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ORIGINAL RESEARCH

Household flood preparedness and associated factors in the flood-prone community of Dembia district, Amhara National Regional State, northwest Ethiopia

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Background: Flood preparedness empowers the community to respond effectively to related hazards. However, there was no research done in the country concerning household flood preparedness. Therefore, the aim of this study was to assess household flood preparedness and associated factors in the flood-prone community of Dembia district, northwest Ethiopia.

Methods: A community-based cross-sectional study was conducted from March to April 2014 in the Dembia district. A two-stage sampling technique was used. The study was conducted using 806 flood-prone participants. An interviewer-administered questionnaire was used to collect data. The collected data were entered using Epi info version 3.5.1 and transported into SPSS version 16 for further analysis. Descriptive and analytic statistics were computed. Variables having association with the outcome variable were reported using odds ratio with 95% confidence interval (CI). Model fitness was checked by Hosmer and Lemeshew chi-square test.

Results: Household flood preparedness was found to be 24.4%. The age group of ≥ 46 years (adjusted odds ratio [AOR]=2.62; 95% CI: 1.12, 6.00) above, monthly household income >893 Ethiopian Birr, (AOR=6.72; 95% CI: 2.2 7, 19.88) attending primary level education (AOR=22.08; 95% CI: 8.16, 59.74), warning system in household (AOR=5.41; 95% CI: 2.38, 12.32), knowledge of flood prevention, (AOR=2.52; 95% CI: 1.43, 5.57) were positively associated with household flood preparedness.

Conclusion and recommendation: This study has demonstrated that household flood preparedness was found to be low in the study area. Household flood preparedness was significantly associated with the older age group, attending primary level education, having a higher monthly income, receive household level warning messages, having knowledge on preparedness, prior exposure to a flood, and length of flood >6 days. Strengthening household flood preparedness in advance is important in order to prevent flood and its related consequences.

Keywords: household, flood preparedness, flood, Ethiopia

Introduction

Ethiopia is one of the flood-prone countries in Africa. The worst flood incidence occurred in the summer of 2006 as a result of prolonged and intensive rainfall, which resulted in flash floods and overflow of rivers and dams affecting 199,900 people in eight regions of the country. This resulted in loss of lives, damage of properties, and destruction of livelihoods of tens of thousands of people. All measures and policies taken before an event for the prevention, mitigation, and readiness constitute household preflood preparedness. Preparedness is a continuous cycle. The measures taken by the households to

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strengthen this preparedness cycle were planning, organizing, training, equipping, exercising, evaluation and improvement activities to ensure effective coordination, and enhancing capabilities to prevent, protect against, respond to, recover from, and mitigate the effects of flood disasters. Preparedness includes designing warning systems, planning for evacuation and reallocation, storing food and water, building temporary shelters, devising management strategies, and holding disaster drills. Contingency planning is also included in the preparedness and planning for post-risk response and recovery. A recent policy regarding the households preparedness has suggested that improving preparedness of the communities is the key to the success to reduce flooding disaster risk, and this is closely linked to economic status and knowledge because top–down programs in which communities are not involved tend to reach those worst affected by disaster, and may even make them more vulnerable.[1,2]

The most important challenge is to change from concentrating solely on postdisaster relief and focus on predisaster preparedness because of various factors, such as strengthening awareness of the community and supplying resources. Evidences showed that for every dollar spent on prevention and preparedness, ~100 dollars or more is needed for relief efforts after the disaster has taken place. Flood preparedness empowers households and communities to respond effectively to hazards associated with flood.[1,3,4] However, there was no research done in the country concerning household flood preparedness. Therefore, the objective of this study was to assess flood preparedness of the households and associated factors in a flood-prone community in Dembia district, northwest Ethiopia.

Methods

Study design

Community-based cross-sectional study was conducted to assess flood preparedness of the households and associated factors in a flood-prone community of Dembia district.

Study setting

Ethiopia is one of the countries that follow federal system of administration, and within this federal country, there are nine ethnic states. Thus, Amhara is one of the states mainly inhabited by the people of Amhara. These people are found in the northern and central parts of the country, mainly in the highland segment of the country. Each region has zones, lower units of administration. This particular study was conducted in Dembia district, North Gondar zone, one of the zones of Amhara region, from March to June 2014. The district is bordered by the largest lake of the country, Lake Tana. Dembia district is located in northwest of Ethiopia, 775 km from the capital city Addis Ababa. The district lies in an elevation between 1400 and 2700 m above sea level. Administratively the district is divided into 45 kebeles, which are the lowest governmental administrative units of the government of Ethiopia, of which 5 kebeles are urban and 40 kebeles are rural. Twelve kebeles of the district were flood prone. The flood-prone community is uniformly resided and found at the periphery of Lake Tana. The estimated number of household heads in the flood-prone community is about 26,465, which consisted of an estimated 70,930 adult populations aged ≥18 years (Figure 1).[5]

Source and study population

The source populations were household heads aged ≥18 years living in the flood-prone community of the district. In this study, fathers or, in some households, mothers were the leaders or managers of their households, and thus, they were considered as heads of households and selected to be the study subjects, considering them as more experienced, responsible, and involved in the households flood preparedness than the other members of the households. The study populations were those household heads with similar age group living in the six selected flood-prone kebeles of the district.

Inclusion and exclusion

All selected household heads who lived at least for 1 year in the study area were included in the study. Heads of households who were unable to give the required information because of different reasons such as unable to hear were excluded from the study.

Sample size determination

Sample size was calculated using single population proportion formula, $n=z^2_{a/2}(p\times[1-p])/d^2$, and assuming the proportion of household's flood preparedness as 50% because there is no similar study done so far, the precision as 5%, and 95% confidence level. Finally, the sample size was found to be 384. Considering the design effect of two and possible nonresponse rate of 5%, the minimum sample size required was calculated to be 806.

Sampling procedure

A two-stage sampling technique was used. Initially, from the 12 rural flood-prone kebeles, six were selected randomly using lottery method. Then, individual households in the

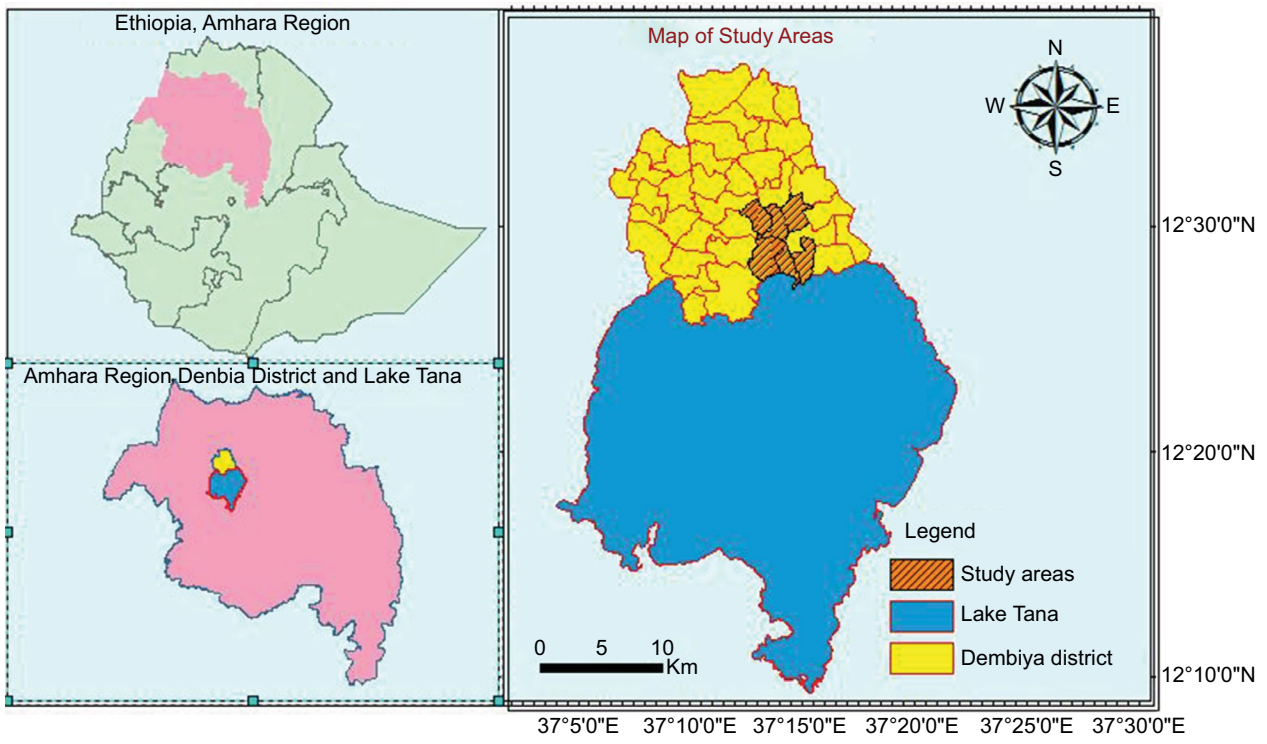

Figure 1 Map of study area.

selected kebeles were drawn using a simple random sampling technique. List of households in the selected kebeles were obtained from each kebele office. The number of households that were included among the selected kebeles was determined to be proportional to the household size. When eligible participants were not available at home during data collection, the interviewers had revisited twice again, and finally if unable to get the household head, the next immediate household was taken.

Variables

The dependent variable of this study was household flood preparedness, whereas independent variables included age, educational level, household monthly income, employment status, housing condition, awareness, and knowledge of flood preparedness.

Operational definitions

Household flood preparedness

In this study, households who were found to have included 11 items in the flood preparedness emergency kit during the data collection period were considered as prepared households. Those 11 items in the emergency kit during the data collection period were emergency warmth and shelter, food, tools, water, receiving training, batteries, developed a reconnection plan for evacuation where to go and whom to call, personal sanitation, battery-powered radio and/or cell phone, first-aid kit, and necessary documents.

Awareness

Household heads were considered as having awareness if they responded "Yes" for the question "Have you ever received any information about the awareness of household flood preparedness through warning, training and experience?"

Warning system in the households

When participants currently used at least one warning system in the households such as cell phone, microphone, and warning using local materials.

Knowledge

When respondents responded "Yes" for the question "Do you know about household's preparation for flooding?"

Flood experience

When subjects were exposed to flood disaster at least once in their life time.

Prior exposure

When subjects were exposed to flood disaster in the last rainy season.

Data collection tools

To assess household flood preparedness and associated factors, structured and interviewer-administered questionnaire was used. The questionnaire was pretested in other flood-prone areas that were not included in the main study (Figure S1).

Data collection procedure

Data were collected using a structured interviewer-administered questionnaire having two main parts. The first part contained information on sociodemographic characteristics, whereas the second part contained information on awareness, knowledge, and household flood preparedness. The questionnaire[6] was translated into Amharic and back-translated to English for its consistency. A total of six diploma-level data collectors and two BSc-holding supervisors were employed after training on the main aim of the study, the techniques of data collection, and the confidentiality of the data. Respondents were asked whether they know and made any flood preparation by themselves in order to make their households and homes safer from flood disaster. If the respondents had replied that they were aware and prepared for flood, the data collector selected items from their emergency kit checking the 11th item in the kit.

Data quality control

The quality of data was assured by giving emphasis in designing data collection tools, and pretesting and training the data collectors and supervisors. Daily supervision was conducted and corrections were made accordingly.

Data processing and analysis

Data were checked, coded, and entered to Epi info version 3.5.1 and exported to SPSS statistical software version 16 for analysis. Both descriptive and analytic statistics were computed. The fitness of the model was checked using Hosmer and Lemeshew chi-square test. Bivariable analysis was used to screen eligibility of the independent variables. All variables with a p-value of <0.2 in the bivariable analysis were entered into the multiple logistic regression model to identify the net effect of factors associated with household flood preparedness. Multicollinearity within independent variables was checked using variance inflation factor.

Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board of the University of Gondar. A permission letter was obtained from Dembia district administrative office and communicated to each selected kebele. Study participants were informed about the purpose of the study, the importance of their participation, and the right to withdraw from the study at any time they want. Verbal consent was obtained prior to data collection. Confidentiality of information was kept through securing the data in a locked room and using passwords in computers. Consent to publish is secured from study participants.

Results

Sociodemographic characteristics of respondents

Among 806 eligible participants, 776 were interviewed, making the response rate 96.3%. The majority of respondents were men, 663 (85.45%). Respondents' age ranged from 21 to 90 years with a mean age of 45 years. Six hundred

Table 1 Sociodemographic characteristics of the participants in the Dembia district, northwest Ethiopia, 2014

Variable	Frequency	Percentage
Sex		
Male	663	85.4
Female	113	14.6
Age, years		
18–28	158	20.4
29–45	268	34.5
≥46	346	45.1
Marital status		
Married	641	82.6
Single	41	5.3
Separated	31	4.0
Widowed	63	8.1
Religion		
Orthodox	525	67.7
Muslim	251	32.3
Educational status		
Cannot read and write	514	66.2
Primary level (grade 1–4)	262	33.8
Monthly income		
≤893 ETB	403	51.9
>893 ETB	373	48.1
House ownership		
Owned	752	96.9
Rented	24	3.1
Family size		
1–2	311	40.1
3–4	270	34.8
5–6	90	11.6
≥7	105	13.5

Abbreviation: ETB, Ethiopian birr.

forty-one (82.6%) of the participants were married. More than two-third (66.2%) of the participants were unable to write and read (Table 1, Figure S2).

Awareness and knowledge of the respondents toward flood preparedness

Of the total participants, 82.1% had awareness on flood prevention and preparedness during this study, 238 (30.7%) had taken training, and 176 (22.2) had warning system in their household. Mobile was a means of information sharing for household warning system for 176 (22.2) respondents. Two hundred eighty-one (36.1%) respondents reported that they had knowledge on household flood preparedness and 100% of the respondents had flood experiences (Table 2).

Household flood preparedness in Dembia district

Respondents were asked 11-item questions to assess household flood prevention and preparedness. Accordingly, respondents were classified as having no score or items, have some items, and have all the 11 items in their flood preparedness emergency kit according to their demographic characteristics, economic status, and knowledge, based on their capacities. It was triangulated with observation of the items in the emergency kit. Thus, 189 (24.4%) of the respondents had household flood preparedness, whereas the remaining 587 (75.6%) respondents did not have preparedness (Figure 2).

Table 2 Knowledge and awareness of participants on household flood preparedness in the flood-prone community, Dembia district, northwest Ethiopia, 2014

Variable	Frequency	Percentage
Awareness		
No	139	17.9
Yes	637	82.1
Training		
No	538	69.3
Yes	238	30.7
Warning system in the household		
No	604	77.8
Yes	172	22.2
Knowledge		
No	495	63.7
Yes	281	36.3
Prior exposure to a flood		
No	360	46.4
Yes	416	53.6
Length of flooding, days		
≤6	449	53.6
>6	327	46.4

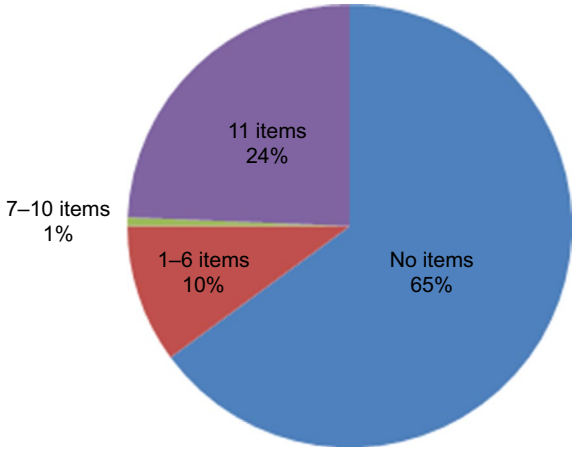

Figure 2 Distribution of scores for cutoff point selection of the 11-item questions among heads of household respondents in the flood-prone Dembia district, northwest Ethiopia.

Factors associated with household flood preparedness

Variables such as gender, age, educational status, religion, household income, occupation, marital status, family size, house ownership, warning system in household, knowledge, prior exposure, previous flood experience, awareness, any training for flood prevention and preparedness, and duration of flooding were found to be eligible for multivariable logistic regression. In the multivariable analysis, age, household monthly income, educational status, warning system in household, knowledge, prior exposure, and duration of flooding were significantly associated with household flood prevention and preparedness.

Individuals who were aged ≥46 years were nearly three times more likely to have household preparedness compared with those aged 18–28 years (AOR=2.62; 95% confidence interval [CI]: 1.12, 6.00). The odds of having preparedness among individuals who had primary level of education were found to be higher compared with individuals who were unable to read and write (AOR=22.08; 95% CI: 8.165, 59.74). Income was also found to be statistically significant with household flood preparedness. Households having monthly income >893 Ethiopian birr were nearly 6.7 times prepared compared with those who had ≤893 birr (AOR=6.72; 95% CI: 2.27, 19.88). The odds of being prepared for flood among those having warning system in the household were higher than those who did not have (AOR=5.41; 95% CI: 2.38, 12.32). Respondents having knowledge on household preparedness were more likely to be prepared compared with less knowledgeable individuals (AOR=8.91; 95% CI: 1.67, 47.57). The odds of being prepared among those who had prior exposure were higher compared to those with no such exposure (AOR=32.67; 95% CI: 6.15–67.46). The odds

Table 3 Factors associated with household the flood preparedness in flood-prone community, Dembia district, northwest Ethiopia

Variable	Household flood preparedness, n (%)		COR (95% CI)	AOR (95% CI)
	Yes	No		
Age, years				
18–28	38 (20.1)	120 (20.4)	1.00	1.00
29–45	3 (1.6)	265 (45.1)	0.04 (0.01, 0.18)	0.6 (0.09, 3.84)
≥46	148 (78.3)	202 (34.4)	2.3 (1.52,3.50)	2.6 (1.2,6.1)
Education				
Cannot read and write	9 (4.8)	506 (86.2)	1.00	1.00
Primary level	180 (95.2)	81 (13.8)	124.9 (61.5, 253.9)	22.1 (8.16, 59.1)
Monthly income in ETB				
≤189	7 (3.7)	396 (67.5)	1.00	1.00
>189	182 (96.3)	191 (32.5)	53.9 (24.85, 116.9)	6.7 (2.27, 19.9)
Warning system in household				
No	53 (28)	551 (93.9)	1.00	1.00
Yes	136 (72)	36 (6.1)	39.3 (24.7, 62.4)	5.4 (2.4, 12.3)
Knowledge of flood				
No	3 (1.6)	492 (83.8)	1.00	1.00
Yes	186 (98.4)	95 (16.2)	32.7 (28.2, 100.8)	8.92 (1.67, 47.6)
Prior exposure to a flood				
No	5 (2.6)	355 (60.5)	1.00	1.00
Yes	184 (97.4)	232 (39.5)	56.3 (22.8, 139.0)	32.67 (6.2, 67.4)
Duration of flooding, days				
≤6	66 (34.9)	383 (65.2)	1.00	1.00
>6	123 (65.1)	204 (34.8)	3.5 (2.48, 4.9)	2.5 (1.14, 5.6)

Note: Reference=1.00.
Abbreviations: CI, confidence interval; COR, crude odds ratio; ETB, Ethiopian birr.

of household preparedness were three times higher among those experiencing >6 days of flood compared with those experiencing ≤6 days duration of flood (AOR=2.52; 95% CI: 1.43, 5.57; Table 3).

Discussion

This study has tried to assess household flood preparedness and the associated factors among the flood-prone communities of Dembia district. The findings indicated that household flood preparedness was lesser (24.4%). Factors such as age, household monthly income, educational status, warning information in household, knowledge of flood, prior exposure of flood, and duration of flooding were significantly associated with household flood prevention and preparedness.

Age was positively correlated with household flood preparedness. Households led by older individuals were 2.62 times more likely to have household preparedness compared with those aged households headed by younger ones (AOR=2.62; 95% CI: 1.12, 6.00). Previous studies suggested that older household heads were more likely prepared based on their flood experience.[7] This might be due to the fact that older respondents had more basic supplies to survive before and after a disaster as a result of previous knowledge about vulnerable area.

This study also showed that household heads with primary level of education were highly prepared compared with those unable to read and write. Previous studies indicated that primary level of education was positively correlated with household flood.[8] The possible explanation of this relationship could be explained by knowledge, skills, and access to more information in order to decrease vulnerability and insecurity that contributes to household preparedness to flood.

Households with better monthly income were found to be better prepared than those with lower monthly income. This was supported by another study that showed that households with lower income had low level of preparedness than those with higher income.[9] This might be due to the fact that those with better income may have adequate resources, which could enhance their preparedness efforts.

Household warning system was positively correlated with flood preparedness. In this study, mainly battery-powered radio and/or cell phone were used as warning systems. Thus, respondents having either battery-powered radio or cell phone as a warning system in the household were more likely prepared than those who had neither of them. Previous studies suggested that a targeted flood warning service in the household raised their awareness regarding preparedness activities. Those who believe that household protection is

a personal responsibility have showed higher levels of preparedness than those who did not believe.[3]

Knowledge was positively correlated with household flood preparedness. Respondents having knowledge of household flood preparedness were more likely to be prepared than those who did not have knowledge. This could be explained by that those who had knowledge on what should be included in an emergency kit were more likely prepared than those who lack the knowledge. This finding was supported by previous studies, which indicated that lack of knowledge was a barrier to accomplishing preparedness activities.[10]

There was a strong association between prior exposure and household flood preparedness. This finding was found consistent with another study, which showed that prior exposure to major flooding events increases individual preparedness among high-flood risk populations.[11] This could be due to recalling of the prior serious physical and economical damage as well as fear similar flooding events in the future.

Duration of flooding was positively associated with household flood preparedness. Households experiencing >6 days length of flooding were better prepared than those experienced ≤6 days of flooding. The possible reason could be increased length of flooding, causing serious damage, which could enhance individual's knowledge of future hazards and preventive measures.

Gender was not significantly associated with household flood preparedness. This finding was not in line with previous studies that indicated that gender was related to household flood preparedness.[12] The reason for this difference could be that gender alone might not be a sufficient predictor of household preparedness, rather household flood preparedness related to obtaining knowledge, skills, and resource.[13]

Home ownership was not associated with household flood preparedness. This was also not consistent with previous studies that indicated that home ownership was significantly associated with household flood preparedness.[14] The possible explanation for this finding could be that household's flood preparedness was not due to having home or not but a result of the presence of property, better knowledge of options for action, and financial resources.

Previous flood experience was not associated with household's flood preparedness. This finding was not in line with the findings of other studies that indicated that prior flood disaster experience has a significant association with household flood preparedness for future flood disaster.[7,15] This could be due to the fact that as time laps, the impact of disaster experience on future preparedness behaviors may fade up.

Conclusion

Household flood preparedness in the flood-prone community of Dembia district was found to be low. Age of household heads, education, monthly income, household warning system, knowledge on flood preparedness, prior exposure of flood, and duration of flooding were significantly associated with household flood preparedness.

Recommendation

In light of the findings of the study, the authors recommended that, in addition to community flood preparedness strategies, concerned bodies should strengthen household flood preparedness considering the knowledge of the community, age of household heads, income level, and duration of flood they have experienced.

Acknowledgments

Our special thanks and sincere appreciation go to the University of Gondar for the financial support of this study. We are highly indebted to Dembia district, all study participants, data collectors, and supervisors. University of Gondar funded this study.

Author contributions

BA designed the study, involved in proposal development, supervised data collection, and participated in data analysis and interpretation of the data. MW and AS assisted in the design of the study, proposal writing, data analysis, and interpretation of the study. All authors were responsible for data collection, initial analysis, and drafting of manuscript. All authors reviewed and approved the final manuscript.

Disclosure

The authors report no conflicts of interest in this work.

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Supplementary materials

Title of the project: household flood preparedness and associated factors in flood-prone community of Dembia district, Amhara National Regional State, northwest Ethiopia.

Name of the investigators: Baye Ashenafi, Mamo Wubshet, Alemayehu Shimeka

Name of the organization: Gondar University, College of Medicine and Health Science, Institute of Public Health.

Introduction

Information sheet and consent form prepared by the investigator with the aim of explaining the research project that you are asked to join by the group of research investigators. The main aim of this research project is flood preparedness and associated factors in flood-prone community in Dembia district, ANRS, and northwest Ethiopia. Decision on your involvement will be made by you and only you. The investigator includes six data collectors, two supervisors, and two advisors from Gondar University.

Purpose

The main aim of this study is flood preparedness and associated factors in flood-prone community in Dembia district.

Procedure

To assess flood preparedness and associated factors in flood-prone community, you are invited to participate in the project. If you are willing to participate in this project, you need to understand and sign the agreement form. Then you will be requested to give response to some questions that will take few minutes (~30 minutes). All the responses given by you will be kept confidentially by using coding system whereby no one will have access to your response.

Risk

By participating in this study, you may feel that there is some discomfort especially on wasting your time (30 minutes) to respond questions but this may not be too much as you are one of the members of the communities, and your response will act as an important input to determine flood preparedness and associated factors in a flood-prone community. However, there is no physical or psychological risk expected being involved in the study.

Benefits

If you participate in this study, you may not gain direct benefit, but your participation will help us to assess flood preparedness and associated factors to enhance and upscale the finding.

Confidentiality

Information about you will be collected without your name but a code number assigned to will be stored in a file and kept locked. Your personal information will only be used for the purpose of the study, your response will be aggregated to yield summary data, but your individual response will not be reported.

Participation

You have to know that your participation is largely based on your willingness and approval. There are questions to be answered by you. You are expected to answer all of the questions but you have the right to say “no” and not participate in the study (you can choose not to respond to some or all of the questions). You have also a full right to withdrawal from this study at any time you wish without losing any of your rights and without any penalty.

Persons to contact in this research project will be reviewed and approved by the ethical committee of University of Gondar. If you want to know more information and ask any questions at any time you want, you can contact in the following address.

1. Baye Ashenafi
   Mob: 0913521195
2. Dr Mamo Wubishet (Bsc, Mph, PhD)
   Mob: 0912180307
3. Alemayehu Shimeka
   Mob: 0912137586

Are you willing to participate in the study?

Yes----------then continue

No----------thanks and move to the next study subject

Figure S1 Information sheet and consent form.

University of Gondar

College of Medicine and Health Science

Institute of Public Health

No	Question	Coding categories (circle the no)
101	Gender	Male……1 Female……..……2
102	Age (years)	----------
103	Education	Illiterate……....1 Write and read only…….2 From 1–4 grade……3 6–12 grade……..4 Above grade 12……5
104	Marital status	Married……1 Single……....2 Divorced……..3 Widowed……4 Separated……5
104	Number of household members	…….
105	Occupation	Unemployed……..1 Agriculture……2 Construction……3 GO employer……..4
106	Religion	Orthodox……1 Muslim……2 Protestant……..3
107	Ethnic group	Amhara……1 Tigre……..2 Oromo……..3
108	Housing conditions	Owned……1 Rented ……2
109	Permanent residence	Yes ----------1 No ----------2
110	Monthly income	……Birr
Section 2: Household flood preparedness information		
No	Question	Coding categories (circle the no)
201	Which one is more serious problem/s in your surroundings?	Flooding……1 Food shortage……..2 Communicable disease……..3 Noncommunicable disease ……..4
202	In the past, have you or someone in your household experienced a flood disaster?	Yes……1 No……..2
203	Have you been exposed to flood in the last rainy season?	Yes……1 No……..2.
204	Types of flood	Flash flood……1 Lake over flow flood……....2
205	How often does the flood strikes?	Once a year……1 Twice a year……..……2 Once in 2 years……...3 There is no similar occurrence…….4
206	Onset of disaster	Very fast onset……1 Slow onset……..2
207	How long does the disaster event lasts?	……days
208	Have you ever received any awareness about household flood preparedness through warning, training, and experience?	Yes……1 No……2
209	If yes, on which topics did you receive awareness?	Developing a community disaster plan…1 Practicing a disaster plan……..2 Shelter management……3 Evacuation planning/relocation….4 Items inclusive in the preparedness kit…5

210	Have you ever received a training on flood preparedness?	Yes……1 No……2
211	Is there any warning systems in your household?	Yes……1 (specify----------) No……..2
212	Do you know about HH emergency preparation for flooding?	Yes……1 No……..2
213	If yes, did you make any emergency flood preparation by yourself in order to make your family and home safer from flood disaster?	Yes……1 No……..2
214	If no, what was the reason?	Lack of knowledge……1 Resource constraints…….2 Lack of experience……..3 Lack of training……4 Lack of warning……5
215	If yes, have you or someone in your household stored or stocked up the following items as emergency preparation for a flood disaster (check all that you apply)?	Emergency warmth and shelter…….1 Food……2 Tools……3 Water……...4 Receiving training……5 Batteries……..……6 Developed a reconnection plan for evacuation: where to go and whom to call……..7 Personal sanitation……8 Battery-powered radio and/or cell phones……..9 First-aid kit……10 Necessary documents……..11
216	For how many days have you or someone in your household sufficiently stored or stocked up the above items for a flood disaster?	……..days
217	Does this community have any kind of a community plan that has been drawn by the community itself that made you more flood disaster resistant in prospect?	Yes……1 No……..2
218	Does your household have any kind of a household plan for flood disaster that made you more resistant in prospect?	Yes……..1 No……..2
219	Have you spent more money that made you more disaster resistant in prospect?	Yes……1 No……2
220	What things purchased/made to resist flooding disaster?	Boats ……..1 Dam construction ….2 Life jacket……..3

Thank you for your participation

Identification

Identification number of the respondent……

Name of data collector……..signature……

Name of supervisor……signature……

Date of data collection……..,……/2014

Name of kebelle……

Figure S2 English Version Questionnaire.