistics χ^2 p value
Availability of battery-operated radio with extra batteries	150 (74.3)	122 (60.4)	8.822 0.003
Availability of flash light with extra batteries	139 (68.8)	114 (56.4)	6.609 0.010
Availability of adequate non-perishable food for the next 3 days	109 (54.0)	147 (72.8)	19.397 0.001
Household has evacuation destination	86 (42.6)	147 (72.8)	37.730 0.001
Have discussed with family members on what to do in case of flood	76 (37.6)	73 (36.1)	0.096 0.757
Availability of 1 gallon/person/day of drinking water for the next 3 days	33 (16.3)	119 (58.9)	78.007 0.001
Have any telephone number for emergencies - fire service, Nigeria Police, SEMA, Medical personnel	27 (13.4)	38 (18.8)	2.218 0.136
Availability of cash or ATM card for use in case of flood disaster	22(10.9)	151 (74.8)	168.230 0.001
Having a health personnel as a member of the household	8 (4.0)	20 (9.9)	5.526 0.019
Someone in the household trained on first aid	8 (2.0)	50 (24.8)	35.512 0.001
Availability of first aid kit	3 (1.5)	30 (14.9)	24.056 0.001
Household practices flood safety drills	1 (0.5)	11 (5.4)	10.007 0.006
Have a household member who has participated in flood disaster drill	0 (0.0)	12 (5.9)	10.392 0.001
Awareness of community warning signals such as use of whistle, siren	0 (0.0)	6 (3.0)	8.408 0.030
House insured against flood	0 (0.0)	2 (1.0)	2.783 0.499

Table 4: Overall households flood disaster preparedness in rural and urban communities

Community flood preparedness	Rural (n=202) n (%)	Urban (n=202) n (%)	Total
Not prepared	192 (95.0)	171 (84.6)	363 (89.9)
Partially prepared	10 (5.0)	21 (10.4)	31 (7.7)
Very prepared	0 (0.0)	10 (2.5)	10 (2.5)

Fisher exact= 20.092 p=0.001

Profile of the FGD and KII Participants

The 48 FGD participants from the 3 rural communities (Takalafiya, Soba and Garu) were aged between 18 and 62 years and educational qualification from no formal education and tertiary. The 48 FGD participants from the 3 urban communities (Ungwan Rimi, Kabala and Kigo) were aged between 22 and 65 years and educational qualifications ranging between secondary and tertiary.

The 3 community leaders from the 3 rural communities (Takalafiya, soba and Garu) were 40, 51 and 60 years old; with primary, secondary and no formal levels of education respectively. They all have been ruling the communities for at least 1 year.

The M & E office of SEMA was 40 years of age, had university education and has been in that position for 3 years during the survey.

Information about flooding in the communities

The FGD participants from the rural and urban communities agreed that flooding is a major problem in their communities. However, the pattern of flooding varies from community to community.

Some of the reports are captured as follows: A male participant from Kabala said, "*The community has been experiencing flood at intervals of 10 years, 5 years, 2 years, but now yearly*" (Urban, FGD 3). While a male participant from Ungwan Rimi said, "*Flood is a big problem here and once it is raining season, we know that we are in trouble*" (Urban, FGD 5).

A male participant from Takalafiya said, "*Flood is a big problem in our community and it is usually from fullness of rivers, lack or blockage of drainages. And in recent years, the occurrence has no regular pattern in the community but it usually takes place between August and September*" (Rural, FGD 1).

All the female respondents from the six communities that participated in the FGDs were aware that flood is a major problem in their respective communities. It usually occurs between August and September with serious effects on the communities. A female participant from Garu said, "*Flood is a problem in the community. It could happen in the night making it very dangerous. The water level could reach your waist level*" (Rural, FGD 8).

Another female participant from Garu said, "*Flood is frustrating our husbands because they have to sell crops and food stuff to buy cements and 'marmara' to enforce the buildings". Flood water has carried customers' clothes*" (Rural, FGD 8). A female participant from Takalafiya said, "*Flood almost took away my co-wife last year, if not that God saved her*" (Rural, FGD 2). A participant from the same community said that she lost her 6-year-old child due to flood in the community 2 years ago.

During the KIIs, all the six community leaders acknowledged that the communities have been suffering from flood impact for a long time, and that once it rains, they live in fear because most houses here were built with mud blocks.

A community leader from Soba police station community said, "*Once it is cloudy, we are in trouble; nobody comes out of his/her house until the rain stops*" (Rural, KII).

Household flood disaster preparedness

Majority of the respondents in the rural and urban communities described their households' level of flood disaster preparedness as generally not prepared, except for some in Ungwan Rimi community (an urban community) that said that their households are partially prepared against flood disasters.

A male participant from Takalafiya said, "*Household flood disaster preparedness is very poor and factors responsible included poverty, lack of good roads, improper refuse disposal, building on water ways, poor flood awareness and education*" (Rural, FGD 1).

However, a male participant from Ungwan Rimi said, *"We are partially prepared because Christian Aid (NGO) and European Union have been carrying out flood education and training in our community. They have also installed a rainfall gauge meter in the community*" (Urban, FGD 5).

A female participant from Kabala said, "*Household flood disaster preparedness is poor here because our husbands are farmers, poor and our houses are not built with mud block.*" (Rural, FGD2).

A male participant from Ungwan Rimi said, *"We get information about flooding through a rain gauge meter installed in the community to monitor the level/ volume of water in the river close to the community. In addition, posters with emergency phone numbers to contact in case of flooding have been provided by Christian Aid and European Union"* (Urban, FGD 5).

The Household flood disaster preparedness was poor especially as reported by the community leaders in the rural communities. The people in the rural communities only mix mud and plaster the walls of their houses, which in most cases does not prevent collapse of houses.

A community leader in Garu said, "*We only rely on God*" (Rural, KII).

Community Leader from Takalafiya said, "*The people here are poor and uneducated, so nobody thinks of us*" (Rural, KII).

Most of the community leaders mentioned poverty and lack of knowledge on flood disasters as factors that influenced household flood disaster preparedness. Most of the community leaders, the members of the communities knew very little about SEMA and LEMC in the State.

The SEMA staff (M & E officer) acknowledged that flood has been a problem in the six studied communities with devastating impact on social and economic development. Flood has been happening with increasing impacts, such as collapsed of buildings, loss of properties, loss of animals and disruption of economic activities, among others. The SEMA staff said: "*There are nine communities that we have selected as pilots and Ungwan Rimi is one of them. A lot of people have been affected by flooding in terms of social and economic activities in the above mentioned six communities; Ungwan Rimi is one of the worst hit in the state and Kigo New Extension is next. A five-year report from SEMA showed that every year not less than 500 people in Ungwan Rimi are affected by flood*" (SEMA staff, KII).

DISCUSSION

In this study, majority of the households in both the urban and rural communities were not prepared against flood disaster. This finding is similar to that of the studies in Oyo, Rivers and Edo States which showed lack of preparedness against flood in the communities.[22,35,36]

The public health implication of poor household preparedness is that in an event of flood in the studied areas, its impact could be very serious; but will likely to be more among households in the rural communities because of their estimated monthly income, building materials used to build the houses, main source of their drinking water and type of toilet facilities there, among others. Researchers have emphasized the importance of individual and household disaster preparedness in response to natural disasters; and it goes to show that if individuals are not ready, then nobody is ready because individuals are the basic unit of analysis in disaster preparedness.[37]

The findings of the quantitative and the qualitative components of the study were very similar except for the disagreement between the responses of the SEMA M and E officer, the community members and the community leaders in virtually all the communities studied. The SEMA staff reported that the state disaster agency has been very proactive in the areas of flood awareness and education, simulation exercises and responses but the other

respondents said that SEMA has not been proactive in flood disaster management in their communities; meaning there is a disconnection between what the SEMA staff said and what the community leaders and members reported.

The community, religious leaders and members of Takalafya and Garu communities reported that SEMA has performed poorly in terms of enlightenment, dissemination of early warning information, training on flood disaster mitigation and mobilization, among others.

Rural communities have been documented to have higher percentage of people living in poverty and lower per capita income which are among the factors that influence flood disaster preparedness.[8,38] They may not observe the paradigm shift from reactive to proactive disaster risk reduction and management, land use pattern, evacuation routes, river protection and resilient housing, among others. In case of the urban communities, the growth and development of such areas may be rapid with no commensurate infrastructural and non-structural development that may affect assistance in the event of flood disaster.[39]

A number of elements used in the assessment of the household flood disaster preparedness in both the rural and urban communities were deficient, which included availability of persons trained on first aid and availability of first aid kits, having contacts of first responders in emergencies, households' participation in safety and disaster drills, houses having flood insurance, early warning signs and having health personnel residing in the communities. These are capability/manageability factors that could play very important role in the prevention and mitigation of flood disasters. Significant achievements in science and technology in the area of early warning signs in both rural and urban communities endure the negative consequences of severe flooding. Poor early warning systems will mean that people might not be able to respond properly to and recover fully from the impact of floods in both communities.

A study has identified that, for every euro invested into an early warning system for flood in the Europe, there is a return of 159 euros after twenty years of operation.[40] Educating people on the awareness of disaster risk management could lead to a significant reduction in the negative impact of disaster.[41]

A similar study in Ethiopia[32] showed only 24.4% of the households were prepared for flood disaster, and that in Japan found insufficient disaster preparedness both at household and community levels, with no complementary household and community disaster preparedness.[42] Meaning that poor household flood disaster preparedness is not limited to Nigeria but other countries such as Ethiopia, Zambia and Ghana, among others[9,18,32] However, factors such as income, education, and house ownership, among other households and individual characteristics, had significant positive effects on preparations for flood disasters.[7]

The 2012 flood involving 32 of the 36 States in Nigeria has been described as the most devastating in the last 40 years where over 7 million persons have been affected, 5800 injured and 431 killed.[43]

Similar finding has been reported in other African countries. The aftermaths of flood disasters in Ghana are the large-scale destruction of infrastructure, displacement of people, loss of human lives, outbreak of diseases, huge loss of investments, among other things. Over the years, the government and disaster management agencies of Ghana have mainly focused on disaster relief activities after the occurrence of disasters similar to the situation in Nigeria.

Majority of the respondents being within the productive age group and educated could be taken advantage of in the design of intervention programme for both communities. In addition, a good proportion of the respondents have been staying in the communities for more than 10 years means that they are knowledgeable about the impacts of flood disaster in the communities and the presence of person with disability means this vulnerable group will need assistance in all aspect of flood management in the communities.

Awareness and preparedness towards disasters vary depending on the characteristics of individuals within the community and characteristics of communities across space. It is essential for households in disaster-prone areas to have disaster management capacities to ensure their safety and survival when faced with hazardous events.

However, in certain instances, floods have positive impacts. Some of the positive impacts include increase in primary production due to sediments containing phosphorus and nitrogen, abundance of water for livestock, among others.[44, 45] These could explain why farmers and fisherman are some of the persons staying in the flood-prone communities in this study. Disaster could lead to development, thereby stressing the importance of effective flood disaster preparedness and the concepts of living with flood and "build back better".

Limitations of the study: There is possibility of the participants reporting mainly desirable responses, and some may suffer from recall bias because of their inability to remember past flood event they have experienced.

Conclusion: Majority of the households were not prepared in both the rural and urban communities, but only small proportion were very prepared in the urban households compared to none in the rural households. The identified deficiencies were availability of personnel trained on first aid and first aid kits, contact phone numbers of first responders in disasters, household members participating in safety and disaster drills, flood insurance and poor early warning systems, among others. These deficiencies were more among the rural households. There is a need for training in both communities in the various areas they are deficient; first aid, family disaster plan, simulation exercise and early warning system. There is need for SEMA and LEMC to organize and execute programs on flood disaster education and training in the identified flood-prone communities left out.

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