Psychological Impact of Flood and their coping behaviors among the residents of Melamchi and Helambu

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Acronyms and Abbreviations

COVID-19	Corona Virus 2019
DASS-21	Depression Anxiety Stress Scale-21
DRR	Disaster Risk Reduction
HSCL-25	Hopkins Symptom Checklist-25
IES-R	Impact of Event Scale-Revised
OR	Odds Ratio
PTG	Post Traumatic Growth
PTSD	Post traumatic Stress Disorder
SPSS	Statistical Package for Social Sciences
SRH	Sexual and Reproductive Health
SF-12	Short Form-12
WHO	World Health Organization

Abstract

Amidst COVID situation, heavy rainfall since June 15, 2021 has caused flooding and landslides in Helambu and Melamchi of Sindhupalchowk district resulting huge physical, infrastructural and human losses.(3) People experienced initial traumatic event followed by ongoing stressors and hence affecting person's mental health and well being. Hence, Tarangini Foundation conducted this research to assess the level of mental health status and the type of coping behaviors adapted by people affected by flood in Melamchi, Helambu.

Quantitative questionnaire survey design was used and a pre-determined questionnaire, 21-item Depression Anxiety Stress Scale (DASS-21) was used to collect the information on the level of mental health status.

Out of total 126 participants surveyed, 80.2% of the people had some kind of physical destruction that affected their livelihood due to flood. Among the surveyed participants, 22.2% had severe stress, 64.3% had extremely severe anxiety and 38.1% had extremely severe depression. Majority of the participants (73.8%) were involved in some sort of coping behavior. Significant association between depression and irregular menstruation after flood in adolescents ($p=0.041$, $OR=0.057$) was shown.

This study found a large negative impact of the flood on mental health outcomes and psychological functioning. Women and girls were disproportionately exposed to a wide variety of violence and misappropriate behaviors leading to a situation of fear and anxiety ultimately increasing incidence of mental and psychological problems. Hence, this is an area worthy of further investigation and guidance in order to lose the long-term mental health impacts in flood affected communities. This study further might be important to inform policy makers about the magnitude and prevalence of mental illness in affected population.

Chapter 1

Introduction

With the increase of COVID-19 cases and the onset of the second wave of COVID in Nepal, the country underwent lockdown in Kathmandu and surrounding districts from April 29, 2021.(1) With the further spike in cases, prohibitory orders were in place for 2 months in almost all the 77 districts across the country, after which government authorities decided to make a shift towards smart-lockdown to manage the ongoing pandemic crisis.(2)

Amidst this crisis situation, another emergency hit the country with flooding and landslides in many parts of the country. Heavy rainfall since June 15, 2021 has caused flooding and landslides in Helambu and Melamchi of Sindhupalchowk district, where (as reported on June 16, 2021) seven people have died and more than 60 people are missing, 260 houses have been damaged and more than 600 people are displaced.(3) Three bridges in Helambu and one in Melamchi have been swept away by the flood and many roads have been destroyed, leaving many parts of the district disconnected.(4) According to reports, floods and landslides in the Sindhupalchowk district have caused panic among the residents.(5) The risen river level has penetrated the local markets as well as many houses in the affected area. There is a risk of major humanitarian damage in the area. Cultivable lands have been converted into sandbank and the loss of properties caused due to flood is estimated to be in billions.(6)

Health system were already challenged with COVID-19 response, and with the addition of natural disaster on top of it have led to the neglect and denial of rights to sexual and reproductive health (SRH) care with increased mental stress and problems. According to the World Health Organization (WHO), natural disasters negatively impact the mental health and well-being of affected populations in the short- and long-term and affect the care of people with pre-existing mental health conditions.(7) Various researches also present similar findings that natural disasters and emergencies take a significant toll on mental health of the people affected.(8) Even among those affected women are more likely to be exposed to mental health risks due to the lack of capacity to avoid, cope with and recover from such disasters. (9)

Although health systems were challenged with unfortunate event like flood, the neglect and denial of rights to health care are unjustifiable. On top of that, women's are disproportionately affected in these scenarios. The overall marginalizing of health situation among the women in the ongoing scenario is reflection of the deep seated patriarchal orientation of health systems that dictate what constitutes 'essential' health services. Patriarchal concepts of women's roles within the family mean that women are often valued according to their ability to reproduce. (6) As a result, the imposed women's roles and structures and the consequences from the disaster have exerted double effects in the mental health of the women.

To expand on it, when a natural disaster occurs, it affects people's lives and livelihoods, but some population and communities are more vulnerable than others and disparity exists between them. On the other hand, the natural disaster has severe impacts to women. Women are left with household and other form of works during natural calamities. Women's responsibilities increase in times of natural disasters while their interests are poorly represented. Hence, this study will try to explore the disproportionate mental health affect exerted on women during the Melamchi flood and the coping strategies adopted by the population along with an approach to identify psychological impacts among the participants.

Rationale

Disasters can be especially difficult because they often involve an initial traumatic event followed by ongoing stressors. Immediately after the flood, many people experienced difficulty finding food, water, and shelter. For some this has been followed by long-term challenges or stressors, such as not having enough money or a regular source of income to support their survival. Due to all of these challenges, it is common that disasters, like the recent flood, can affect a person's mental health and wellbeing. People can be affected physically and emotionally.

In general, women are twice as likely as men to have mental health problems associated in stress, depression and anxiety. The pandemic has further exacerbated this condition and women have been disproportionately hit with increasing mental health conditions. In the case of Melamchi and Helambu, the situation is even more intense due to the onset of floods and landslides, coupled with the existing stressors of the second wave of the pandemic. In this regards, Tarangini Foundation

aims to conduct as a research on the psychosocial impact of flooding and landslide disaster on women with the following objectives:

- To assess the level of mental health status (stress, anxiety and depression) among the people affected by flood in Melamchi, Helambu.
- To determine the types of coping behaviors adapted by the population.
- To identify the socio demographic characteristics and factors associated with psychological impact among the participants.

Chapter 2

Methodology

Study design:

Quantitative questionnaire survey design was used to conduct the survey among the flood affected residents of Melamchi and Helambu. One-time cross-sectional method, using a pre-determined questionnaire was used to receive information regarding the psychological impact of the disaster on affected residents.

Study population and sample:

The target population comprised of people of age above 13 years residing in the flood and landslide affected regions of Melamchi and Helambu of the Sindhupalchowk district of Nepal.

Sampling technique:

Convenient sampling technique was used to gather the sample

Tools of data collection:

The study instrument comprised a structured questionnaire format that inquires about socio-demographic information such as sex, age, study level, residency and so on as well as the worries related to COVID-19 and availability of social support, among others. Moreover, the participants responded to the 21-item Depression Anxiety Stress Scale (DASS-21).

Data analysis and interpretation:

The obtained data was analyzed with IBM SPSS version 23.0. An analysis of descriptive statistics was conducted to illustrate the demographic and other selected characteristics of the respondents. Further analysis was conducted to examine the association between psychosocial variables and other selected variables.

Inclusion criteria:

- Adolescents and adults who were living in Melamchi and Helambu and were present at home at the time of the flood.

Exclusion criteria:

- Resident who were younger than 13 years old
- Adult individuals who are proven to have any mental disorders previously and have been getting treatments which affect the mental ability of the individual.

Ethical considerations:

All the participants voluntarily participated in the study after being informed about the purpose of the study. Concealment of the identity of participants was maintained and no identity was revealed.

Chapter 3

Literature Review

A cross sectional study was done in Nepal after about 1 year after the earthquake with an aim of gathering data on post traumatic stress and depression in adolescents along with the coping strategies. The Child Post traumatic Stress Scale and the Depression Self Rating Scale were used as the measurement tools. The study was done among 409 participants out of which the prevalence of post traumatic stress disorder (PTSD) was seen among 43.3% and depression was seen among 38.1% of the participants. The prevalence of PTSD was significantly higher in the earthquake affected areas (49% vs. 37.9%). The factors significantly associated with the PTSD diagnosis were female gender, joint family, financial problems, displacement, injury or being trapped in earthquake, damage to livelihood and fear of death. Significant number of adolescents had post traumatic stress and depression one year after the earthquake. (10)

A study was conducted in 2017 in Nepal with an aim of examining the frequency of common mental health and psychosocial problems along with their correlates after the 2015 earthquake. The study was done among 513 participants using stratified multi stage cluster sampling design. Hopkins Symptom Checklist – 25 was used to measure the symptoms of depression and anxiety. Similarly, PTSD Checklist – Civilian was used to assess the post traumatic stress disorder. The study showed that 34.3% of the participants had depression and 33.8% of the participants had anxiety. 42% reported that distress was a serious problem in their community. 5.2% of the people had elevated rates of PTSD symptoms above a validated cut off score. Similarly, higher levels of impaired functioning were found to be associated with greater odds of depression and anxiety symptoms. (4)

A study was conducted in Bhaktapur, Nepal among 558 mothers with an aim of describing the earthquake exposure, the impact on family's daily life and the symptoms of post traumatic stress disorder (PTSD) and their association in Nepalese mothers after 20 months of the earthquakes. The tool used was Impact of Event Scale – Revised (IES – R). The study found that, more than 60% of the participant's family life was affected negatively due to earthquake. Out of the total participants, 24% had IES – R scores indicating PTSD symptoms within clinical concern. Similarly, mothers with family members who were killed had higher IES – R scores than those

with no family members who died. The study thus demonstrates high level of exposure to traumatic events, large negative impacts on the everyday life of the families and a high level of PTSD symptoms. (11)

A cross sectional descriptive study was conducted among 291 adult survivors after 10 months of the earthquake in Nuwakot district with an aim of investigating the prevalence of post traumatic stress disorder and use of coping strategies among the participants. Multistage sampling method was used in this study. PTSD was measured by PTSD checklist – 5 and coping strategies were assessed with the help of adapted and modified brief cope scale. Data analysis was done using descriptive and inferential statistics. The study found that PTSD was prevalent among 24.10% of the adult survivors which was significantly associated with age ($p=0.017$), sex ($p=0.013$), education ($p<0.0001$) and injury to self ($p=0.003$). Active coping was found to be the highest used coping strategy. (12)

A study was conducted among respondents in the rural district of Bahraich, Uttar Pradesh, India with an aim of examining the immediate impact of a recurrent flood on mental health and functioning among an affected population. The study compared 318 affected respondents with 308 individuals who were not affected by the flood. Hopkins Symptom Checklist – 25 (HSCL – 25) was used to assess the symptoms of anxiety and depression. Psychological and physical functioning was assessed by using the Short Form – 12 (SF – 12). The study found that the affected group had shown much more symptoms of anxiety and depression in comparison to the unaffected group. The affected group also scored significantly lower on psychological and physical functioning than the unaffected group. (13)

A literature suggested that flooding is responsible for tremendous physical, psychological and social disruptions in the people that require extensive rehabilitation of the affected population. Along with the physical illnesses, flooding has resulted in the causation of mental health problems like PTSD, anxiety and depression. Some studies have also reported long term effect on mental health with profound psychiatric morbidity in flood affected individuals. It was found that the most common psychological illness of the people living in the flood affected regions would be PTSD that showed the symptoms like difficulty in sleeping, emotional distress, avoidance and emotional arousal. (14)

A cross sectional study was conducted among 450 individuals of the eastern region of Jeddah Governorate, Saudi Arabia with an aim of exploring the impact of floods on mental health of the residents affected by the flood disaster, identifying the natural factors causing the disaster, human impact and negative role in the disaster, measuring the psychological impact on the population in the affected place and estimating the prevalence of PTSD among the residents in the flood affected region of Jeddah. PTSS – 10 questionnaires was used to assess PTSD among people exposed to disaster. Data entry and statistical analysis was done in SPSS 14.0 statistical software package. The aftermath assessed by the PTSS – 10 questionnaires revealed the overall stress disorder mean score to be 3.50 out of 7. The study also found that highest score was recorded for the feeling of fear of places and situations. The mean stress score was significantly higher among males than females and was significantly higher among those who have jobs. (15)

A study was conducted with an aim of exploring the characteristics associated with psychological distress and mental health deterioration over the longer term. The research had examined responses from a postal survey of households flooded during the 2007 flood event across England. Descriptive statistics, correlation analysis and binomial logistic regression were applied for the data analysis. The study showed that the household income, depth of flooding, having to move out during reinstatement and mitigating actions were related to the prevalence of psycho social symptoms in previously flooded households. The findings from the study also suggested that, support with installing mitigating measures may lead to improved mental health outcomes for the population at risk. (16)

A study was conducted in 2012 with an aim of exploring the psychological effects of victims of the Johor Flood in Malaysia in terms of cognition, feeling or emotion and behavior. Exploratory qualitative approach was adopted in the study and convenient sampling technique was used. Total numbers of five participants were interviewed with the face to face interview. The study found that victims suffered cognitive, emotional and behavioral shortfalls like fear, anxiety, hopelessness, helplessness and depression. (17)

A systematic review was done in 2021 with an aim of determining the impact of psychological issues of people affected with the flood. The study was done with the 15 quantitative studies that were searched from the databases between 2006 and 2020. These studies were conducted across the world comprising six different countries. The findings from the study revealed that the

prevalence of Post traumatic depression was 80% among the various studies. Nearly 67% of people affected with flood were shown symptoms of anxiety and more than half (60%) of the respondents were depressive due to the flood aftermaths. (18)

A cross sectional study was conducted in 2019 with an aim of determining the effects of problem and emotion focused coping responses along with the psychological distress among the flood victims in Sabah. A total of 100 participants were included in this study and random convenient sampling technique was used during the sample selection. Depression Anxiety Stress Scale (DASS) was used as a tool to assess the level of depression, anxiety and stress among the participants. Similarly, problem focuses flood coping scale and emotion focused flood coping scale were used to investigate the coping responses after the flood. The results from the study found that, 68% of the respondents were in moderate level of depression with a mean value of 20.02. Similarly, 91% of the respondents had moderate problem focused flood coping responses. 65% of the respondents had low emotion focused flood coping responses. (19)

A cross sectional study was conducted in 2013 with an aim of seeing the predictive role of coping strategies in psychological distress and post traumatic growth among 1862 individuals exposed to floods 2010 in Pakistan. The tools that were used to measure the psychological wellness and coping behaviors were Brief Cope inventory, Depression, Anxiety, Stress Scale (DASS) and Post Traumatic Growth (PTG). Data was analyzed using PASW 18. Findings revealed that age, year of education and marital status from socio demographic characteristics were significantly associated with psychological distress. Psychological distress was found to be associated with the denial coping, substance abuse coping, behavior disengagement, venting, humor and self blaming. (20)

Chapter 4

Findings

The findings of the study are described in the text and their numerical details are presented in the tables.

4.1 Socio-demographic characteristics of research participants

Age of respondent ranged from 14 years to 89 years. Majority (42.1 percent) of the participants were from age group of 30-49 years. Participants the minority of the age group of 70-89 years composed 5.6% of the total sampled population with the mean age of 41.9 years. The population of female participants is found to be more (75.4 percent) than the male participants. Janajati were highest (47.6 percent) and Dalits were lowest (12.7 percent) among ethnic groups participating in the study. One fifth of the participants had never gone to school. Three fourth of the participants were married with nearly 8 percent widow or widower. Among the participants 55.6 percent lived in joint family. Agriculture was the main (45.2 percent) profession of the study participants followed by business (31 percent). Monthly income of the study participants ranged from NRs 1,500 to NRs 150,000 with average income of NRs 20,000 (Table 1).

Table 1: Socio – demographic characteristics of study participants

Characteristics	**Frequency (n=126)**	**Percentage**
Age in completed year		
10-29	31	24.6
30-49	53	42.1
50-69	35	27.8
70-89	7	5.6
Mean ± S	**Minimum**	**Maximum**
41.97 ± 16.50	15	87
Sex		
Female	95	75.4

Male	31	24.6
Caste/ethnicity		
Brahmin	33	26.2
Chhetri	17	13.5
Janajati	60	47.6
Dalit	16	12.7
Educational Qualification		
Primary level: up to grade 5	17	13.5
Secondary level: grade 6 to 10	26	20.6
+2 level	10	7.9
Graduate and above	6	4.8
Not gone to school	26	20.6
Literate	41	32.5
Marital status		
Unmarried	20	15.9
Married	95	75.4
Separated	1	0.8
Widow/Widower	10	7.9
Profession		
Business	39	31
Service	10	7.9
Agriculture	57	45.2
Labor work	9	7.1
Student	11	8.7
Family Type		
Nuclear family	56	44.4
Joint family	70	55.6
Monthly Family income (of 80 participants)		
20000 or less	49	61.3
More than 20000	31	38.8
Median ± SD	**Minimum**	**Maximum**
20000 ± 34458.53	1500	150000

4.2 Mental health and chronic health status

The presence of chronic disease among respondents and their family members was done, the stats for which has been shown in Table 2. The table reflects that, among the total population, 57.1% of the respondent's family member had chronic disease out of which 84.7% were under medication. In the same way, out of 126 respondents, 43.7% themselves had some kind of chronic diseases out of which 85.5% were under medication (Table 2).

Table 2: Chronic disease and COVID – 19 among respondents and their family

	Yes		No		
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Total**
Having a family member with chronic disease	72	57.1	54	42.9	126
If yes, is he/she under medication	61	84.7	11	15.3	72
Does the respondent have any kind of chronic health problem	55	43.7	71	56.3	126
If yes, is he/she under medication	47	85.5	8	14.5	55
Was the respondent tested positive for COVID-19	14	11.1	112	88.9	126

Were any of respondent's family member tested positive for COVID-19	25	19.8	101	80.2	126

Table 2 above also depicts that, out of the total participants, 11.1% of the respondents were tested positive for COVID – 19 whereas 19.8% of the respondent's family members were tested positive for COVID – 19.

The major information related to flood has been shown below (Table 3). The study reveals that out of 126 participants, 80.2% of the people had some kind of physical destruction that affected their livelihood due to flood. Out of the respondents that were affected, 34.7% had their agricultural fields taken away due to flood. Similarly, 33.7% of the participant's houses were taken away or flooded due to the disaster followed by business 19.7%, domestic animals 9.3% and vehicles 2.6%. Out of the total participants, more than half of the participant's houses were in the bank of river.

The table showcases that, 86.5% of the respondents had no injuries whereas 8.7% had minor injuries followed by 4% having major injuries. In the same way, 23% of the participant's family members died due to the flood out of which, 37.9% were their neighbors or friends followed by family member 24.1%, relatives 17.2% and someone known by the respondents 20.7% respectively.

4.3 Damages caused due to flood

Table 3: Information related to damage due to flood

	Number	Percentage
Physical destruction due to flood		
Yes	101	80.2
No	25	19.8
If yes, in what ways damage did occur (multiple choice)		
House	65	33.7
Business	38	19.7
Agricultural field	67	34.7
Domestic animals	18	9.3
Vehicles	5	2.6
House in the bank of river		
Yes	65	51.6
No	61	48.4
Respondent's health affected due to flood		
Minor injuries	11	8.7
Major injuries	5	4
Physical disability	1	0.8
No injuries	109	86.5
Did someone die due to flood		
Yes	29	23
No	97	77
If yes, who died		
Family member	7	24.1
Relatives	5	17.2
Neighbors/ friends	11	37.9
Someone known by the respondents	6	20.7

Before the occurrence of flood, 92.1% of the respondents were living at their own house whereas 7.9% were living in rent. After the occurrence of the massive disaster, only 38.1% of the respondents were living in their own houses where as 27.8% were living in temporary living space/ tents managed by the government and 22.2% of the respondents were living in rent. Similarly, 11.9% of the participants said they were living in some other places. The further categorization of 'other places' can further be done. Out of the 15 participants, 86.7% were living in other's house whereas 1 participant was living in school and 1 participant was living in temple.

4.4 Risk assessment information related to flood

Table 4: Risk assessment information related to flood

Where was the respondent living before flood		
Own house	116	92.1
Rent	10	7.9
Where is the respondent living at present		
Own house	48	38.1
Temporary living space/tents managed by government	35	27.8
Rent	28	22.2
Others	15	11.9
Categories of others (n=15)		
In other's house	13	86.7
School	1	6.7
Temple	1	6.7
Was the respondent aware of the risk of flood		
Yes	24	19

No	102	81
Level of risk to the respondents house if flood reoccurred		
Extreme risk	69	54.8
Normal risk	17	13.5
Little risk	3	2.4
No risk at all	11	8.7
No house	26	20.6
Is the respondent feeling secured in current place		
Yes	62	49.2
No	64	50.8
If no, what might be the reasons		
Fear of flood	65	89
Fear of violence	2	2.7
Lack of privacy	1	1.4
Others	5	6.8
What kind of support is needed in current situation		
Financial support	109	86.5
Psychosocial support	8	6.3
Others	3	2.4
No need	6	4.8
Is the respondent's family relations being affected by the current context		
Yes	22	17.5
No	104	82.5

Out of the total participants, 81% of the respondents were not aware regarding the risk of the occurrence of flood in that particular area. In case of recurrence of flood in the future, 54.8%

reported that their house was in extreme risky situation and 13.5% reported that they had normal risk. In the same way, 2.4% said that they had little risk and 8.7% of the participants reported that there was no risk at all. Similarly, 20.6% of the respondents reported that they had no houses in the first place, to have any sort of risk.

The table above describes that, out of the total population, about half of the respondents, that is 50.8% were not feeling secured in the current place of living. Out of participants who did not feel secure, 89% had fear of flood, 2.7% had fear of violence, 1.4% did not feel secure due to lack of privacy and 6.8% of the respondents had some other reasons for feeling insecure like fear of landslides, family problems etc.

The study found that, out of the total population, 86.5%of the respondents required financial support followed by psycho social support 6.3% and other support 2.4% like clothes, shelter etc. Out of the participants, 4.8% reported that they need not require any sort of support. It was found that, more than half of the respondent's that is 82.5% of their family relations were being affected due to the current context of disaster.

The study tried to assess if the flood affected families had previously been affected by the earthquake in 2072 B.S. too. The given table signifies that, out of the total participants, 97.6% of the respondents were affected by the earthquake of 2072 BS out of which, 89.4% of the respondent's houses was fully damaged whereas 10.6% of the respondent's houses were partially destroyed.

4.5 Damage due to earthquake 2012

Table 5: Earthquake related information

	Number	Percentage
Affected by earthquake 2072		
Yes	123	97.6
No	3	2.4

If Yes, in what manner your house was destructed		
Partially damaged	13	10.6
Fully damaged	110	89.4

1. Out of the 85 number of women from the study, majority of the participants that is, 87.1% reported not being prone to any violence or suffered from the past whereas 12.9% of the respondents had suffered violence in the past or were prone to suffer the violence on the future. Similarly, 57.6% of the respondents said that the family planning devices were available in that particular situation. Out of 85 participants, 27.1% said that there was no availability of family planning devices whereas 15.3% didn't know anything regarding the availability of the family planning devices in that situation.

In the same way, 64.7% of the participants reported that there was possibility for pregnancy services and treatment in that situation. Out of the 85 participants, 18.8% of the participants were having irregular menstruation after the occurrence of flood.

4.6 Women's health due to flood

Table 6: Impact of flood on women's health

	Number (n=85)	Percentage
Prone to violence or suffered from violence in the past		
Yes	11	12.9
No	74	87.1
Family planning devices available in current situation		
Yes	49	57.6
No	23	27.1
Don't know	13	15.3

Possibility for pregnancy services and treatment in current situation		
Yes	55	64.7
No	30	35.3
Irregular menstruation after the occurrence of flood		
Yes	16	18.8
No	59	69.4
Menopause	10	11.8

The table below (Table 7) reveals that, out of 15 adolescent girls, 93.3% were not prone to violence or had suffered from violence in the past whereas 1 participant had suffered from violence in the past and were prone to violence in the upcoming days.

Out of the total adolescent girls, more than half, that is, 53.3% had irregular menstruation after the occurrence of flood. Out of the total participants, 1 of the adolescent girl was pressurized for marriage due to the particular situation. In the same way, 86.7% of the participants were stressed about the education due to the disaster. Similarly, majority of the adolescent girls were stressed about the impact of flood and pandemic on employment that s, 53.3%.

4.7 Adolescent girls and their situation

Table 7: Information related to adolescent girls

	Number (n=15)	**Percentage**
Prone to violence or suffered from violence in the past		
Yes	1	6.7
No	14	93.3

Irregular menstruation after the occurrence of flood		
Yes	8	53.3
No	7	46.7
Pressurized for marriage due to current situation		
Yes	1	6.7
No	14	93.3
Stressed about education due to current situation		
Yes	13	86.7
No	2	13.3
Stressed about impact of flood and pandemic on employment		
Yes	8	53.3
No	7	46.7

Information from Table 8 shows that among the total participants, majority of the participants i.e. 37.3% had no stress or were normal after the flood occurrence. Similarly, 22.2% of the participants had severe stress, 16.7% were extremely severely stressed, 15.9% were moderately stressed and 7.9% had mild stress.

4.8 Depression, anxiety and stress among respondents

Table 8: Level of stress, anxiety and depression among respondents

	Depression		**Anxiety**		**Stress**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Normal	18	14.3	11	8.7	47	37.3

Mild	13	10.3	5	4	10	7.9
Moderate	33	26.2	18	14.3	20	15.9
Severe	14	11.1	11	8.7	28	22.2
Extremely Severe	48	38.1	81	64.3	21	16.7
Total	126	100	126	100	126	100

The given table also portrays that out of the total population, majority of the respondents had extremely severe anxiety i.e. 64.3% and 14.3% had moderate level of anxiety. Similarly, 8.7% of the participants had severe anxiety and 4% had mild anxiety. Only, 8.7 % of the participants had no anxiety at all.

From the given table, it is known that majority of the participants had extremely severe depression that is, 38.1% followed by moderate depression (26.2%), mild depression (10.3%) and severe depression (11.1%). Out of the total participants, 14.3% were normal or had no any depression.

Adoption of coping behaviors to deal with the stress among the respondents was also assessed in the study. From the below table, it can be seen that majority of the participants i.e. 73.8% were involved in some sort of coping behavior or activities. Out of which, 58.1% were engaged in talk therapy, 16.9% were involved in virtual support group, 11.8% were engaged in music to cope, 1.5% of the respondents were engaged in physical exercise, 2.2% in yoga, 2.2% in meditation, 4.4% were engaged in faith based practice or spirituality, one of the participant was engaged in dance to cope and 2.2% were involved in some other activities as their coping activities.

4.9 Adapted coping behaviors

Table 9: Coping Behaviors adapted by the respondents (multiple choices)

	Number	**Percentage**
Involvement in some coping behaviors/ activities		
Yes	93	73.8

No	33	26.2
Types of coping behaviors		
Physical exercise	2	1.5
Talk therapy	79	58.1
Yoga	3	2.2
Faith based practice/ spirituality	6	4.4
Meditation	3	2.2
Virtual support group	23	16.9
Music	16	11.8
Dance	1	0.7
Others	3	2.2

4.10 Association between stress and independent variables under study

The primary results of the study showing the association between stress and independent variables under study has been shown in table 10 below. The table above reveals that respondents who were under medication due to any kind of chronic health problem and level of stress were significantly associated to each other (p=0.048). From the given table, it can be known that, out of 79 respondents who were stressed, 78.9% were taking the medication because of the chronic health problem whereas 21.1% were not taking any types of medication. Similarly, out of 47 participants who did not show any level of stress, 17 of them were under medication.

There can also be seen significant association between stress and the death of respondent's near ones due to the flood (p=0.035, OR = 0.356). Out of 79 respondents who were stressed, 29.1% of them had lost their near ones due to the flood. In the same way, out of 47 respondents who were not stressed 12.8% respondent's family members were lost due to the flood.

Table 10: Association between stress and independent variables

	Stress in Respondents		p - value
	Normal No. (%)	**Stress No. (%)**	
Sex			
Female	38 (80.9)	57 (72.2)	0.273
Male	9 (19.1)	22 (27.8)	
Family Type			
Nuclear	20 (42.6)	36 (45.6)	0.742
Joint	27 (57.4)	43 (54.4)	
Having a family member with chronic disease			
Yes	27 (57.4)	45 (57)	0.958
No	20 (42.6)	34 (43)	
If yes, is the person under medication			
Yes	25 (92.6)	36 (80)	0.191
No	2 (7.4)	9 (20)	
Respondent with any kind of chronic health problem			
Yes	17 (36.2)	38 (48.1)	0.192
No	30 (63.8)	41 (51.9)	
If yes, is respondent under medication			
Yes	17 (100)	30 (78.9)	0.048*
No	0 (0)	8 (21.1)	**OR = 0.638 (0.515-0.792)**
Tested positive for COVID - 19			
Yes	3 (6.4)	11 (13.9)	0.249

No	44 (93.6)	68 (86.1)	
Any of respondent's family members tested positive for COVID - 19			
Yes	11 (23.4)	14 (17.7)	0.439
No	36 (76.6)	65 (82.3)	
Physical damage due to flood			
Yes	35 (74.5)	66 (83.5)	0.217
No	12 (25.5)	13 (16.5)	
Was the respondent's house by the side of river			
Yes	29 (61.7)	36 (45.6)	0.08
No	18 (38.3)	43 (54.4)	
Injured during flood			
Yes	40 (85.1)	69 (87.3)	0.722
No	7 (14.9)	10 (12.7)	
Respondent's near ones died due to flood			
Yes	6 (12.8)	23 (29.1)	0.035*
No	41 (87.2)	56 (70.9)	**OR = 0.356 (0.133-0.954)**
Where was the respondent living before flood			
Own house	43 (91.5)	73 (92.4)	1
Other places	4 (8.5)	6 (7.6)	
Where is the respondent living after flood			
Own house	21 (44.7)	27 (34.2)	0.24
Other places	26 (55.3)	52 (65.8)	

4.11 Association of risk assessment variables with stress

From Table 11, it can be seen that there exists significant association between stress and adolescent girls stress about impacts of pandemic and flood on employment (p=0.041, OR=17.50). Participants who were stressed about impacts of pandemic and flood on employment were 17.50 times prone to have stress than those who were not stressed about the impacts of pandemic and flood on employment. Out of 79 respondents who were stressed, 16.7% of the respondents were stressed about the impacts of pandemic and flood on employment.

Table 11: Association of risk assessment variables with stress

	Stress in Respondents		
	Normal	**Stress**	**p - value**
	No. (%)	**No. (%)**	
Respondent aware of the flood risk			
Yes	8 (17)	16 (20.3)	0.655
No	39 (83)	63 (79.7)	
If flood recurred, is the respondent's place in risk			
Yes	34 (72.3)	55 (69.6)	0.746
No	13 (27.7)	24 (30.4)	
Feels secured in current place of living			
Yes	24 (51.1)	38 (48.1)	0.748
No	23 (48.9)	41 (51.9)	
Family relations affected due to flood			
Yes	12 (25.5)	10 (12.7)	0.066

No	35 (74.5)	69 (87.3)	
Was the respondent affected by the earthquake 2072			
Yes	47 (100)	76 (96.2)	0.293
No	0 (0)	3 (3.8)	
If yes, in what way respondent's house was damaged			
Partially	5 (10.6)	8 (10.5)	0.984
Fully	42 (89.4)	68 (89.5)	
Prone to violence or suffered from violence in the past			
Yes	3 (9.7)	8 (14.8)	0.739
No	28 (90.3)	46 (85.2)	
Family planning devices available to the respondents in this situation			
Yes	18 (58.1)	31 (57.4)	0.953
No	13 (41.9)	23 (42.6)	
If needed, is it possible for pregnancy services and treatment in this situation			
Yes	23 (74.2)	32 (59.3)	0.165
No	8 (25.8)	22 (40.7)	
Irregular menstruation after flood			
Yes	3 (9.7)	13 (24.1)	0.15
No	28 (90.3)	41 (75.9)	
Prone to violence or suffered from violence in the past			
Yes	1 (11.1)	0 (0)	1

No	8 (88.9)	6 (100)	
Irregular menstruation after flood			
Yes	4 (44.4)	4 (66.7)	0.608
No	5 (55.6)	2 (33.3)	
Pressurized for marriage due to current situation			
Yes	1 (11.1)	0 (0)	1
No	8 (88.9)	6 (100)	
Stressed for education due to pandemic and flood			
Yes	8 (88.9)	5 (83.3)	1
No	1 (11.1)	1 (16.7)	
Stressed about impacts of pandemic and flood on employment			
Yes	7 (77.8)	21 (16.7)	0.041*
No	2 (22.2)	105 (83.3)	**OR = 17.50 (1.223-250.35)**
Involvement in some coping behaviors/ activities			
Yes	33 (70.2)	60 (75.9)	0.479
No	14 (29.8)	19 (24.1)	

4.12 Association between anxiety and independent variables under study

The given table reveals that there exists significant association between anxiety and the physical damage occurred due to the flood (p=0.026, OR=0.253). Out of 115 participants who had anxiety, 82.6% of the participant's had experienced physical damage due to flood. Similarly, out of 11 participants who didn't have anxiety, 54.5% of the respondents had experienced physical damage due to flood.

Table 12: Association between anxiety and independent variables

	Anxiety in Respondents		
	Normal	**Stress**	**p - value**
	No. (%)	**No. (%)**	
Sex			
Female	6 (54.5)	89 (77.4)	0.093
Male	5 (45.5)	26 (22.6)	
Family Type			
Nuclear	3 (27.3)	53 (46.1)	0.343
Joint	8 (72.7)	62 (53.9)	
Having a family member with chronic disease			
Yes	4 (36.4)	68 (59.1)	0.203
No	7 (63.6)	47 (40.9)	
If yes, is the person under medication			
Yes	3 (75)	58 (85.3)	0.493
No	1 (25)	10 (14.7)	
Respondent with any kind of chronic health problem			
Yes	3 (27.3)	52 (45.2)	0.346
No	8 (72.7)	63 (54.8)	
If yes, is respondent under medication			
Yes	3 (100)	44 (84.6)	1
No	0 (0)	8 (15.4)	
Tested positive for COVID - 19			
Yes	1 (9.1)	13 (11.3)	1

No	10 (90.9)	102 (88.7)	
Any of respondent's family members tested positive for COVID - 19			
Yes	3 (27.3)	22 (19.1)	0.455
No	8 (72.7)	93 (80.9)	

4.13 Association between anxiety and damage related variables

Table 13: Association of damage related variables with anxiety

	Anxiety in Respondents		
	Normal	**Anxiety**	**p - value**
	No. (%)	**No. (%)**	
Physical damage due to flood			
Yes	6 (54.5)	95 (82.6)	0.026* **OR=0.253 (0.070-0.910)**
No	5 (45.5)	20 (17.4)	
Was the respondent's house by the side of river			
Yes	6 (54.5)	59 (51.3)	0.837
No	5 (45.5)	56 (48.7)	
Injured during flood			
Yes	11 (100)	98 (85.2)	0.358
No	0 (0)	17 (14.8)	
Respondent's near ones died due to flood			
Yes	3 (27.3)	26 (22.6)	0.714

No	8 (72.7)	89	
Where was the respondent living before flood			
Own house	10 (90.9)	106 (92.2)	1
Other places	1 (9.1)	9 (7.8)	
Where is the respondent living after flood			
Own house	7 (63.6)	41 (35.7)	0.102
Other places	4 (36.4)	74 (64.3)	
Respondent aware of the flood risk			
Yes	2 (18.2)	22 (19.1)	1
No	9 (81.8)	93 (80.9)	
If flood recurred, is the respondent's place in risk			
Yes	7 (63.6)	82 (71.3)	0.73
No	4 (36.4)	33 (28.7)	
Feels secured in current place of living			
Yes	5 (45.5)	57 (49.6)	0.794
No	6 (54.5)	58 (50.4)	
Family relations affected due to flood			
Yes	0 (0)	22 (19.1)	0.21
No	11 (100)	93 (80.9)	
Was the respondent affected by the earthquake 2072			
Yes	11 (100)	112 (97.4)	1
No	0 (0)	3 (2.6)	
If yes, in what way respondent's house was damaged			

Partially	0 (0)	13 (11.6)	0.604
Fully	11 (100)	99 (88.4)	
Prone to violence or suffered from violence in the past			
Yes	0 (0)	11 (13.4)	1
No	3 (100)	71 (86.6)	
Family planning devices available to the respondents in this situation			
Yes	0 (0)	49 (59.8)	0.072
No	3 (100)	33 (40.2)	
If needed, is it possible for pregnancy services and treatment in this situation			
Yes	1 (33.3)	54 (65.9)	0.283
No	2 (66.7)	28 (34.1)	
Irregular menstruation after flood			
Yes	0 (0)	16 (19.5)	1
No	3 (100)	66 (80.5)	
Prone to violence or suffered from violence in the past			
Yes	0 (0)	1 (9.1)	1
No	4 (100)	10 (90.9)	
Irregular menstruation after flood			
Yes	0 (0)	8 (72.7)	0.026* **OR= 2.33 (0.992-5.489)**
No	4 (100)	3 (27.3)	
Pressurized for marriage due to current situation			

Yes	0 (0)	1 (9.1)	1
No	4 (100)	10 (90.9)	
Stressed for education due to pandemic and flood			
Yes	4 (100)	9 (81.8)	1
No	0 (0)	2 (18.2)	
Stressed about impacts of pandemic and flood on employment			
Yes	3 (75)	5 (45.5)	0.569
No	1 (25)	6 (54.5)	
Involvement in some coping behaviors/ activities			
Yes	9 (81.8)	84 (73)	0.727
No	2 (18.2)	31 (27)	

The result showcased that, there was significant association between anxiety and the irregular menstruation after the flood among the adolescents (p=0.026, OR=2.23). Those adolescents who had irregular menstruation were 2.33 times prone to having anxiety than those respondents who did not have irregular menstruation. Out of 15 adolescent girls, 11 girls had anxiety out of which 72.7% respondents had irregular menstruation after flood. The remaining 4 adolescent girls, who did not have anxiety, did not have any irregular menstrual after flood.

4.14 Association between depression and independent variables

Table 14: Association between depression and independent variables

	Depression in Respondents		
	Normal	**Stress**	**p - value**
	No. (%)	**No. (%)**	
Sex			
Female	12 (66.7)	83 (76.9)	0.353
Male	6 (33.3)	25 (23.1)	
Family Type			
Nuclear	6 (33.3)	50 (46.3)	0.306
Joint	12 (66.7)	58 (53.7)	
Having a family member with chronic disease			
Yes	5 (27.8)	67 (62)	0.007*
No	13 (72.2)	41 (38)	**OR = 0.235 (0.078 - 0.709)**
If yes, is the person under medication			
Yes	4 (80)	57 (85.1)	0.575
No	1 (20)	10 (14.9)	
Respondent with any kind of chronic health problem			
Yes	3 (16.7)	52 (48.1)	0.019*
No	15 (83.3)	56 (51.9)	**OR = 0.215 (0.059-0.787)**
If yes, is respondent under medication			
Yes	3 (100)	44 (84.6)	1
No	0 (0)	8 (15.4)	

Tested positive for COVID - 19			
Yes	1 (5.6)	13 (12)	0.69
No	17 (94.4)	95 (88)	
Any of respondent's family members tested positive for COVID - 19			
Yes	4 (22.2)	21 (19.4)	0.755
No	14 (77.8)	87 (80.6)	
Physical damage due to flood			
Yes	11 (61.1)	90 (83.3)	0.029*
No	7 (38.9)	18 (16.7)	**OR = 0.314 (0.107-0.920)**
Was the respondent's house by the side of river			
Yes	11 (61.1)	54 (50)	0.382
No	7 (38.9)	54 (50)	
Injured during flood			
Yes	16 (88.9)	93 (86.1)	1
No	2 (11.1)	15 (13.9)	
Respondent's near ones died due to flood			
Yes	5 (27.8)	24 (22.2)	0.604
No	13	84 (77.8)	
Where was the respondent living before flood			
Own house	17 (94.4)	99 (91.7)	1

Other places	1 (5.6)	9 (8.3)	
Where is the respondent living after flood			
Own house	11 (61.1)	37 (34.3)	0.030*
Other places	7 (38.9)	71 (65.7)	**OR= 3.015 (1.079-8.426)**
Respondent aware of the flood risk			
Yes	6 (33.3)	18 (16.7)	0.095
No	12 (66.7)	90 (83.3)	
If flood recurred, is the respondent's place in risk			
Yes	14 (77.8)	75 (69.4)	0.584
No	4 (22.2)	33 (30.6)	
Feels secured in current place of living			
Yes	7 (38.9)	55 (50.9)	0.344
No	11 (61.1)	53 (49.1)	
Family relations affected due to flood			
Yes	1 (5.6)	21 (19.4)	0.195
No	17 (94.4)	87 (80.6)	
Was the respondent affected by the earthquake 2072			
Yes	18 (100)	105 (97.2)	1
No	0 (0)	3 (2.8)	
If yes, in what way respondent's house was damaged			

Partially	0 (0)	13 (12.4)	0.212
Fully	18 (100)	92 (87.6)	
Prone to violence or suffered from violence in the past			
Yes	0 (0)	11 (14.3)	0.589
No	8 (100)	66 (85.7)	
Family planning devices available to the respondents in this situation			
Yes	2 (25)	47 (61)	0.066
No	6 (75)	30 (39)	
If needed, is it possible for pregnancy services and treatment in this situation			
Yes	3 (37.5)	52 (67.5)	0.124
No	5 (62.5)	25 (32.5)	
Irregular menstruation after flood			
Yes	0 (0)	16 (20.8)	
No	8 (100)	61 (79.2)	
Prone to violence or suffered from violence in the past			
Yes	0 (0)	1 (11.1)	1
No	6 (100)	8 (88.9)	
Irregular menstruation after flood			
Yes	1 (16.7)	7 (77.8)	0.041*

No	5 (83.3)	2 (22.2)	**OR = 0.057 (0.004-0.817)**
Pressurized for marriage due to current situation			
Yes	0 (0)	1 (11.1)	1
No	6 (100)	8 (88.9)	
Stressed for education due to pandemic and flood			
Yes	15 (83.3)	8 (88.9)	1
No	1 (16.7)	1 (11.1)	
Stressed about impacts of pandemic and flood on employment			
Yes	5 (83.3)	3 (33.3)	0.119
No	1 (16.7)	6 (66.7)	
Involvement in some coping behaviors/ activities			
Yes	13 (72.2)	80 (74.1)	0.869
No	5 (27.8)	28 (25.9)	

The above table shows that there exists significant association between depression and having a family member with chronic disease (p=0.007, OR=0.235). Out of 108 respondents who had depression, 62% of the participant's had family members with chronic disease. Similarly, among 18 participants who had no depression, 27.8% had family members with chronic disease and 72.2% of the respondents didn't have family members with chronic health problems.

There was also seen significant association between depression and respondents having any sort of chronic health problem (p=0.019, OR=0.215). Out of 108 respondents having depression, 48.1% respondents had some kind of chronic health problem whereas 51.9% didn't

have any chronic health problem. In the same way, out of 18 respondents who had no depression, 83.3% didn't have any kind of chronic health problem.

There exists significant association between depression and physical damage done due to flood (p=0.029, OR= 0.314). Out of 108 respondents who had depression, 83.3% of participants had experienced physical damage due to flood whereas 16.7% did not have any physical damage. In the same way, out of 18 participants who did not have depression, 61.1% had experienced physical damage and 38.9% had no any physical damage.

There can also be seen significant association between depression and the place of living after the occurrence of flood (p=0.030, OR=3.105). Participants who used o live in other places after flood had 3.015 times more chances of being depressed than the participants who were living in their own house. Out of the 108 participants who had depression, 65.7% of the respondents were living in other places like temple, relative's house and temporary living places like tents provided by the government.

The table also reflects that there is significant association between depression and irregular menstruation after flood in adolescents (p=0.041, OR=0.057). Out of 108 respondents who had depression, 77.8% of the respondents had irregular menstruation and 22.2% of the respondents did not have irregular menstruation after flood. In the same way, out of 18 adolescent girls who did not have depression, 83.3% did not have irregular menstruation after flood.

Chapter 5

Discussion

The present study aimed to determine the level of mental health status that is, stress, anxiety and depression among the people residing in the flood affected areas of Melamchi and Helambu. Moreover, it aimed to see the coping behaviors and activities adapted by the respondents and to determine the associative factors towards the level of stress, anxiety and depression. The results from this study found that, 62.7% of the participants had stress, 91.3% had anxiety and 85.7% of the participants had depression.

A study conducted in UK reported that, 24.5% of the respondents had anxiety and 35.1% of the respondents had depression after the occurrence of flood. The anxiety and depression was found more in our study, maybe because the respondents of Melamchi and Helambu had to bear the additional mental trauma from earthquake of 2015 and COVID – 19 which contributed in deteriorating the mental wellbeing of the respondents.(21)

A study conducted in Nepal after the massive earthquake found that 33% of the surveyed residents were screened positive for depression. Almost all of the participants i.e. 99.6% had reported resource loss during the disaster which was quite similar to our study (80.2%).(22) In the same way, a study conducted after the massive earthquake in Nepal reported that 38.1% of the respondents were found to be depressed after the occurrence of the disaster and the significance of PTSD was significantly higher in more affected area. In this study as well, damage to livelihood after the disaster was associated with the PTSD diagnosis which is similar to our study. In our study as well, physical damage due to the flood is seen to be associated with anxiety and depression. In this particular study, the coping behaviors like talking to others, helping others were adapted by the individuals which is similar to our study (58.1% engaged in talk therapy). (23)

A study was conducted in China after the occurrence of Wenchuan earthquake which concluded that 21% of the women were having irregular menstruation after the occurrence of disaster. (24) Another study was conducted in China after a disaster which reported that 51.8% of the women were having irregular menstruation after the occurrence of disaster. (25) These findings are similar to this study where 18.8% of women and 53.3% of adolescent girls are found to have irregular

menstruation after the occurrence of flood. In our study, the irregular menstruation is found to be associated with depression as well.

A comparative study done in Uttar Pradesh, India reported that the individuals who were affected by the flood had shown significantly high symptoms of depression and anxiety than the unaffected group which is similar to our study. In this study the results showed no any significant relationship between mental health and domains of functioning in the affected group. However, in our study the women and girls were having some functional disturbances like irregular menstruation which might have occurred due to additional burden of trauma from COVID as well (13).

A similar findings was found from a study conducted in Tamil Nadu, India among the flood affected population where anxiety was found in 27.4% of the respondents and depression was found in 45.29% of the participants which is comparatively lower than our studies (depression-85.7%, anxiety-91.2%) which might have happened due to the additional burden of trauma from already existent pandemic and also due to the trauma from the massive earthquake 2015 (26).

A study from Kerela found that the population that have been affected by flood twice had less psychological wellbeing than those affected only once and the population who had never been affected by the flood had more psychological wellbeing than those who were affected by the flood once or twice. From the findings of this study we can say that disaster has a significant effect on the deterioration of the mental wellbeing of the suffered ones (27).

Extreme age (children and elderly), female gender, socio- economic status, pre-existing mental health issues and financial crisis post disaster were found to be the factors influencing the Post traumatic stress disorder among the flood affected population where as in our study, loss of resources, place of living after flood, irregular menstruation, death of near ones, having chronic disease to themselves and the family members were found to be associated with the mental health wellbeing of the flood victims (14).

A typhoon at the time of COVID-19 resulted in devastating and detrimental effects to the mental health of the population affected from which it can be said the disaster with an addition of pandemic, plays a vital role in deteriorating the mental wellbeing of the affected population and communities(28).

A study reported depression among 33% of the earthquake survival. The association between resource loss and depressive symptoms was also found in this study which is similar to our study (p=0.029) (22).

Many studies have shown people having deteriorated mental wellness and involvement of coping strategies during the time of disaster which is similar to our study(12,29–31). These studies add to our knowledge regarding the mental wellbeing of the affected individuals after the occurrence of disaster and the relationship between the psychological wellbeing and its associative factors along with the coping behaviors adapted by the population.

Chapter 6

Conclusion and Recommendations

It is known that flood disaster results in damage, destruction and loss of life and property of population. In addition to this, this study acknowledges the mental health status that is, the level of stress, anxiety and depression among the respondents after the occurrence of flood in Melamchi and Helambu. This study found a large negative impact of the flood on mental health outcomes and psychological functioning. The gender roles in our patriarchal society where females are expected to take control and care of the family members especially children and elderly during disasters like flood has negatively affected the mental and psychological health status of the women. The findings clearly show that the menstrual periods in women were affected by the flood which has a probable cause to be the mental distress they had to go through. The overwhelming responsibilities that they had to bear during the flood increased the level of mental stress and anxiety leading to depression in some. Further, the flood impacts worries women the most with food security, household's energy, assets and belongings, more intensive works and the early warning system which consume more women's strength and don't serve their unique needs.

Violence that women had to face during the flood both physical and sexual was another noteworthy takeaway point from the study. The flood in Melamchi and Helambu exposed women and girls to a wide variety of violence and misappropriate behaviors leading to a situation of fear and anxiety leading to an increased incidence of mental and psychological problems. It is evident that women's vulnerability and mental disorders are reciprocally related to each other. The data from the study without a doubt depicted the difference in the level of mental and psychological along with other health issues based on gender. Women were more anxious and stressed about their special health conditions like menstruation during the flood. Some of these issues were more prevalent in women and girls only because of their gender and at times because of the gender roles women have to play in the society amid any unforeseen events like flood.

Therefore, from this study it is clearly observed that flood victim does experience moderate to severe level of depression, anxiety and stress. Along with the mental health status, from this study it has been known that the people residing in the flood affected areas are mostly engaged in some coping activities among which the talk therapy has been found to be adapted by most of them. In

the same way, several associative factors were identified with the mental health status. Stress was found to be significantly associated with death of respondent's near ones and stress regarding impacts of pandemic and flood on employment. In the same way, anxiety was found to be significantly associated with physical damage done due to flood and irregular menstruation after flood. Likewise, depression was found to be associated with having a family member with chronic disease, respondent having chronic disease, physical damage done due to flood, place of living after the flood and irregular menstruation after flood.

Therefore, the findings from this study imply that this is an area worthy of further investigation and guidance in order to lose the long-term mental health impacts in flood affected communities. This study further might be important to inform policy makers about the magnitude and prevalence of mental illness in affected population.

Recommendations:

- The government and the responsible authorities should have some programs to outlook the psychological wellbeing of the flood affected communities.
- People from this study are found to have negative psychological impacts of after the occurrence of flood, the DRR and management division should give more priorities to the preparedness phase of the disaster along with the response phase.
- Physical damage is found to be associated with anxiety and depression, due to which, proper housing planning can be done by the government so that there wouldn't be more physical damage and property loss due to flood.
- The place for living should be managed in a permanent way for the community members after the flood.
- More of coping activities can be introduced to the community members so that they can be engaged with it at the time of need.
- It is imperative that health rights are understood in their entirety for promoting better health outcomes. Right to mental health focusing to women is integral to Health for ALL. Inclusion of women in DRR plans.

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Annex

निर्देशन: संभाव्य उत्तरहरु मध्य कुनै एउटामा गोलो चिन्ह लगाउनुहोस्

Part 1: Socio- demographic Characteristics

(सामाजिक – जनसाङ्खिक विवरण)

ठेगाना / गाँउपालिका / नगरपालिकाको नाम _____

वडा नं. _____

S.N	**Questions (**प्रश्नहरु**)**	**Possible Answers (**संभाव्य जवाफहरु**)**
1.	उत्तरदाता को उमेर (पुरा गरेको)/ Age of the respondent	_____ वर्ष
2.	Sex / लिङ्ग	१. महिला (Female) २. पुरुष (Male) ३. अन्य
3.	जात / जातियता / Caste/ Ethnicity	1.Brahmin (ब्राह्मण) 2. Chhettri (क्षेत्री) 3. Janjati (जनजाति) 4. Dalit (दलित) 5. Muslim (मुस्लिम) 6.Others(अन्य)_____
4.	शैक्षिक योग्यता (पुरा गरेको) Educational qualification	१. प्राथमिक शिक्षा (Primary level: up to grade 5) २. माध्यमिक शिक्षा (Secondary level: from grade 6-10) ३. उच्च माध्यमिक शिक्षा (+2 level) ४. स्नातक स्तर वा सो भन्दा माथि (Graduate and above) ५. स्कूल गएको छैन ६. साक्षर
5.	वैवाहिक स्थिती Marital Status	१. हाल अविवाहित रहेको (Unmarried) २. हाल विवाहित रहेको (Married) ३. हाल छोडपत्र भएर बसेको (Divorced) ४. हाल अलग्गिएर बसेको (Separated) ५ . विदुवा/ विदुर (Widow/ Widower)
6.	तपाइको पेशा के हो ?	क) व्यापार ख) जागिर ग) कृषि

		घ) ज्यालादारी ङ) अन्य _____
7.	परिवारको किसिम / Family Type	१. एकल (nuclear family) २. संन्युक्त (Joint family)
8.	Stable Family Income (व्यक्तिगत) निरन्तर मासिक आम्दानी	.....रुपैँया
9.	Monthly Family Income तपाईको परिवारको मासिक आम्दानी कति थियो ?	.....रुपैँया
10.	Having a family member with chronic disease के तपाईको परिवारमा दिर्घ रोग भएको व्यक्ती हुनुहुन्छ ?	१. छ (Yes) २. छैन (No) यदी छैन भने, प्रश्न न. -१२ मा जानुहोस्
11.	If yes, is he/ she under medication? यदी छ भने, उक्त दिर्घ रोग भएको व्यक्तिले हाल औषधी उपचार गरी रहनु भएको छ ?	१ छ (Yes) २ छैन (No)
12.	Do you have any kind of chronic health problem? के तपाइलाई कुनै प्रकारको दिर्घरोग छ ? (जस्तै - diabetes, उच्च रक्त्चाप्)	१. छ (Yes) २. छैन (No) यदी छैन भने, प्रश्न न. -१४ मा जानुहोस्
13.	If yes, are you under medication? यदी छ भने, के तपाइ औषधीको सेवन गर्नुहुन्छ ? अहिले औषधि को आवश्यता छ ? छ भने कसरी पुरा गर्नु भएको छ ?	१. गर्छु (Yes) २. गर्दिन (No)
14.	Were you tested positive for COVID - 19? के तपाइलाई कोभिड पोजिटिभ देखिएको थियो ?	१. थियो (Yes) २. थिएन (No)

बाढी सँग सम्बन्धित प्रश्न :

15.	Were any of your family members tested positive for COVID - 19? के तपाइको परिवारमा कसैलाई कोभिड पोजिटिभ देखिएको थियो ?	१. थियो (Yes) २. थिएन (No)
S.N	**Questions (**प्रश्नहरु**)**	**Possible Answers (**संभाव्य जवाफहरु**)**
1.	के तपाईँको भौतिक क्षती भएको थियो ?	क) थियो ख) थिएन
2.	यदी थियो भने, के के मा क्षती भएको थियो ?	क) घर ख) व्यवसाय ग) खेतबारी घ) पशु चौपाया ङ) सवारी साधन च) यदी अन्य भए खुलानुहोस् _____
3.	के तपाइको घर खोलाको किनारमा थियो/ छ ?	क) थियो ख) थिएन
4.	के तपाइलाई बाढिले गर्दा स्वास्थ्यमा क्षती भएको थियो ?	क) सामान्य घाउचोट ख) गहिरो घाउचोट ग) शारिरिक अपाङ्गता
5.	के बाढिले गर्दा तपाइको नजिकको कोही बित्नु भएको छ ?	क) छ ख) छैन

6.	यदी छ भने को ?	क) आफ्नै परिवारको सदस्य ख) नातेदार ग) छरछिमेकी साथिभाइ घ) चिनजानको व्यक्ति
7.	तपाइ बाढी आउनु अगाडी कता बसिराख्नु भएको थियो ?	क) आफ्नै घरमा ख) भाडामा ग) अन्य _____
8.	अहिले कहाँ बसी रहनु भएको छ ?	क) आफ्नै घरमा ख) सरकारी अस्थायी बसोबास को व्यवस्था भएको ठाउँमा ग) भाडामा घ) अन्य
9.	के तपाइलाई आफू बसेको ठाउँ बाढिको जोखिममा थियो भनेर थाहा थियो ?	क) थियो ख) थिएन
10.	फेरी बाढी आयो भने तपाइको घर जग्गा कतिको जोखिममा पर्छ ?	क) एक्दम धेरै ख) ठिकै ग) थोरै घ) पर्दैन
11.	अहिले तपाईँ बसोबास गरिराख्नु भएको ठाउँमा तपाईले आफूलाइ सुरक्षित महसुस गर्नु भएको छ ?	क) छ ख) छैन

<u>भूकम्पसँग सम्बन्धित प्रश्न</u>

12.	यदी छैन भने, किन ?	क) बाढिको डर ख) हिंसाको डर ग) गोपनियताको अभाव घ) अन्य _____
13.	अहिले परेको कठिनाईबाट निस्कन तपाईलाई कस्तो सहयोगको आवश्यकता छ ?	क) आर्थिक ख) मनोसमाजिक परामर्श ग) .....
14.	के तपाई घर भित्र सिमित भएको कारणले तपाईको पारिवारिक सम्बन्धमा असर परेको छ ?	क) छ ख) छैन
S.N	**Questions (**प्रश्नहरु**)**	**Possible Answers (**संभाव्य जवाफहरु**)**
1.	के तपाई २०७२ सालको भकूम्प पिडित हुनुहुन्छ ?	क) हो ख) होइन
2.	हो भने तपाईको घर कुन प्रकारले क्षति भएको थियो?	क) आंसिक ख) पूर्ण

<u>महिलाका लागी प्रश्नहरु :</u>

S.N	**Questions (**प्रश्नहरु**)**	**Possible Answers (**संभाव्य जवाफहरु**)**
1.	के तपाईंमाथि केहि दुर्व्यवहार वा हिंसा भएको छ वा हुने सम्भावना छ ?	क) छ ख) छैन
2.	के यो अवस्थामा तपाईंलाई परिवार नियोजनका साधन उपलब्ध छ ?	क) छ

		ख) छैन
3.	के तपाईंलाई चाहेमा अहिले गर्भवती चेकजाँच गर्न सहज छ ?	क) छ ख) छैन
4.	के बाढी आए यता तपाईंको महिनवारीमा गडबड भएको छ ?	क) छ ख) छैन

किशोरीहरुका लागी प्रश्न:

S.N	**Questions (**प्रश्नहरु**)**	**Possible Answers (**संभाव्य जवाफहरु**)**
1.	के तपाईं माथि केही दुर्व्यवहार वा हिंसा भएको छ वा हुने सम्भावना छ ?	क) छ ख) छैन
2.	के बाढी आए यता तपाईंको महिनवारीमा गडबड भएको छ ?	क) छ ख) छैन
3.	अहिलेको अवस्थाले गर्दा के तपाईंलाई परिवारबाट विवाहको दबाब छ ?	क) छ ख) छैन
4.	के तपाईं महामारी तथा बाढीले शिक्षामा परेको असरले चिन्तित हुनुहुन्छ ?	क) छ ख) छैन

5.	के तपाईं महामारी तथा बढीले रोजगारीमा पर्न सक्ने असरको बारेमा चिन्तित हुनुहुन्छ ?	क) छ ख) छैन

निर्देशन: प्रत्यक प्रश्नको दाहिने पट्टी लेखिएको ०,१,२,३ मध्य कुनै एउटामा मात्र टिक चिन्ह लगाउनु होस् ।

DASS - 21 Questionnaires (Depression, Anxiety and Stress Scale)

	Questions	कहिल्यै पनि भएन **Not at all**	**कहिलेकाहिँ भयो Sometimes**	**अलि बढी भयो Usually**	**एकदम बढी भयो Most of the time**
1.	I found it hard to wind down आफूलेआफैलाई सहजता वा सजिलो महसुस गर्न गाह्रो भएको थियो ।	०	१	२	३
2.	I was aware of dryness of my mouth मेरो मखु सुख्खा भएको अवगत हुन्थ्यो ।	०	१	२	३
3.	I couldn't seem to experience any positive feeling at all. मैले केही सकरात्मक भाव अनुभव गर्न सकिन।				
4.	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion) मलाई स्वास फेर्न गाह्रो महसुस हुन्थ्यो, जस्तै छिटो छिटो फेर्न, कुनै शारिरिक परीश्रम बिना स्वास फुल्ने हुन्थ्यो ।	०	१	२	३
5.	I found it difficult to work up the initiative to do things मलाई कुनै पनि काम सुरुवात गर्न गाह्रो भएको थियो ।	०	१	२	३
6.	I tended to over-react to situations मैले चाहिने भन्दा बढी प्रतिकृया दिन्थेँ वा बढी बोल्ने गर्थेँ ।	०	१	२	३
7.	I experienced trembling (e.g. in the hands) मैले मेरो शरिरमा कम्पन महसुस गरेको थिएँ (जस्तै हात काप्ने)।	०	१	२	३
8.	I felt that I was using a lot of nervous energy कुनै बेला केही बढी नै डराएँ जस्तो महसुस भयो ।	०	१	२	३
9.	I was worried about situations in which I might panic and make a fool of myself. म यो परिस्थितसँग बढी नै चिन्तित हुन्थेँ र म धेरै डराएर आफैलाई मुर्ख बनाउने त भइन भन्ने हुन्थ्यो ।	०	१	२	३
10.	I felt that I had nothing to look forward to मलाई अघि बढ्ने आधार नै छैन भन्ने अनुभव हुन्थ्यो ।	०	१	२	३
11.	I found myself getting agitated मैले आफैलाई सानो सानो कुराहरुमा पनि चिन्तित भएको पाएँ।	०	१	२	३
12.	I found it difficult to relax मलाई आराम गर्न गाह्रो भएको थियो ।	०	१	२	३
13.	I felt downhearted and blue मैले आफु उदासिन र दुखी महसुस गरेको थिएँ ।	०	१	२	३

14.	I was intolerant of anything that kept me from getting on with what I was doing त्यस बेला, मैले गरेको काममा कसैले मलाई कुनै तरिकाबाट बाधा दिएमा, मलाई सहनै नसक्ने हुन्थ्यो ।	०	१	२	३
15.	I felt I was close to panic मैले आतंकित भएको महसुस गरेको थिएँ ।	०	१	२	३
16.	I was unable to become enthusiastic about anything. म कुनै पनि काम गर्न उत्साहित थिइन ।	०	१	२	३
17.	I felt I wasn't worth much as a person मलाई आफू योग्य व्यक्ति नभएको महसुस भयो ।	०	१	२	३
18.	I felt that I was rather touchy म बढी नै भावुक भएको महसुस गर्थें ।	०	१	२	३
19.	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat) शारिरिक कृयाकलाप बिना नै मैले मेरो मुटुको धड्कन महसुस गरेको थिएँ - जस्तै छिटो छिटो धड्केको वा कहिले काहिँ धड्कन रोकिएको ।	०	१	२	३
20.	I felt scared without any good reason मैले कुनै कारण बिना नै डरको महसुस गरेको थिएँ ।	०	१	२	३
21.	I felt that life was meaningless. मलाई मेरो जिवन को सार्थकता नै छैन भन्ने अनुभव भएको थियो ।	०	१	२	३

निर्देशन: प्रत्यक प्रश्नको दाहिने पट्टी सम्भाव्य उत्तरमा गोलो चिन्ह लगाउनुहोस् ।

Part 3: Coping behavior

S.N	Questions	Answers
1.	बाढी पहिरोले आक्रान्त पारेको बेलामा, के तपाइले आफुलाई समस्यामुक्त गर्न केहि उपायहरु /तरिकहरु अपनाउनु भएको थियो ? Did you involve yourself in some coping activities?	१. थियो (Yes) २. थिएन (No)

2.	यदी थियो भने, के कस्ता उपायहरु/ तरिकाहरु तपाईंले अपनाउनु भएको थियो ? (बहुउत्तर दिनुहोस्) What were the coping behaviors that you got yourself involved in?	१. शारिरिक व्ययाम् (Physical exercise) २. साथिभाइ सित प्रत्यक्ष कुराकानी गर्ने (Talk therapy) ३. योग (Yoga) ४. आध्यात्मिक अभ्यास् (Faith based practice/ spirituality) ५. ध्यान् (meditation) ६. टेलिफोन तथा सामाजिक सन्जालबाट चिनजानको मान्छेसँग विचारहरु तथा अन्तर्कृया आदान प्रदान गरेर (virtual support group) ७. संगीत सुनेर (music) ८. नाचगानमा लागेर (dance) ९. अन्य (others)
3.	अरु केहि भएको खण्डमा, खुलाउनु होस् If others, explain	_____