KAMUZU COLLEGE OF NURSING

EFFECTS OF FLOODING ON MENTAL HEALTH OF VICTIMS IN MZUZU CITY, MALAWI

MSC (COMMUNITY HEALTH NURSING) THESIS

BY

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DECLARATION

I, Glory Wezi Sopera Mwafulirwa, declare that the thesis "Effects of flooding on mental health of victims in Mzuzu city, Malawi", which I hereby submit for the Master of Science degree in Community Health Nursing at Kamuzu College of Nursing, is my own work and that all sources that I used or quoted have been indicated with complete references and acknowledgements. I further declare that this thesis has not been previously submitted by me for a degree at this or any other tertiary institution.

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CERTIFICATE OF APPROVAL/CERTIFICATION

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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DEDICATION

This thesis is dedicated to my God sent husband Dr Alinune Kabaghe, my parents Mr and Mrs Winstone Sopera Mwafulirwa, my siblings Ngoja, Kamalizga, Lilombero, Deborah, Ahaggrey and Ntchindi. These people supported me in so many ways including spiritually, financially and socially and they believed in me through the entire time I was pursuing this Master of Science degree.May God bless and favor them in all areas of their lives.

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ABSTRACT

Floods caused by climate change have large social consequences for communities and individuals. The mental health effect of floods on victims in Malawi is not documented.

A cross-sectional quantitative study was conducted in Mzuzu city to investigate the effect of the April 2016 flood on the victims. An interviewer administered structured questionnaire was used to interview conveniently sampled adults who were living in the affected areas. Data was analyzed by comparing mental health indicators before and after the floods, using Statistical Package for Social Sciences(SPSS).

A total of 351 interviews were completed; 70.7% of the respondents were females. The proportion of participants who reported being happy, had injuries, were able to provide for their dependents, accessed health services and had a good appetite before and after the floods were found to be statistically significant as they decreased after the floods and had $p<0.001$. On average, signs and symptoms of mental illnesses such as depression and post-traumatic stress disorder (PTSD) were reported in 56% of respondents. 19.3% received no support like others who did in form of food, shelter and counseling. Of those that received support, 79.8% reported that the support received had no effect on their mental health. Hence 61.5% indicated they needed to be provided with housing; 37.3% indicated they needed loans; 1.14% indicated they needed counseling services, for their mental health to be at optimal level.

Flood victims in Mzuzu city had mental health issues as they presented with symptoms of mental problems. Their mental health indicators such as mood, physical health and eating pattern diverted from the normal state. A comprehensive mental health assessment should be considered for flood victims and a policy incorporating comprehensive mental health services in managing disaster victims should be developed.

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LIST OF ABBREVIATIONS

COMREC	College of Medicine Research and Ethics Committee
DSM V	Diagnostic and statistical manual of mental disorders 5^{th} editions
MCC	Mzuzu City Council
PTSD	Post-traumatic stress disorder
SJOG	St John of God
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Climate change- Climate change is a change in the typical or average weather of a region or city and this could be a change in a region's average annual rainfall or it could be a change in a city's average temperature for a given month or season (Wall,2015).

Health- Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity (World Health Organisation, 1948).

Mental health- Mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community (World health Organiation,2014).

Floods- An overflow of a large amount of water beyond its normal limits, especially over what is normally dry land (Floods, 2017).

Key words - Climate change, floods, flood victims, mental health

CHAPTER 1

Background Information and Introduction

Introduction

Climate change is increasingly recognized as one of the greatest threats to human health of the 21st century with consequences that mental health professionals are also likely to face. Africa has been identified as one of the parts of the world most vulnerable to the effects of climate change (Niang et al., 2014). Floods, which are caused by climate change, have been found to have direct effects on mental health of the people that are victims to it worldwide. Murray et al., (2011)reported that floods affect people's welfare, employment, mobility, wellbeing, psychosocial resilience, relationships and mental health.

Malawi is an African country which due to climate change has experienced extreme rainfall resulting in frequent floods. These extreme weather events damage infrastructure and occasionally displace significant portions of the population (Pauw, Thurlow, & van Seventer, 2010). Floods are natural disasters that are sudden and terrible events in nature(Varcarolis, 2013). On the other hand, climate change is a change in the typical or average weather of a region or city, and this could be a change in a region's average annual rainfall or it could be a change in a city's average temperature for a given month or season (Wall,2015). A change in the rainfall then leads to floods that affect thousands of people leaving them displaced and homeless.

According to the Malawi Government, (2016) during the first ten days of April 2016, northern Malawi had received widespread persistent high intensity rainfall and heavy flooding, destroying crops, infrastructure and in some cases leading to loss of lives in the city of Mzuzu. These floods affected a total of 1643 households and a total population of 8881 in Mzuzu city (Mzuzu City Council, 2016). Despite the measures the country took through government and

non-governmental institutions to assist the flood victims, the component of mental health effects has not been investigated. There was therefore need to understand experiences of those affected to address mental health effects if present.

Padhy, Sarkar, Panigrahi, & Paul, (2015) stated that mental health comprises an important component of health. Similarly, World Health Organization (WHO), (1948) states that mental health is a key component of the World Health Organization's definition of health as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". WHO (2014,p.2) states that mental health is "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community". Mental health is determined by a range of socio-economic, biological and environmental factors. Cost-effective public health and inter-sectoral strategy interventions exist to promote, protect and restore mental health (WHO, 2016). Mental health problems are part of this continuum of mental health which differ in their causes, symptoms, effects and treatment, but are all characterized by alterations in thinking, mood or behavior, and associated distress or impaired functioning and all may be severe and/or enduring (Berry, 2008).

Horton, (2007) states that even though western countries pay great attention to the mind and human consciousness in philosophy and the arts, disturbances of mental health remain not only neglected but also deeply stigmatized across our societies. Similarly, Verner, Schütte, Knop, Sankoh, and Sauerborn, (2016) state that there are a few studies that have been done in relation to the effects of extreme weather events such as floods on mental health due to climate change than on physiological effects. Hence there was a need to conduct this study to add to the body of knowledge on the effects of floods due to climate change on the mental health of victims

especially in Malawi. In addition, the results will guide in developing interventions on managing the mental health of flood victims. The study used the Betty Neumans' System theory through-out. In this theory a person is viewed as whole and whose parts are in dynamic interaction and considers all variables simultaneously affecting the client system which are physiological, psychological, socio-cultural, developmental, and spiritual (Alligood, 2014).

Background Information

People affected by natural disasters such as floods experience a lot of effects on their health. Environmental determinants such as pollen, smoke, dust, and stagnant water consequent to heat, drought and floods are likely to adversely affect human health and lead to chronic physical diseases. Occurrence of chronic physical disorders is likely to affect mental health directly or indirectly due to strain on coping (Padhy et al., 2015).

Climate change may increase the frequency, severity and duration of floods and drought and may consequently affect mental health through at least three pathways (Berry, Bowen, & Kjellstrom, 2010). It will directly affect mental health by inflicting more and worse natural disasters on human settlements which, typically, cause serious anxiety-related responses and, later, chronic and severe mental health problems (Berry et al., 2010). Second, it will increase the risk of injury and physical health problems which are causally and reciprocally related to mental health. Third, it will endanger the natural and social environment on which people depend for their livelihoods and wellbeing (Berry et al., 2010). These effects will not be felt equally by all, but will fall disproportionately on those who are already vulnerable, especially on indigenous people and those living in developing countries, which will bear the brunt of adverse climate change (Berry et al., 2010). In relation to that, poverty in Malawi remains widespread in both rural and urban areas with most being in rural areas (Mussa & Pauw, 2011).

Ministry of Finance, Economic Planning and Development (2014) states that the Northern and Central regions of Malawi have experienced increased poverty rates over the period between 2005 and 2012. This state of poverty puts the people in Malawi including those in Mzuzu which is in the Northern region of Malawi at high vulnerability to the effects of the floods since their houses are constructed poorly and others are constructed along the valleys. Therefore, when floods come due to heavy rains they result in the houses, people and their belongings being washed away.

In north America, an exploratory case study was conducted in Nunatsiavut, Canada on climate change and mental health by Willox et al., (2013). This research qualitatively explored the impacts of climate change on mental health and well-being. The participants reported that changes in weather, snow and ice stability and extent, and wildlife and vegetation patterns attributed to climate change were negatively impacting mental health and well-being due to disruptions in land-based activities and a loss of place-based solace and cultural identity. Participants reported further that changes in climate and environment increased family stress, enhanced the possibility of increased drug and alcohol usage, amplified previous traumas and mental health stressors, and were implicated in increased potential for suicide ideation. Hence, these participants' response, clearly indicate that indeed loss of homes and cultural identity due to displacement by floods, predisposes people to stress and use of drugs and substances where they find solace in. This thus affects their mental health which in the long term can result in mental illness.

Another study by Neuner, Schauer, Catani, Ruf, and Elbert, (2006)in Asia which assessed Post-traumatic stress disorder in children living in three severely affected regions in Sri Lanka by the 2004 Tsunami which according to Choi, (2013) was an effect of climate change.

The study indicates that Post-Traumatic Stress Disorder (PTSD) was a highly prevalent mental health problem for children living in the affected areas in Sri Lanka. The prevalence rate ranged between 14% and 39% but an additional 5% to 8% had PTSD unrelated to the Tsunami. The PTSD symptoms were explained by the severity of the trauma exposure and family loss, as well as previous traumatic events. The results confirm the relevance of the individual history of traumatic events for the genesis of PTSD and indicate a high need for mental health assistance among the Tsunami-affected children in Sri Lanka (Neuner et al., 2006). Thus similarly to the study done in North America, the results are the same that extreme weather events such as floods have direct effects on mental health of people affected due to loss of family, property and homes although in the one done in Sri Lanka the sample were children.

Africa has also been identified as one of the parts of the world most vulnerable to the impacts of climate change (Niang et al., 2014) with Sub-Saharan region still having the largest proportion of people living below the poverty line of all world regions (World Bank, 2015). Although reviews of climate change and health abound, few articles consider the specific health and development impacts of climate change in sub-Saharan Africa (Ramin &mcmichael, 2009). The psychological or mental health consequences are often ignored during natural disasters such as floods, particularly in African nations, but it is important to consider the emotional effects that people experience during the trauma of losing homes, loved ones, and their ways of life (Ebbitt, 2015).

The Malawi Government, (2012) states that Malawi's contribution to greenhouse gas emissions is low on a global scale. However, Malawi's unique and fragile ecosystems are particularly vulnerable to the effects of climate change, thereby negatively affecting the livelihood of Malawians. This vulnerability is exacerbated by Malawi's socio-economic and

demographic factors such as a slim economic base, dependence on rain-fed agriculture, greater reliance on biomass energy, and low adaptive capacity at the community and national levels (Malawi Government, 2012). In Malawi, the most frequently reported natural hazards are floods and they account for over 40 per cent of all disasters (Lumumba & Izadkhah, 2009). These conditions have contributed to frequent flood episodes in Malawi such as from 1942 when severe floods were experienced in the Lower Shire Valley. Lumumba and Izadkhah, (2009) stated that in 1956, severe floods affected the Lower Shire Valley. In 1997 floods damaged the Bangula-Chiromo railway line in Nsanje District apart from the usual damage of crops and houses and in 2001 floods affected almost all flood prone areas in the country and they were all declared disaster areas where hundreds of thousands of homes were lost, thousands of livestock killed, and many crops ruined and a cholera outbreak also happened. The floods also occurred in 2003 and in 2006 which affected 34,678 households with 1,794 houses destroyed, 24,032 hectares of crops washed away, and three culverts in Nsanje District destroyed (Lumumba & Izadkhah, 2009).

Furthermore, in floods affected more than 10,000 people in Malawi and caused US$ 3 million worth of damage to households and infrastructure in Chikwawa, Nsanje, Zomba and Phalombe (Hallegatte, 2015). According to Mzuzu City Council, (2016) in 2016 floods affected Mzuzu city which left 1643 households displaced and 10 people dead while Karonga had over 958 households displaced (Juma, 2016). Despite all these floods due to climate change happening in Malawi, no study has since been conducted to assess the effects of floods on mental health of the victims, thus the aim of this study.

Problem Statement

Lumumba and Izadkhah, (2009) state that in Malawi, floods account for over 40% of all disasters. The major flood areas in Malawi are along Lake Malawi shores, the main rivers, and in low lying areas. With this history of floods in Malawi, the floods which occurred in Mzuzu city in 2016 was an unexpected event as the city is at a relatively high elevation. Due to poverty, over 60 percent of the population in the city live in unplanned settlements (Mpoola, Chanza, Nankuyu, Kamela, & Chirambo, 2011). The unplanned settlements are composed of poorly planned and constructed houses which can be easily destroyed by floods. The 2016 floods led to displacement of 1643 households and affected a population of 8881 in mainly unplanned settlements (Mzuzu City Council, 2016). Although a lot of people were affected by the floods, interventions mainly concentrated on their physical needs such as, food, finances and temporary shelter; there were no interventions directly related to mental health for the victims. In fact, there was no evaluation of the effects of the floods on the mental health of the victims. The lack of an evaluation of and interventions for the mental health needs of the victims indicate a neglect on the psychological component of a person. Therefore, identifying mental health effects of flooding on the victims is key for planning psychological interventions to address them.

Study Justification

The results from this study will add to body of knowledge in a Malawian context on effects of floods on mental health of victims in the country. This might assist the Mzuzu city authorities to be enlightened on how the floods affected the mental health of the people in the city and come up with strategies in collaboration with health service providers to locate and manage all flood victims in the city thereby preventing them from developing complications due to lack of management of mental health issues affecting them.

Furthermore, the results will be used to inform curriculum in nursing education in relation to mental health to generate evidence for decision making and provide solutions for improved adaptation to, and mitigation of, the effects of floods in Malawi. Replicating this study would help the government to consider inclusion of the results from both studies in the national climate change policy and the Malawi national disaster risk management policy. This will help to incorporate in the policies information on comprehensive assistance of disaster victims to promote their mental health directly or indirectly.

Main Objective

The study aimed at exploring the effects of flooding on mental health of victims in Mzuzu city, Malawi.

Specific objectives.

1. To describe the victims' wellbeing before the floods.
2. To identify challenges experienced by the victims after the floods.
3. To identify the early signs and symptoms of mental illness as reaction to the floods by the victims.
4. To determine the intervention provided for reconstitution to the flood victims and effects on their mental health.

CHAPTER 2

Literature Review

Introduction

Literature review is a written summary of the state of existing knowledge on a research problem (Polit & Beck, 2006). Literature review helps to determine knowledge on a topic of interest, provides a context for a study and justifies the need for a study (Polit & Beck, 2006). Thus this section will discuss the various studies that have been conducted in relation to effects of natural disasters such as floods on mental health of the victims.

Various search engines were used to access the literature related to this study such as Google scholar, Research gate, WHO data bases, Pub Med and HINARI. A number of search terms were used to search literature which were; effects of floods, mental health effects on flood victims, support systems for flood victims and impact of climate change on mental health just to mention some. The Betty Neuman systems model guided the literature review as a conceptual framework.

Conceptual Framework

Betty Neuman model was used since it focuses on the client as a whole or system (which may be an individual, family, group or community) and how the client responds to stressors (Alligood, 2014). The Neuman Systems Model is a dynamic, open, systems approach to client care originally developed to provide a unifying focus for defining nursing problems and for understanding the client in interaction with the environment. Similarly, in relation to this model, clients are viewed as wholes whose parts are in dynamic interaction and considers all variables simultaneously affecting the client system which are physiological, psychological, socio-cultural, developmental, and spiritual (Alligood, 2014).

The Betty Neuman's System's model is a nursing theory based on the individual's relationship to stress, the reaction to it, and reconstitution factors that are dynamic in nature. Neuman (2011) stated that there are nine major concepts, with their sub concepts, identified in the model. These are; wholistic approach, open system (including function, input and output, feedback, negentropy, and stability), environment (including created environment), client system (including five client variables, basic structure, lines of resistance, normal line of defense, and flexible line of defense), health (wellness to illness), stressors, degree of reaction, prevention as intervention (three levels), and reconstitution (Neuman, 2011). In this study only four major concepts namely; stressors, reaction, prevention as an intervention and reconstitution were used to guide the literature search. The literature contains information that looked at the stressors of people affected by floods, reaction to the stressors and interventions that have been recommended by various authors and found to be effective by leading to reconstitution of the victims. These concepts used from the Betty Neuman's model are also related to the objectives that were set for this study.

Therefore, in relation to the Neuman's model, flood victims are clients that are in an environment which has factors that affect them and in this case, floods as a natural disaster. The floods would then lead to the various parts of an individual being affected. For example, they get injured thereby being affected physically. Losing homes and loved ones leads to one developing anxiety and making one to be psychologically affected. The victims are relocated from their original places leading to loss of identity and cultural or spiritual beliefs. This is so because they now have to live in a new community with different cultural or spiritual beliefs hence being affected in their socio-cultural and spiritual variable of an individual. All these variables of a client such as physiological, socio-cultural and spiritual components might also affect the

psychological component of a client as the stressors experienced can lead to anxiety or traumatic experiences that affect one's psychological or mental processes.

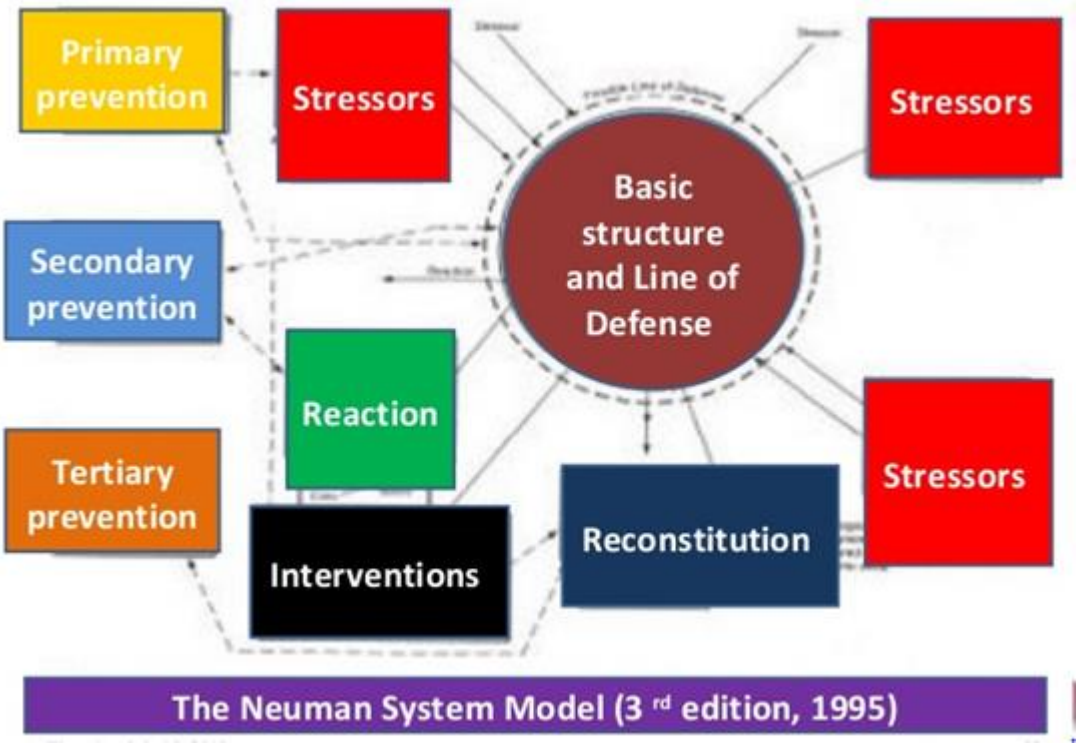

Figure 1: Conceptual framework; Betty Neuman model

Stressors

A stressor is any phenomenon that might penetrate both the flexible and normal lines of defense, resulting in either a positive or negative outcome (McEwen & Wills, 2014). In relation to this study, the stressors were the floods which destroyed houses, caused relocation and death of loved ones, and loss of land for income generation activities. These led to disruption of the flood victim's system stability thereby manifesting in developing signs of mental health problems, which are negative outcomes.

Floods have been one of the natural disasters that are affecting people world-wide. Du, FitzGerald, Clark, and Hou, (2010) conducted a systematic review study which aimed at identifying the health impacts of disasters and the underlying causes of health impacts associated with floods. The results were grouped into three parts: immediate impacts, medium and long term impacts where poor mental health fell under long term effects of floods as a natural disaster. The mental health problems may derive from physical health problems, personal losses, social disruption, economic hardship and major life stressors. People who have experienced a flood have been shown to have a fourfold higher risk of psychological distress than do those not exposed to a flood, and a suicide rate 13.8% higher than pre-disaster rates. Contrary to that, management of the mental health consequences of exposure to disasters has not been fully addressed by those in the field of disaster preparedness or service delivery (Du et al 2010).

This is similar to Malawi where there is no evidence on the management of mental health of the people affected by disasters such as floods. This could be due to lack of proper measures put in place to assist the victims comprehensively whilst incorporating mental health in the management. The other reason could also be that there are no reports indicating the extent of the problem if it is indeed there. Thus this study in Malawi will contribute to the body of knowledge on what needs to be done to promote mental health of flood victims. Furthermore, as this study indicates clearly that long term effects of floods are mental health problems, it is then necessary that the victims be assisted comprehensively to prevent the long term effects of floods on their mental health.

Murray et al (2011) stated that after the 2007 floods in England, researchers from the Health Protection Agency and King‘s College London conducted a health impact assessment using population surveys in two affected regions of the United Kingdom: South Yorkshire and

Worcestershire. The prevalence of risk factors for negative psychosocial consequences was measured using a series of validated tools including the General Health Questionnaire (GHQ-12), General Anxiety Disorder Assessment (GAD-7), Patient Health Questionnaire (PHQ-9) and Post-Traumatic Stress Disorder (PTSD) checklist-short form. Additionally, exposure variables were measured including the presence of flood water in the home, evacuation and disruption to essential services, perceived impact of the floods on finances, house values and perceived health concerns.

It was found that the prevalence of mental health symptoms was elevated two to three times in a survey where respondents who had been affected by flood water in the home, had health concerns and perceived that the flooding had a significant impact on their finances and house value. Having been evacuated during the floods was associated with an increase in psychological distress, but not with other psychosocial outcome measures. Interestingly, levels of reported mental health symptoms were higher in South Yorkshire when compared to Worcestershire, despite the two regions being similarly affected by the floods. The authors suggest that this outcome may be due to differing levels of social deprivation across the two regions, the timing of data collection (3 months versus 6 months), and the sampling methods used in each region. However, the relative increase in self-reported mental health symptoms in flooded versus non-flooded groups leads to the conclusion that exposure to flooding can result in negative psychosocial or mental health outcomes.

Similarly, Patz, Frumkin, Holloway, Vimont, and Haines, (2014)conducted a systematic review from 2009 to 2014 on 56 articles selected from 250 related to climate change and health, focused on governmental reports, predictive models, and empirical epidemiological studies. The aim of the review was to review studies on health risks related to climate change and

the co-benefits of efforts to mitigate greenhouse gas emissions that are leading to climate change. It was found that disasters that are caused by climate change such as floods and hurricanes are leading to mental health conditions such as PTSD, anxiety and depression. For example, several months after Hurricane Katrina, 49.1% of those surveyed in New Orleans and 26.4% in other affected areas developed anxiety mood disorder; 1 in 6 had PTSD and with considerable overlap between the 2 diagnoses using Diagnostic and Statistical Manual of Mental Disorder (DSM-IV). The reviewed studies recommended that there should be interventions such as strengthening social support networks, providing post disaster mental health services and prompt insurance compensation for loss to prevent the effects of the disasters on the mental health of affected people.

Stressors caused by disasters such as floods, also vary with the intensity. For example, areas with extreme damages may have more victims with extreme stressors and thus may need extreme measures to be taken to support them. In addition, it is also important that the mental health of communities should be promoted. Furthermore, if any assessments are conducted, mental health should be part of them so that there can be knowledge of mental health before a disaster. This would help in making a comparison on lifestyle before and after a disaster such as floods. Fernandez conducted a systematic mapping review of published scientific literature from 1994 to May 2014 in five languages for mixed studies on mental health impacts of floods caused by extended periods of heavy rain in river catchments. The studies reviewed clearly showed that there was a significant increase in cases of Post-Traumatic Stress Disorder (PTSD) in the affected areas, when compared with post-traumatic stress disorder prevalence before the flood, assessed retrospectively. Groups exposed to flooding events showed higher levels of anxiety when compared with the non-exposed groups. Overall, people from the flood-affected areas

experienced an increase in depression symptomatology. There was contradictory evidence regarding suicide following a flood event. A study in the United States of America reported an increase in the rates of suicide following a flood event. Overall psychological health and mental health-related quality of life was significantly worse in affected areas compared to non-affected areas. A study conducted by Turner et al.,(2013)in Australia reported an increased use of tobacco and alcohol after floods had affected Queens-land. This was not found in a study conducted by North, Kawasaki, Spitznagel, and Hong, (2004) in America where the levels of using alcohol and tobacco remained the same for flood victims.

In the same systematic review, a study in France using administrative data, indicated there was an increase in the number of psychotropic drug prescriptions during the three weeks following flooding and this was detected at a higher rate in females (Motreff et al., 2013).The higher the level of exposure (measured in most of the cases as a combined index of different aspects related to the level of losses/damage and the threat/harm), the higher levels of mental health-related problems were reported in the studies. Several studies indicated the impact of coping styles in the development of mental disorders after a flood, showing that positive and proactive behaviors were associated with positive mental wellbeing. Poor mental health status before the flood and existing physical health problems were associated with post-event mental health. Poor socio-economic status has been systematically associated with poor mental health outcomes after exposure to floods (Fernandez et al., 2015).

In trying to show importance of knowing if the mental health effects are due to floods, a study was done by Jahan (2015) which aimed at assessing the mental health impacts of flooding and to explore the key determinants of flood-related mental illness in the coastal regions of Bangladesh. Pre and post-flood mental health data in the year 2010-2011 were obtained from the

Directorate General of Health Services of Bangladesh (DGHS) as well as from face to face interviews with the flood victims. It was found that females are 2.49 to 8.17 times more prone to develop depression than males after a flooding episode. Married people were 1.52 to 6.82 times more likely to develop depression than unmarried people. Unemployed people were 2.91 to 4.89 times at more risk of developing depression than employed people after a flood. Respondents with a low income (<2000 taka) which is equivalent to 25USD had a higher risk of developing depression than those with a higher income (>4000 taka) equivalent to 50USD when they were exposed to a flood. After the flood they suffered 3.91 to 6.17 times more depression than the higher income group (>4000 taka).

Furthermore, the total number of mental illness cases increased from 950 (38.0%) to 1,647 (65.9%). Before the flood, the prevalence of mental illness was 16.7% (depression), 10.6% (anxiety), 4.9% (PTSD), and 5.7% (drug abuse). After the flood the prevalence increased to 27.6% (depression), 16% (anxiety), 12.3% (PTSD), and 9.8% (drug abuse). In general, all the psychological disorders were significantly predicted by higher exposure to water level, injury, loss of a family member, financial help and loss of land. However, the influence of other factors (such as social support, education level, coping strategy and previous trauma history) on the prevalence of mental illness cannot be ignored.

Dziwornu and Kugbey (2015) conducted a comparative study which aimed at assessing the mental health problems and coping among flood victims in Ghana. They examined the mental health problems and coping strategies among flood victims and non-victims in the Eastern Region of Ghana. A total of 400 respondents (200 flood victims and 200 non-victims) were sampled from two Districts, one with a history of floods and the other with no flood history. A Retrospective Cohort Design was used to determine the effects of natural disaster

(flood) on the victims. The respondents were administered with the Brief Symptom Inventory and the Coping Strategies Inventory. Results revealed significant differences in mental health problems between flood victims and non-victims. This was so since it was found that flood victims scored significantly lower on all the adaptive coping strategies such as expressive emotion, cognitive restructuring and positive religiosity than non-victims except problem solving and social support. On the other hand, flood victims scored significantly higher on all the maladaptive coping strategies such as self-criticism, wishful thinking and problem avoidance than non-victims except negative religiosity and social withdrawal. It is therefore concluded from the outcomes of this study that flood victims experience significant stressors/ mental health problems and therefore, psychological care of the victims must be taken into consideration in times of rendering assistance after a flood disaster. This prevents complications that come due to lack of early diagnosis and treatment of mental health problems.

Reaction to the Stress Related to Natural Disasters (Floods)

There are quite a number of ways people respond to stressors such as floods in various settings and by different types of people. Neuman, (2011) states that there are internal and external forces that influence or are being influenced by the client, at any point in time. For example, being affected by floods as victims is stressful and when one has been affected it means the normal line of defense has been penetrated and people respond differently.

A number of studies have shown a range of symptoms or reactions resulting from exposure to natural disasters such as flooding which seem to be the similar in most flood or natural disaster victims. Among these consequences, individuals may experience symptoms of post-traumatic stress disorder (PTSD), depression and anxiety. Mason, Andrews, and Upton, (2010) conducted a study with the aim to examine the psychological impact of flooding in the

UK. A cross-sectional survey was used to investigate the psychological symptoms associated with the aftermath of the flood amongst adults living in the affected communities. A questionnaire battery including the Harvard Trauma Questionnaire (trauma and symptoms associated with PTSD), Hopkins Symptom Checklist (anxiety and depression), Coping Strategies Questionnaire and a range of questions addressing socio-demographic characteristics and factors relating to the flood was administered to households in flood-affected areas. It was found that 27.9% of participants met criteria for symptoms associated with PTSD, 24.5% for anxiety and 35.1% for depression. Females had higher mean scores on PTSD, anxiety and depression than males. Most frequently reported coping strategies were rational, detached and avoidant, with the least frequent being emotional coping. Having to vacate home following flood, previous experience of flooding and poor health were associated with greater psychological distress. Detached coping appeared to be related to less distress. They concluded that symptoms of distress are a significant issue amongst communities affected by environmental events warranting further attention to prevent chronic distress.

One would wonder why females were found having higher scores on PTSD than their male counterparts, as found in the study above. A meta-analysis study was conducted by Tolin and Foa,(2006) on sex differences in trauma and PTSD. It was found that regardless of the type of study, population, type of assessment, or other methodological variables, women and girls are more likely than men and boys to meet criteria for PTSD. This is consistent with epidemiological research showing a higher prevalence of fear and anxiety-based disorders among female respondents which are women and girls.

As it is also stated in the above study, the flood victims experience distress due to the floods which take away their homes, cause relocation and worry on existing poor health which

leads to chronic distress. It is hence relevant to be aware of such reactions by flood victims so that they are then referred to the necessary disciplines for management to prevent them from developing complications related to mental health or chronic distress which includes mental illness. Flood victims get very distressed due to feelings of hopelessness and a doomed future. This is related to a study by Berry, Hogan, Owen, Rickwood, and Fragar, (2011) who quantitatively assessed climate change and Farmers' Mental Health: Risks and Responses, aimed at finding out how climate change and related factors may affect farmers' mental health in Australia. The study concluded that additional climate change related pressures such as floods and droughts facing farmers exacerbate the stresses inherent in farming. Farmer's poor sense of future is of considerable concern because of its possible links to hopelessness and suicide.

Additionally, Sparrow (2015) states that the lower Shire floods of 2005 in Malawi made farmers in Chikwawa and Nsanje, two of the districts worst affected by weeks of heavy seasonal rains and unprecedented flooding, to look on in disbelief. They were asking questions such as "when would it end? Wasn't it enough? They had lost their homes, their crops, their food stocks and their animals" In 2012, 2 million people faced hunger in Malawi because of prolonged dry spells which is as a result of climate change and three consecutive very poor harvests. These concerns clearly show that farmers and other people feel hopeless, helpless and experience anxiety after experiencing natural disasters since they do not know where to start and how their life will be from then on as they lose their farm inputs during the disaster such as floods.

With a longitudinal prospective design, Bei et al., (2013) examined the impact of floods on the mental and physical health of older adults and explored risk and protective factors in Australia. Two hundred and seventy-four older adults (age ≥60) completed surveys before and

after a flood event. Both the surveys included measures of anxiety, depression, self-reported health, and satisfaction with life; the post-flood survey also included questionnaires on flood experience, symptoms of PTSD, stoicism, and psychological coping with floods. It was found that the victims reacted differently to the event that had occurred. Compared to those not personally affected by the floods (78.8%), personally affected individuals (21.2%) reported significantly higher PTSD symptoms, with one in six reporting PTSD symptoms that might require clinical attention. Personally affected individuals also reported a greater increase in anxiety post-flood, but changes in their depressive symptoms and self-reported health were not significantly different from those not personally affected. Greater flood exposure and the lack of social support were the risk factors for poorer mental and physical health. Higher stoicism, which is masking of feelings and emotions, was associated with higher post-flood depression and poorer self-reported mental health. Despite the evidence of resilience, a small proportion of older adults experienced significant difficulties after the floods. The results in this study help understand older adults' psychological responses to disasters and have practical implications for service planning and delivery.

Similarly, the Malawi Government, (2016) stated that Malawi's population of older persons has been on the increase. In 1987, Malawi enumerated a total population of 7.9 million of which 473,898 were older persons representing 6 percent of the total population. The 1998 Malawi Population and Housing Census showed that out of the 9.9 million persons counted, 547,542 were older persons with 53 percent of them being female. This presented a 13.4% increase in the population of older persons in 1987. The 2008 Malawi Population and Housing Census showed that out of the 13.1 million persons counted, 685,316 were older persons (representing 5.2 percent of the total population) with 303,570, of them being males and 381,746

females. This represents a 20% increase from 1998 population. With this increase it is of no doubt some of them were also victims of the floods in Mzuzu city as they were living in the prone areas. This being the case, an assumption would be drawn that these older persons would react negatively to the stressor. This is so as they are prone to develop mental health problems due to burden of care and chronic conditions they may have which is likely to affect their mental health directly or indirectly due to strain on coping as stated by (Padhy et al., 2015).

Interventions and Reconstitution for Flood Victims

Interventions for natural disaster victims such as floods is a very important aspect so as to allow them to cope with stressors. Alligood, (2014) states that Interventions are purposeful actions to help the client retain, attain, or maintain system stability. They can occur before or after protective lines of defense and resistance are penetrated. The Neuman model supports beginning intervention when a stressor is suspected or identified. Interventions are based on possible or actual degree of reaction, resources, goals, and anticipated outcomes. The Neuman model identifies three levels of intervention: (1) primary, (2) secondary, and (3) tertiary. Primary prevention is used when a stressor is suspected or identified, secondary prevention involves interventions or treatment initiated after symptoms from stress have occurred and tertiary prevention occurs after the active treatment or secondary prevention stage (Neuman, 1989). This means that when floods occur, there are interventions to be taken to prevent the victims from developing mental illness, treat those that have developed mental health problems and rehabilitate those that already are on treatment to maintain their optimal state of mental health.

It is the government, community based organizations and other Non-governmental organizations that usually play a role in providing assistance to the victims such as shelter, food and clothing which are only physical needs and temporary but not psychological needs.

Dziwornu and Kugbey (2015) recommended in their comparative retrospective study on "Mental Health Problems and Coping among Flood Victims in Ghana", that the first implication that flood victims experience severely are psychological problems and any form of assistance must make room for psychological interventions. Thus, providing victims with relief items should not be the only priority but their short and long term physical and mental wellbeing should be taken into consideration. Additionally, the National Disaster Management Organization or teams should be well resourced in terms of personnel and financial resources to deal with the negative consequences of natural disasters especially floods. Furthermore, they recommended that persons at risk of floods should be educated on the negative physical and mental health consequences of natural disasters especially floods. This would assist the victims in being aware of consequences of the disaster on their mental state and hence to seek assistance when they feel they are having signs of mental health problems so that interventions can be done to prevent complications.

Padhy et al., (2015) recommended a number of interventions that can assist in preventing or reducing the effects on mental health. They recommended that provision of adequate treatment facilities for managing mental health problems are to be undertaken for natural disaster-related problems, since that is when the vulnerability to stress is acute. Promoting positive mental health was another intervention recommended to mitigate the psychological distress due to disasters caused by climate change. To reduce suicide fatalities due to secondary consequences of climate change it was recommended that the governments may include debt-abolition or economic support for farmers. Creating co-operatives and protection of farmers from loan sharks might reduce the suicide rates due to destruction of crops. Furthermore, provision of subsidies and guaranteed income during floods might lead to less economic and psychological stress on farmers in question. This is similar with what Fernandez et al.,

(2015)stated that socioeconomic status has been systematically associated with poor mental health outcomes after exposure to floods as the lower the socioeconomic status, the higher the risk of mental health problems. Thus economic empowerment is very important as a support measure to disaster victims to help in income generation activities as a source of income that helps them to be able to provide for their families thus maintaining mental health state. Similarly, Patz et al., (2014), recommended that there should be interventions such as strengthening social support networks, providing post disaster mental health services, and prompt insurance compensation for loss to prevent the effects of the disasters on the mental health of the affected people.

The intervention measures clearly show that many effects of natural disasters on mental health of victims are due to hopelessness since one has lost their source of income if they were for example doing farming. Hence socioeconomic empowerment is very vital to reduce stress on the flood victims. Despite Malawi having a national climate change policy, it does not state measures that will be taken to support the disaster victims, therefore this study results could enhance its review to accommodate the issues that have been found. Malawi could adopt these measures of supporting the flood victims when it is found that they were affected mentally. The measures that can be taken are linking the victims to loan service providers to start businesses and depend on themselves, providing counseling services and managing physical and mental health problems caused by the floods. It would be necessary for the disaster management teams under the governments to put up these measures or policies that would clearly indicate the need for mental health services for the flood victims to promote their mental health state.

Conclusion

Literature has shown that floods pose a major threat to mental health of the victims through for example development of PTSD, depression and other anxiety disorder whose effect can be minimized through various interventions.

CHAPTER 3

Research Methodology

Introduction

This chapter describes the methodology that was employed to carry out this study. The chapter describes the study design, the study setting, study population, sampling method, sample size and selection, data collection, data management, data analysis, plan for dissemination and ethical consideration.

Research Design

This was a descriptive cross-sectional study that utilized quantitative methods of data collection and analysis. Quantitative methods were used to quantify the problems found and it was also driven by the literature review as most of the studies found used quantitative methods to also quantify the problems. A cross-sectional research design provides the researcher with a picture of what might be occurring in a sample or population of people at a particular time (Maltby, Williams, McGarry, & Day, 2010). Descriptive studies are recommended and can be used to provide information about human behavior in a community and describe attitudes towards an issue (Kumar, 2014). As a type of non-experimental research design, cross-sectional research designs are used in studies where researchers wish to construct a picture of a phenomenon; explore events, people or situations as they naturally occur; or test relationships and differences among variables (Maltby, Williams, McGarry, & Day, 2010). Hence, this study qualified to use a descriptive cross-sectional research design so as to construct a picture or provide information on how the floods affected the mental health of the victims in Mzuzu city.

Study Setting

The study setting was Mzuzu city where the floods happened in April, 2016. Mzuzu is a city in the northern region of Malawi with a population of 133,968 and growing at 4.2 percent per annum and is one of the fastest growing cities in Malawi and the third largest urban centre after Lilongwe and Blantyre (Mpoola, Chanza, Nankuyu, Kamela, & Chirambo, 2011). Over 60 percent of the population lives in unplanned settlements and the city does not have adequate policies and regulations to support orderly and planned growth (Mpoola et al., 2011). The unplanned settlements lead to building of unplanned and poor quality houses that are easily destroyed by floods leading to displacement of the people. In the Mzuzu floods, 1643 households were displaced (Mzuzu City Council, 2016).

Study Population

A study population as defined by Polit and Beck,(2008)refers to all the individuals or objects with the common, defining characteristics. The targeted study population were adults who were flood victims in Mzuzu city.

Inclusion criteria.

Inclusion criteria specify the characteristics that delimit the study population (Polit & Beck, 2010). Participants included in the study were adults that were 18 years and above that had been affected by the April 2016 floods. They also were those people that were able to speak English or Chichewa for easy communication with the researcher since these were the two main languages the researcher was and is fluent with.

Exclusion criteria.

Exclusion criteria specify the characteristics that participants do not have (Polit & Beck, 2010). Individuals aged less than 18years, were not 2016 Mzuzu flood victims, and could not communicate in Chichewa or English were excluded from the study.

Study Period

The study took a period of 10 months which was from October 2016 to July 2017.

Sampling Method

The study used convenience sampling method. Convenience sampling is the type of sampling that uses the most readily accessible persons or objects as subjects in a study (Lobiondo-Wood &Haber, 2010). Convenience sampling is easier for the researcher to obtain subjects since they are readily accessible to participate in the study (Lobiondo-Wood & Haber, 2010). All persons that were available and eligible when the researcher went for data collection were interviewed. 365 participants were approached and 14 were ineligible since they could not speak or understand Chichewa hence interviews were conducted to the 351 eligible participants. The participants were found with the help of the block leaders which the ward councilors had recommended to assist the researcher. When the participants were identified in their homes, a consent form was read to them. They were interviewed only after giving their consent to participate in the study. For those that could not be interviewed in the home they were asked to come with the researcher to the nearest school identified to be interviewed.

Sample Size and Selection

A sample size is the total number of study participants in a study (Polit & Beck, 2006). Sample size in this study was calculated using statistical formula by Yamane (1967) as indicated below:

$n = N/ 1 + N(e)^2$, Where; n= sample size, N= population size, e= the level of precision or acceptable sampling error

Then n (sample size) = $8881/ 1 + 8881(0.05)^2$

= 382

Therefore, a sample of 382 flood victims was to be recruited into the study.

Development of the Instrument for Data Collection

A structured questionnaire with closed-ended questions was developed by the researcher. Questionnaires are instruments designed to gather data from individuals about knowledge, attitudes, beliefs and feelings (Lobiondo-Wood & Haber, 2010). The questionnaire was guided by the study objectives, the Betty Neuman Systems conceptual framework and Diagnostic and statistical manual of mental disorders (DSM V) by the American Psychiatric Association. The structured questionnaire (see Appendix G) had five sections that were related to four concepts of the Betty Neuman systems namely; stressors, reaction, interventions and reconstitution which are related to the study objectives. The questionnaire contained demographic characteristics of the participants, pre-disaster lifestyle, challenges experienced by the victims after the stressor/floods, signs and symptoms of mental illness as reaction to the floods and interventions for reconstitution. The questions on signs and symptoms of mental illness were taken from the DSM V which contains signs and symptoms of PTSD and depression that are commonly found in disaster victims as per literature review. The questionnaire was developed in English and later translated into Chichewa (see appendix H) to aid communication based on participants' preference. The researcher with the help of a linguist, back translated the Chichewa questionnaire into English to ensure that the questions had not changed meaning.

Pre-testing of the Instrument

Pre-testing of the tool was done at Katawa ward that had 25 flood victims. This was the second lowest ward affected with floods hence that is why it was chosen to at-least be able to find the 5 participants needed for the pre-testing, which was the case. It was easy to conveniently find the victims with the help of the ward councilor and the block leader for the area. Upon the results from the pre-test, there were three questions that were rephrased and five questions added to section E of the questionnaires that were found to be necessary to address the objectives of the study.

Validity of the Data Collection Tool

Polit and Beck (2006) describe validity as the degree to which an instrument measures what it is supposed to be measuring. Hence to ensure validity of the data collection instrument developed by the researcher, the tool was reviewed by the research supervisor and College of Medicine Research and Ethics Committee (COMREC) for clarity. Furthermore, content validity of the tool was done to measure if the instrument was relevant to measure what it was supposed to measure. Content validity was done by the researcher and research supervisors by going through each question on the questionnaire to measure if it is relevant to measure the set objectives of the study.

Reliability of the Data Collection Tool

Briggs and Coleman (2007) state that reliability is when the research procedure or method would produce identical or similar results when reused. After clearance had been granted from College of Medicine Research and Ethics Committee (COMREC) to conduct this study, the researcher conducted a pre-test on the tool in Mzuzu city to 5 participants that were also affected by the floods in one of the ward out of the fourteen wards affected. These 5 participants did not

take part in the main study and this was made sure by not involving anyone from that particular ward to be involved in the main study. Pre-testing of the tool was done so as to examine the questionnaire if it was free from any discrepancies that could affect the data collection and results from meeting the objectives of this study. Privacy was also considered as the interviews were conducted in the homes of the participants or a classroom near their homes.

Data Collection

When participants had been identified by the researcher, they were given the English or Chichewa or Tumbuka Declaration consent form (see appendices D or E or F). After gaining consent from the participant, the researcher conducted face-to-face interviews with the consented participants using a questionnaire (see appendices G and H) with closed ended questions as a guide. The interviews were conducted in Chichewa to ensure data accuracy. In addition, the interviews were done in a quiet and familiar environment to the subjects to allow them to be comfortable and relaxed. The interviews took a minimum of 20 minutes and a maximum of 35 minutes.

Data Management

The questionnaires were checked after each interview to ensure that all questions were answered. Numbers were used on the questionnaire and not names as identification of the questionnaire. The questionnaires were stored by the researcher in a locked cabinet, where only the researcher had access for confidentiality. Data was then entered in SPSS version 20 from the questionnaires. The questionnaires were stored by the researcher to be destroyed when the study is finalized and when there will be no need to further use them in December 2018.

Data Analysis

Grove, Burns, and Gray, (2013) state that data analysis reduces, organizes and gives meaning to the data and in quantitative research it involves descriptive analysis techniques, statistical techniques and analysis techniques. Data needs to be systematically analyzed so that trends and patterns can be detected (Polit & Beck, 2006). The data collected from the participants were recorded on a paper-based questionnaire during the interviews and then entered into Statistical Package for Social Sciences (SPSS) version 20 for analysis. The main outcome variables were participant's happiness, injuries, ability to provide dependents' needs, ability to access health services, sources of income, sleep pattern, appetite, smoking and alcohol use before and after the floods. For the main outcomes, aMcnemar's test was used to assess whether the proportion of participants reporting specific outcomes before and after the floods were statistically different. This test was used as data reported were paired and analyzed through SPSS. This research used descriptive statistics such as proportions and percentages to analyze data which allow the researcher to organize data in ways to facilitate meaning and insight. The results of this study have been presented in tables as well as figures.

Dissemination of the Results

This research is in partial fulfillment for a Master of Science in community health nursing at Kamuzu College of Nursing. The results of this study will be disseminated to various stakeholders at research conferences such as the annual international mental health conference. Results will be written up and submitted to a peer reviewed journal. The copies of the thesis will be made available to Kamuzu College of Nursing library, St John of God College of health sciences library, Non communicable disease department at Ministry of Health and Mzuzu city council (MCC).

Ethical Considerations

Ethical review of the research proposal is important. In this research, the researcher ensured that standards of research ethics were followed by seeking approval to conduct the study from the College of Medicine Research and Ethics Committee (COMREC) and from The Chief Executive Officer of MCC who is the overall in-charge of the activities in the city that include flood victims. Consent forms having information on study purpose, benefits and risks, and maintenance of privacy and confidentiality were used. The participants were assured of confidentiality by not using their names on questionnaires but numbers. Furthermore, they were assured of no negative effect if they refuse to participate or withdraw at any time during the study and that data collected would be used only by the researcher and those that might provide psychological care to promote their mental health. After comprehensive understanding of the study and voluntary participation, the participants signed a consent form**.** The 14 participants that broke down during the interviews were referred to St John of God Hospitaller services for psychological counselling.

CHAPTER 4

Presentation of Results

Introduction

This chapter presents the study results. The analysis was based on 351 participants out of the expected 382. 365 participants were approached and 14 were ineligible since they could not speak or understand Chichewa hence interviews were conducted to the 351 eligible participants. The first part of the chapter presents results on demographic characteristics of the participants followed by the flood victim's wellbeing before the floods, challenges experienced by the victims after the stressor/floods, differences in the before and after wellbeing of the victims, early signs and symptoms of mental illness as reaction to the floods by the victims, interventions received for reconstitution by the flood victims and effects on their mental health.

Demographic Characteristics of Sampled Flood Victims

The following demographic characteristics were asked; age, sex, marital status, education level, religion, tribe and source of income. These were assessed because the study wanted to check if these characteristics had an effect on the outcomes of the study. Table 1 displays results of demographic characteristics of the 351 participants included in the study. As a way of earning their living, 39.8% participants were business persons followed by 31.1% being farmers.

Table 1: Demographic Characteristics of Sampled Flood Victims

Characteristic	**Value**	***N***	**%**
Gender	Female	248	70.7
	Male	103	29.3
Age Group	18-29	64	18.2
	30-41	132	37.6
	42-54	91	25.9
	55 and above	64	18.2
Marital status	Single	17	4.8
	Married	241	68.7
	Divorced	32	9.1
	widow/widower	61	17.4
Religion	Christianity	336	95.7
	Islam	15	4.3
Educational level			
	Secondary	96	27.4
	Primary	233	66.4
	Not educated	22	6.3
Tribe	Chewa	41	11.7
	Tumbuka	245	69.8
	Tonga	50	14.2
	Ngonde	15	4.3

Victims Wellbeing before the Floods

Participants were also asked questions about their wellbeing before the floods in relation to mental health indicators. Table 2 presents the results. (n = 262, 74.6%,) participants indicated that they had a happy mood before the floods. (Only 20 participants (5.7%) had physical injuries due to other causes before the floods, and of these, 13 (41.9%) were treated. (n = 342, 98.3%,) of the participants had all the necessities before the floods.(n = 178, 50.7%) of the participants were doing business; and (n=150, 42.7%)participants were able to provide for their dependents' needs (n = 335. 95.4%) were able to access health services. (n = 319, 90.9%)of the participants could sleep for at least 8 but less than 10 hours; and (n = 262, 74.6%) had good appetite. In terms of smoking status, (n = 341, 97.2%,) never smoked at all (; and never used to take alcohol (n = 332,95.1%).

Challenges Experienced by the Victims after the Stressor/Floods

As a follow-up to their wellbeing, participants were also asked questions pertaining to the challenges experienced after the floods which were taken as mental health indicators. These indicators included happiness as mood, injuries experienced, casual labor as a source of income, losing property, ability to provide for dependents needs, ability to access health services, ability to sleep more than eight hours, good appetite, smocking and taking of alcohol. The diversion of the mental health indicators from the normal after the floods was what was referred to as challenges when compared with how the indicators were before the floods.

Only 0.9% of the participants indicated that they had a happy mood after the floods from 74.6% before the floods giving a ($p<0.001$).The number of injuries increased from 20 to 71 (5.7% to 20.2%) and had ($p<0.001$). (n = 338, 96.3%) of the participants lost their property after the floods. Although slightly over half of the participants were doing business prior to the floods,

only (n = 124, 35.3%)continued doing business, and those doing casual labor increased from 75 (21.4%) before the floods to 173 (49.3%) after the floods; and the number of participants who were not able to provide dependents' needs increased from 201 (57.3%) to 314 (89.5%) after the floods, representing a 32.2% increase($p<0.001$). The number of participants who were able to access health services decreased from 335 (95.4%) before the floods to 315 (90.0%) after the floods($p=0.003$). Although most participants indicated they could sleep for at least 8 but less than 10 hours before the floods, majority indicated they could now sleep for at least 6 but less than 8 hours (n = 146,41.6%). Despite that 74.6%of the participants had good appetite prior to the floods, only 29.9% had good appetite after the floods ($p<0.001$). Just like before the floods, majority never smoked at all (n = 338, 96.3%); and never used to take alcohol (n = 333, 94.9%) after the floods.

Difference in wellbeing before and after the Floods

The study also presents results of a Mcnemar's Test of the difference between proportions among the participants before and after the floods. Based on these results, it is clear that the proportion of participants that were happy before the floods significantly decreased by 73.8% (95% CI: -78.5%, -69.1%); the proportion of participants that had injuries before the floods significantly increased by 14.5% (95% CI: 9.5%, 19.5%); the proportion of participants that were able to provide dependents' needs significantly decreased by 32.2% (95% CI: -37.5%, -26.9%); the proportion of participants that were able to access health services significantly decreased by 5.4% (95% CI: -7.3%, -3.6%); and the proportion of participants that had good appetite significantly decreased by 46.0% (95% CI: -51.9%, -26.9%). However, the changes in proportions of participants that had injuries and got treated, had all the necessities, smoked 3 or more cigarettes, or took 3 or more bottles of alcohol, have been found not to be statistically

significant as their 95% confidence intervals contained a zero. Table 2 presents some of the results and P-values for significance of the results.

Table 2: Wellbeing before and after the Floods

Parameter (mental health indicator)	***Before*** ***n* (%)**	***After*** ***n (%)***	***P-Value ****
Happy mood	262 (74.6)	3 (0.9)	<0.001
Had Injuries	20 (5.7)	71 (20.2)	<0.001
Treated if had injuries	13 (41.9)	64 (79.0)	0.375
Had all necessities	342 (98.3)	338 (96.3)	0.143
Casual labor as a source of income	75 (21.4)	173 (49.3)	<0.001
Able to provide dependents' needs	150 (42.7)	37 (10.5)	<0.001
Able to access health services	335 (95.4)	316 (90.0)	0.003
Slept less than 6 hours a day	7 (2.0)	185 (52.7)	<0.001
Good appetite	262 (74.6)	105 (29.9)	<0.001
Number of times smoked in a day	6 (1.1)	9 (2.6)	0.375
Bottles of alcohol taken a day	6 (1.7)	8 (2.3)	0.727

* Mcnemar's test.

Signs and Symptoms of Mental Illness as Reaction to the Floodsby the Victims

Participants were also asked questions relating to signs and symptoms of mental illness as a reaction to the floods. Figure 2 presents the results.

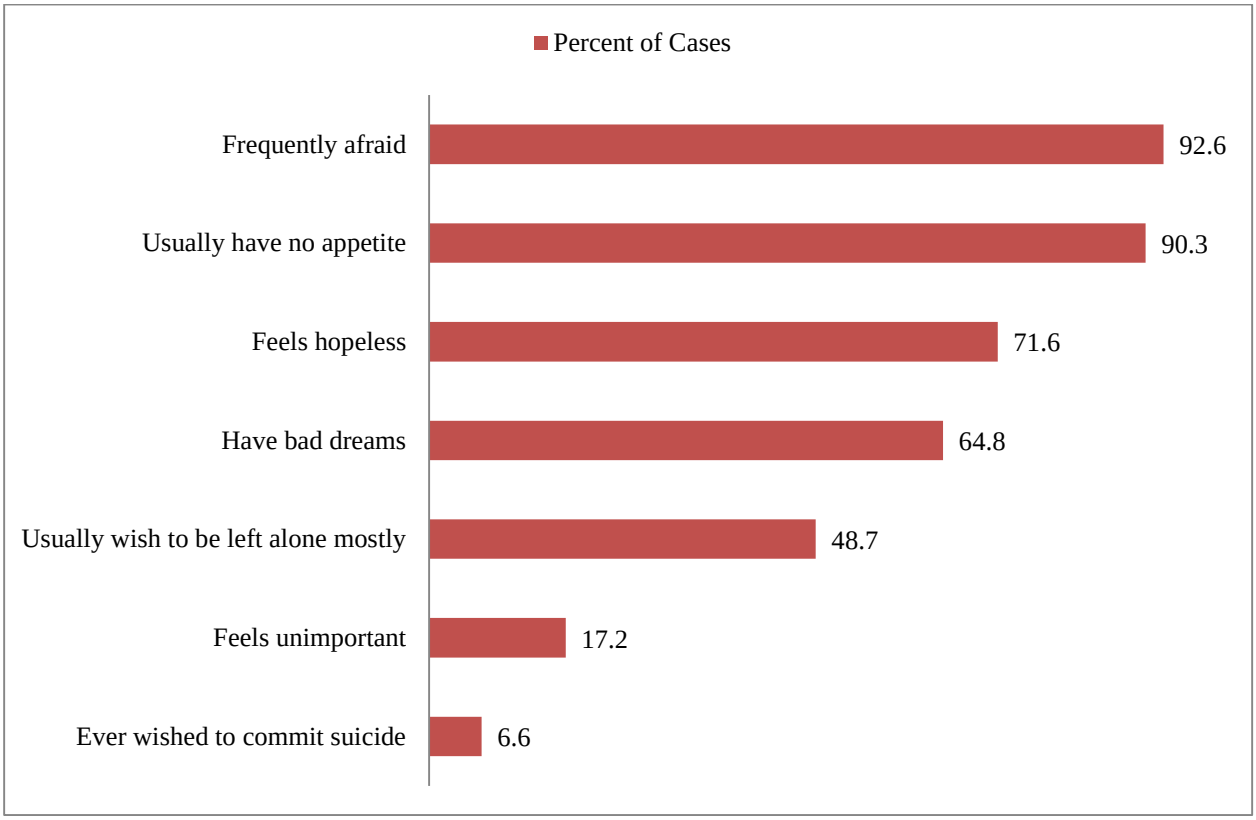

Figure 2: Percentage of participants indicating signs and symptoms of mental illness

Interventions Received by the Flood Victims.

Participants were also asked about interventions they received and if they had any effect on their mental health. The effect would be shown by them not having signs of mental illness and majority being satisfied with the interventions received. Figure 2 presents results on the interventions received by the participants.

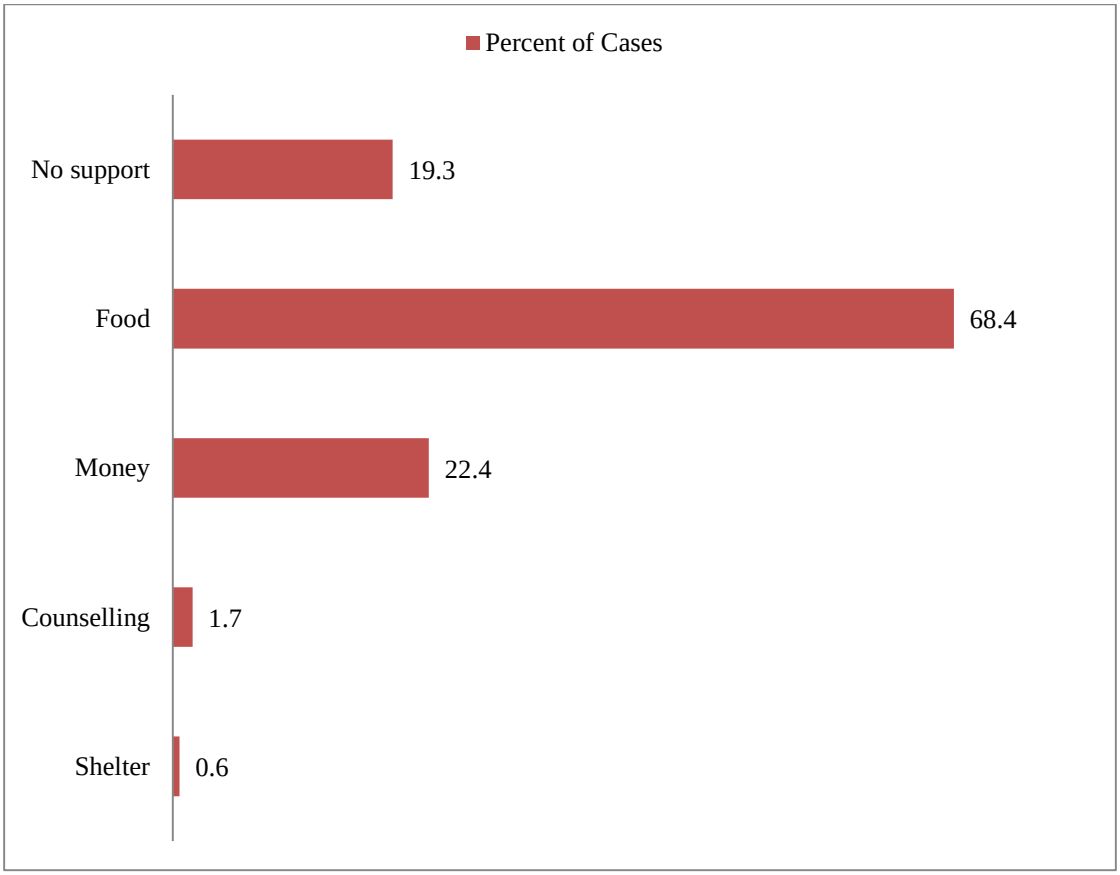

Figure 3: Percentage of participants who received interventions after the floods

Frequency of the Intervention received.

Only one person received counseling more than three times, representing 0.3% of all participants; slightly over half of them received food once (n = 178, 50.7%). Ironically, although only two participants indicated having received some shelter, (n = 54, 15.4%) indicated they received the shelter for two months, (n = 73, 20.8%) received money only once whilst 76.6% received no money.

Effects of Interventions Received on Victims' Mental Health.

Results also indicate that some interventions had effects on participants' mental health. 79.8% of the participants indicated that the interventions received had no effect on their mental health while (n = 61, 17.6%) indicated that the interventions enabled them to provide for their family. Three participants (0.9%) stated that they were able to do farming while six participants (1.7%) reported they were able to start business.

Interventions Needed More to Promote Mental Health of the Victims.

Finally, participants were then asked to indicate interventions they would need more to feel their mental health at optimal level. Most of the participants indicated they needed to be provided with housing (n = 216,61.5%), (n = 131, 37.3%) indicated they needed to be provided with loans to start businesses to support themselves and their dependents while only four participants (1.1%) indicated they needed counseling services.

CHAPTER 5

Discussion, Limitations and Recommendations

Introduction

In this quantitative descriptive study, the researcher explored the effects of flooding on mental health of victims in Mzuzu city in Northern Malawi. The study participants' responses suggest that people affected by floods develop mental health problems requiring interventions to restore an optimal level of health. By comparing the wellbeing of victims before and after the floods, which were mental health indicators, and analyzing signs and symptoms of mental illness victims presented with such as depression and PTSD, it can be argued that the mental health effects have been identified in this study. Similarly, the study indicates the interventions the victims received not being effective enough for their mental health to be at optimal level. Study limitations and recommendations are also included in this chapter.

Difference in Wellbeing Before and After the Floods

Although this was a cross-sectional survey and therefore may not suggest a causal-effect inference, statistically significant differences were detected in the number of people who were happy; had injuries; were able to provide for dependents'; accessed health services as required; had good appetite; secured casual labor as a source of income; slept less than six hours a day after the floods as compared to before. It can be strongly argued that the participants wellbeing was affected hence resulting into mental health effects as there was a significant difference in the mental health indicators that was indicated by $p< 0.05$. These results concur with a comparative study conducted in Ghana Dziwornu and Kugbey (2015) which aimed at assessing the mental health problems and coping among flood victims. The study revealed significant differences in mental health problems between flood victims and non-victims. This

was so since it was found that flood victims scored significantly lower on all the adaptive coping strategies such as expressive emotion, cognitive restructuring and positive religiosity than non-victims except problem solving and social support. On the other hand, flood victims scored significantly higher on all the maladaptive coping strategies such as self-criticism, wishful thinking and problem avoidance than non-victims except negative religiosity and social withdrawal.

It was also important to assess ones' mental health state before and after the disaster to rule out possibility of the poor mental health state being from the time the disaster had not occurred. This has been indicated also by the statistical significance on the difference in proportions (before and after the floods) on the mental health indicators; happy mood; injuries, ability to provide for dependence; sleeping hours in a day; casual labor as a source of income and accessibility to health services. A study by Fernandez et al., (2015) affirms these results since they similarly found that poor mental health state of victims were from after the floods whilst comparing with those non-exposed to a flood. They concluded that there was a significant increase in cases of Post-traumatic stress disorder (PTSD) in the affected areas, when compared with PTSD prevalence before the flood, assessed retrospectively. Groups exposed to flooding events showed higher levels of anxiety when compared with the non-exposed groups. Overall, people from the flood-affected areas experienced an increase in depression symptomatology.

Neuner et al. (2006) also conducted a study in Asia in relation to Tsunami victims' mental state before and after the flooding. They found that prevalence rate of PTSD as a mental health disorder after the flood ranged between 14% and 39% but there was an additional 5% to 8% having PTSD unrelated to the Tsunami. The PTSD symptoms not related to the flood was as a result of previous traumatic events. The results confirm the relevance of the individual history

of traumatic events for the genesis of PTSD and indicate a high need of mental health assistance among the Tsunami-affected children in Sri Lanka (Neuner et al., 2006). Although in this study the sample were children, the results are similar with other studies and the study under discussion; that extreme weather events such as floods directly affect one's mental health indicators such as loss of family and property, source of income, physical health, sleep pattern and appetite. These deviations are easily found when there is a comparison between the wellbeing of the victims' before and after the event occurs.

The statistical significance of increase in injuries by the victims indicates they had mental health effects that were due to poor coping related to the living conditions. This is related to what Berry et al., (2010) stated that injuries caused due to the floods cause serious anxiety-related responses and, later, chronic and severe mental health problems. This is so as occurrence of physical disorders is likely to affect mental health directly or indirectly due to strain on coping (Padhy et al. (2015)

Interestingly, the results indicated that access to health services before and after the floods was statistically significant, it could be so due to the majority of the participants' source of income after the floods being casual labor. This is a problem as casual labor is not a reliable source of income. This may lead one to not being able to have money whenever necessary hence they fail to meet their individual and dependents needs which include not having transport money to access health services whenever necessary. These results are related to what Bei et al. (2013) state that floods are a major life stressor which are also associated with adverse effects on physical health. They found in their study that the most common reason the victims gave for not accessing health services after the disaster was lack of transportation to and from the hospital.

However, the changes in proportions of participants that had injuries and got treated, had adequate necessities/property in their homes, smoked 3 or more cigarettes, or took 3 or more bottles of alcohol, have been found not to be statistically significant as their 95% confidence interval contained a zero and had ($p>0.05$). This is different from what other studies have found. For example Pollack et al.(2016) found in their study that after natural disasters including floods that occurred in Vietnam, alcohol use was common, particularly among men, with 87% of men reporting use of alcohol and 4% of the males reporting symptoms of alcohol dependence after the floods. This difference could be due to the fact that in the Vietnam study the population studied had been exposed to less severe but more frequent disasters unlike in the current study.

In addition, it has been noted that all natural disasters such as floods, cyclones and typhoons affect the victims' mental health as it has been found in this study. This is in line with Amstadter, Acierno, Richardson, Kilpatrick, Grosskurth, and Gaboury, (2009) who conducted a study that was able to measure pre-disaster and post-disaster mental health in typhoon disaster victims. Data collected pre- and post-disaster was available on 797 adult participants affected by a typhoon which is related to a hurricane. Comparison of the results from the two rounds of the study showed that post-typhoon scores were significantly higher than the pre-typhoon ones, ($p<0.01$), indicating that participants felt their own mental health had significantly worsened after their experience of the typhoon. 100 participants (12.5%) met the criteria for a mental disorder. The prevalence of major depressive disorder observed after the typhoon was 5.9%, PTSD 2.6%, psychological distress9.3% and generalized anxiety disorder 2.2%. 70% met criteria for only one disorder, 15% for two and 14% for three, and 1% met criteria for all four disorders.

Therefore, one can argue that indeed, natural disaster victims, in this case flood victims react negatively to the floods that affect their wellbeing when comparison is done on before and

after the event. The intensity of the reaction to this stress (floods) differs with the extent it has occurred as Berry et al. (2010) stated that these effects will not be felt equally by all, but will fall disproportionately on those who are already vulnerable, especially on indigenous people and those living in developing countries such as Malawi. This has been shown in this study as the results indicate that over 66% of the participants were of low education level hence falling under poverty line hence a vulnerable group of people.

Signs and Symptoms of Mental Illness as a Reaction to the Floods by the Victims

On signs of mental illness, the results revealed that the participants were frequently afraid; had poor appetite; felt hopeless; had bad dreams; wished they had been left alone and felt unimportant and others had wished to commit suicide. These signs are an indication that the victims have mental health effects due to the floods as on average 56% of the participants indicated signs and symptoms of mental illness. This is related to the results when the before and after lifestyle of victims were compared. Before these floods, the victims had an optimal level of mental health without stressors that came after the floods. Before, the victims were happy, were able to provide for the needs of their dependents and accessed health services, had good appetite, good sleeping pattern and had all required necessities in their home which was not the case after the floods.

One of the mental health disorders some of the victims had been showing were signs and symptoms of depression which Pietrzak, Southwick, Tracy, Galea, and Norris, (2012) stated as a mental health disorder whose symptoms are elevated in disaster victims such as floods. In the study under discussion, depression is presented by 71.6% victims feeling hopeless, 90.3% of them having no appetite and 6.6% ever wishing to commit suicide after the floods. These are also

the signs and symptoms related to what Evans and Radunovich (2015) described as those found in people with depression. Du et al (2010)study concurs with the results on suicide being found in flood victims as in their study. Their results indicated that poor mental health fell under long term effects of floods as a natural disaster. They further stated that, people who have experienced a flood have been shown to have a suicide rate 13.8% higher than pre-disaster rates.

The other symptoms of a mental health problem the victims showed was PTSD. This was so as hopelessness was in 71.6%of the participants, nightmares in 64.8%of the participants, those wanting to be left alone or being isolative took up 48.7%and on average 56.1% showed signs of depression which according to Varcarolis (2015) are signs of PTSD. Therefore, one can strongly argue that the floods led to effects on the mental health of the victims as the results have indicated presence of symptoms of mental health problems such as depression and PTSD. It was necessary that this study was done at-least 11 months after the event had happened to easily measure symptoms of PTSD in the victims. This is related to what Murray et al.(2011)state, that it is difficult to measure symptoms of PTSD in the first month after an event because the research may be measuring distress (for which the experiences are similar to PTSD symptoms hence necessary to do so at a later time. One reason why some of the participants presented with signs and symptoms of PTSD such as nightmares could be due to the victims relocating back to the homes they were living when floods occurred. Living in the place they experienced the tragic event might lead the victims to easily recall what they went through during the floods. This is related to what American Psychiatric Association, (2013) states about PTSD that intense psychological distress or physiological reactivity often occurs when the individual is exposed to triggering events that resemble or symbolize an aspect of the traumatic event.

Furthermore, Varcarolis (2015) states that PTSD can have long term effects if early treatment is not sought. This is related to what Holgersen, Kl¨ockner, Boe, Weisæth, and Holen, (2011) state in their study that analyzed trajectories of initial stress and long-term mental health after the 1988 North Sea oil rig disaster in Scotland. They state that long-term mental health effects do occur in disaster victims. Therefore, early screening may identify those at long-term risks. New cases also tend to emerge for many years after disasters hence specialist services are likely to be required to address the needs of the survivors of the disasters (Holgersen et al., 2011).

Therefore, the manifestation of signs and symptoms of mental illness could be an indication that the victims had mental health effects. However, for one to be certain a comprehensive clinical assessment of the victims is needed. This is in-line with Murray et al. (2011), who state that there are challenges that are faced by researchers and practitioners in screening large numbers of people for possible mental disorders after major incidents and disasters such as flooding. Many research studies are based on using questionnaires to identify people who have PTSD symptoms. Having PTSD symptoms does not necessarily indicate that people have confirmed diagnoses of PTSD because PTSD is, essentially, a clinical diagnosis. Using self-report scales alone, which rate symptoms, does not necessarily allow researchers to make reliable diagnoses. This makes comparisons from different studies difficult. It may also make it difficult to decide who requires general support and who should be referred for more substantial specialist mental healthcare (Murray et al., 2011).Hence having done this research, it would be recommended that despite the victims' presenting with the signs and symptoms of mental illnesses such as depression and PTSD, there is need to conduct a comprehensive mental

health assessment on the victims to ascertain the diagnosis of PTSD and depression. This would help for early diagnosis and treatment commencement to prevent complications.

Interventions Received and their Effect for Victims' Reconstitution

Interventions for natural disaster victims such as floods is a very important aspect so as to allow them to cope with stressors and reconstitute. Alligood, (2014) states that interventions are purposeful actions to help the client retain, attain, or maintain system stability. Similarly, Varcarolis, (2015) argues that the victims of natural disasters such as floods are to be managed through use of a crisis intervention. Crisis intervention aims at maintaining the pre-crisis level of functioning through primary care, secondary care and tertiary care. She further states that primary care involves promotion of mental health and reducing incidence of mental illness. Secondary care involves preventing prolonged anxiety from diminishing persons' effectiveness and organization. Tertiary care involves rehabilitation or supporting those who have experienced and are recovering from disabling mental state and care as a result of being psychologically disabled(Varcarolis,2015). Similarly, a study by Boscarino, Adams, and Landrigan, (2006) conducted to examine the impact of brief mental health interventions received by employees at the worksite after the World Trade Center disaster (WTCD) in New York found that it is effective to provide crisis intervention after a disaster. Approximately 7% of adults reported receiving employer-sponsored, worksite crisis interventions related to the World Trade Center disaster provided by mental health professionals. In addition, analysis indicated that attending 1 to 3 brief worksite sessions was associated with positive outcomes up to 2 years after the World Trade Center disaster across a spectrum of results, including reduced alcohol dependence, binge drinking, depression, PTSD severity, and reduced anxiety symptoms. It was hence concluded

that brief post-disaster crisis interventions may be effective for victims exposed to psychologically traumatic events (Boscarino et al., 2006).

Despite this literature, that it is necessary for disaster victims to be supported psychologically and materially to prevent or reduce the effects of the event on their mental health, results in this study are contrary to the recommendations. This is so as 19.3% of the participants received no support and out of those that received support, 68.4% indicated they received food; 22.4% received money; only1.7% received counseling; while only 0.6% received shelter. In addition to that, there was also a difference in the way the victims received assistance such as one person received psychosocial counseling more than three times, representing only 0.3% of all participants; 50.7%, received food just once. Hence it can be argued that the results in this study indicate that the victims were not comprehensively managed which is why they had mental health effects due to the floods as they were presenting with signs and symptoms of mental illnesses such as depression and PTSD. There was need to provide primary care intervention such as counseling to prevent the victims from developing signs of mental illness, treat those that had developed mental health problems and rehabilitate those that already are on treatment to maintain their optimal state of mental health as recommended by (Boscarino et al., 2006;Varcarolis,2015).

Pina, Villalta, Ortiz, Gottschall, Costa, and Weems, (2008)observed from the results of 46 youths that the young people who had extra-familial social support showed fewer symptoms of PTSD, depression and anxiety. A positive predictive relationship was found between availability of professional support and not developing PTSD. Despite that this study did not focus on adults, the results concur with the current where the victims also were found to have signs and symptoms of PTSD and depression after the floods. Hence they needed support from

professionals such as psychosocial counselors, loan granters, and social support such as housing provision to eliminate the stress on their mental health state. The inadequate interventions the victims received was also shown when 79.8% of the participants, which was the majority, indicated that the interventions received had no effect on their mental health; while only 17.6% indicated that the interventions enabled them to provide for their family; 0.9% were able to do farming; while 1.7% participants were able to start business. Since the results show that the majority of the victims found the interventions they received as having no effect, it was not surprising that 56% of them had signs and symptoms of mental illnesses as reaction to the floods. These two are directly related as lack of the necessary interventions to disaster victims leads to mental health effects. These effects are seen by victims presenting with signs and symptoms of depression and PTSD, which are in the category of mental health conditions. This hence indicates that victims were not able to reconstitute.

In relation to this, Dziwornu and Kugbey (2015) recommended in their comparative retrospective study on "mental health problems and coping among flood victims in Ghana", that the first implication that flood victims experience severely are psychological problems and any form of assistance must make room for psychological interventions. Thus, in the study under discussion, it can also be said that providing victims with relief items should not be the only priority but their short and long term physical and mental wellbeing should be taken into consideration. Furthermore, the finding that only 1.7% of the victims received counseling could be as a result of the victims not having knowledge on availability and importance of psychological services to them as victims of a traumatic event. Secondly, it could also be that the team that was assisting the victims did not consider the psychological needs of the victims since they would have been in a better place to refer the victims for psychological services.

Along the same lines, Padhy et al., (2015) conducted a literature review which stated a number of interventions that can also assist in preventing or reducing the effects of natural disasters such as floods on mental health of victims. They recommended the provision of adequate treatment facilities for managing mental health problems for natural disaster-related problems. Promoting positive mental health was another intervention they recommended to mitigate the psychological distress due to disasters. To reduce suicide fatalities, which is one sign of mental illness some victims in the study under discussion had, it was recommended that the government may include debt-abolition or economic support for farmers. Creating co-operatives and protection of farmers from loan sharks might reduce the suicide rates due to destruction of crops which is a source of income. Furthermore, provision of subsidies and guaranteed income during floods might lead to less economic and psychological stress on farmers in question (Padhy et al., 2015).Similarly, Osuret et al. (2016) state that support from government and implementation partners is effective in enabling the community to lessen the negative effects of disasters such as floods.

Good support or interventions can act as a protective factor against mental health problems such as PTSD (Murray et al., 2011). In relation to that, results in this study indicated that the victims feel they were at optimal mental health; 61.54% indicated they needed to be provided with housing; 37.32% needed to be provided loans to start businesses to support themselves and their dependents; while only 1.14% indicated they needed counseling services. These three interventions, as discussed earlier, fall under primary level of prevention where if they had been provided would have helped to promote resilience hence the victims reconstituting before they developed the signs and symptoms of mental illnesses. Socio-economic empowerment is vital such as through provision of loans by government or agents linked through

government to the victims to prevent negative effects on the victims. This is related to what Fernandez et al., (2015) , who systematically associated low socioeconomic status with, the high risk of mental health problems. Thus economic empowerment is very important as an intervention measure to disaster victims to help in income generation activities as a source of income that helps them to be able to provide for their families thus reducing stress and promoting reconstitution.

Ironically, although only two participants indicated having received some shelter, 15.4% indicated they received the shelter for two months and 20.8% received money only once. This is a contradictory finding and the possible cause could be that the two that mentioned they had lived at the shelter before were honest. For those that said they did not but mentioned the period they stayed at the shelter had lied. This is related to the finding that there was high percentage (61.54%) of people who said would have been assisted more if they were given houses. This is so as the victims would have lied with the aim of thinking the answer they might give can lead to them being given what they wanted or not.

Significant Demographic Factors

It was also found that more victims were within 30-41 years of age, seconded by 42-54 years' group. These are the ages of people that are regarded as productive in society. Due to them being affected by floods, it can be argued that they are not being productive as they were before the floods. This is indicated in the results where 50.7% participants were doing business prior to the floods but only 35.3% continued, which could have led to those doing casual labor, which is not a liable source of income, to increase from 21.4% before the floods to 49.3% after the floods which were indicated to be statistically significant. This further led to the number of participants who were not able to provide for dependents' needs to increase from 57.3% to

89.5% after the floods, representing a 32.2% increase. Therefore, due to this the participants were not earning as much as they were before being affected by the floods. This then leads to the victims being stressed hence mentally disturbed. This concurs with a study done in India by Sharma, Rodgers, Mishra, Noor, and Ashrafee, (2009) where casual laborers were found to represent the poorest of the poor and their socio economic status even before the floods was precarious. Hence they depended on the Government for relief and rehabilitation.

Low education level is a vulnerability factor in development of mental health after a disaster (Pollack, Weiss, & Trung 2016). It can be certain that one factor that these people had that had put them at risk of developing mental health problems was low educational level which puts one at risk of poverty. This is so as results indicate that majority of the participants (66.3%) had only gone up to primary level of education which is a low level of education in Malawi. Majority of the people who stop at this level are within the poverty group of Malawians. This level of education puts the people in Mzuzu at high vulnerability to the effects of the floods such as poor mental health as they have no stable source of income to support themselves and their dependents due to poverty. Their houses are constructed poorly due to lack of adequate resources. Similarly, Canino, Bravo, Rubio-stipec, and Woodbury (1990) found in their study that low educational level was significantly associated with higher rates of mental disorder on participants affected by a disaster.

Conclusion

This study found that Mzuzu flood victims were affected in many areas of their lives such as happiness, physical health (presence of injuries), provision of dependents' needs, accessibility to health services, sleeping pattern and appetite. This led to effects on their mental health such as presentation of signs and symptoms of mental illness. Similarly, the study indicates the

interventions the victims received not being adequate to have an effect for their mental health to be at optimal level. Furthermore, the victims reported that they would have had reduced effects of flooding on their mental health if interventions that had been offered to them included housing, loans to start business and counseling. In addition, it is required for all victims to undergo a comprehensive clinical mental health assessment to ascertain a diagnosis of mental health problem and start treatment to prevent long term complications. Lastly, it would be of great importance if the government emphasized on inclusion of various interventions to promote the health of the victims directly and indirectly. This would then help the victims attain an optimal level of health that includes the physiological, psychological, socio-cultural, developmental, and spiritual dimensions.

Limitations of the Study

This study had several limitations which are described below

- The study results cannot be generalized because of its nature as it was specific to flood victims in Mzuzu city only. Therefore, in future there might be need to conduct studies elsewhere in Malawi to have a picture of the flood victims in another context.
- Use of a quantitative research design led to lack of some important aspects of information that would have been given by participants to describe further their experience after the floods occurred.
- Recall or reporting bias is a limitation that this study could have since the participants might have given responses, in relation to “wellbeing before the floods”, that are not accurate hence affecting the validity of the study results.

Recommendations

This study makes the following recommendations based on effects of floods on victims in Mzuzu city. The recommendations are categorized under education, policy and research.

Education

Department of Disaster Management Affairs under Government of Malawi should conduct awareness campaigns to areas prone to disasters such as floods. These awareness campaigns would include educating the masses on what to do when a disaster occurs and how to cope to prevent complications such as mental health effects hence promoting resilience.

An indirect intervention on the victims would be for the Government of Malawi and non-governmental organizations to conduct short term trainings for qualified health workers. This would equip the health workers with knowledge and skills to intervene comprehensively on flood victims when disasters such as floods occur. This is important as health workers in Malawi are trained without or with little comprehensive details on care for disaster victims.

Furthermore, curriculum in training institutions should include knowledge and skills in managing flood/disaster victims. This will assist them when they qualify to provide quality care through clinical assessments for early diagnosis and treatment to prevent complications on the victims.

Policy

There is need to consider replicating the study. This can make the government to consider inclusion of the results of both studies in the national climate change policy and the Malawi national disaster risk management policy. This is necessary as the information found will help to

revise the policy so that it incorporates comprehensive assistance to disaster victims on issues of mental health.

Research

Qualitative research is needed to further understand the effect of flooding on mental health of victims. Another important area of research would be to assess the effects of flooding on children or adolescents.

Use of validated tools in a study assessing the mental health effects of disasters on flood victims should be considered. These include the General Health Questionnaire (GHQ-12), General Anxiety Disorder Assessment (GAD-7), Patient Health Questionnaire (PHQ-9) and post-traumatic stress disorder (PTSD) checklist-short form. This can supplement the results of this study.

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Appendix A: CONSENT FORM (Participants information on the study- English)

THE EFFECTS OF FLOODING ON MENTAL HEALTH OF VICTIMS IN MZUZU CITY

Dear participant,

I am Glory Wezi Mwafulirwa, a Master of Science in Community health nursing student at Kamuzu College of Nursing-University of Malawi. In partial fulfillment of my studies, I am conducting a study to explore effects of flooding on mental health of victims in Mzuzu city. Therefore, I would like if you could take part in the study.

Purpose and importance of the study

The study aims to explore the effects of flooding on the mental health of the victims. Hence, the information you will provide will help to add value to the results of the study that will assist in changing policies and measures taken in management of flood victims in the country. Thus you have been chosen to participate in this study since you are a flood victim.

Study procedure and privacy

If you consent to take part in the research, we will keep the the information collected from you and other participants private and will only be used for this study and nothing else. The data collection will take 30 to 40 minutes for each participant. You will be involved in an interview where you will be asked questions about yourself and the experiences before and after the floods, signs and symptoms of mental illness and support systems. The information will then be put together with all that has been collected from others and analyzed to come up with an understanding of the experiences of all participants.

Willingness to participate

Your participation in the study is entirely voluntary. If you refuse to take part, there will not be an effect on you and the services you are receiving at the shelter. If you do agree to participate in the study, you can change your mind and withdraw at any time.

Risks

During the process of collecting data you might be prone to emotional pain due to recalling the devastating events you went through during the floods thus psychosocial counselling services will be provided for you by a counsellor who can take you through the psychosocial problems you might be experiencing.

Contact details

If you have any questions or concerns in relation to this study please contact the people below who will be able to address your concerns or questions; College of Medicine Research Ethics Committee (COMREC) Secretariat, 0111 937 629. Glory Wezi Sopera Mwafulirwa (the researcher) Kamuzu College of Nursing, P/Bag 1, Lilongwe, cell: 099317410.

Appendix B: CONSENT FORM (Participants information on the study- Chichewa)

KUKHUZIKAKWA ANTHU NDI MADZI OSEFUKILA PA UMOYO WA ZAUBONGO

Mau kwa otenga nawo mbali mukafukufuku

Ine ndine Glory Wezi Sopera Mwafulirwa, ophunzira ku sukulu yaukachenjede ya Kamuzu College of Nursing komwe ndikuphunzira paphunziro a masitazi yoona zaumuyo wa anthu mmidzi yosiyanasiyana. Maphunziro amenewa kuti ndiamalize, ndikofunika kuti ndipange kafukufuku. Choncho ndikupanga kafukufuku wokhuzana ndi mmene madzi osefukila anakukhudzilani anthu amu mzinda la Mzuzu kumbali ya zaubongo.Chingandikondweletse inu mutatenga mbali mukafukufuku ameneyi.

Cholinga ndi ubwino wakafukufuku ameneyi

Cholinga cha kafukufuku ameneyi ndichakuti tidziwe kuti madzi osefukila anakukhudzani bwanji kumbali yazaubongo. Mayankho anu athandiza kuti tidziwe kuti anthu okhudzidwa ndikusefukila kwa madzi akhudzika bwanji kumbali yaubongo ndipo angathandizidwe bwanji. Choncho mwasankhidwa kutenga nawo mbali mukafukufuku ameneyi chifukwa muli mugulu la anthu amene anakhudzidwa ndikusefukila kwa madzi mu mzinda la Mzuzu.

Ndondomeko ndi chinsisi mu kafukufuku

Mukavomeleza kutenga nawo mbali mukafukufuku ameneyi, tidzasunga mayankho anu ndi a ena ose mwachinsinsindipo tidzagwilitsantchito mayankho anu pa kafukufuku uyu yekha basi. Mafuso adzafunsidwa kwa mphindi makumi atatu mpaka makumi anayi. Mafuso muzafusidwe ndi okhudzana mbiri yanu, momwe moyo wanu unali madzi asanasefukile, momwe moyo wanu

uli madzi atasefukila, zizindikilo zamatenda okhuza ubongo ndi zithandizo zomwe mwalandila kuyambila pamene munakhudzidwa ndikusefukila kwa madzi.

Kuopya kwa kafukufuku ameneyi

Panthawi yomwe mudzikhala mukutenga nawo mbali poyankha mafuso osiyanasiyana, zitha kuchitika kuti mwakumbukila zovuta zomwe munakumana nazo madzi akusefukila. Zikazatelo, inu mudzatumizidwa kwa othandiza pamavuto azakuntima ndizaubongo kuti akakupaseni uphungu.

Choti mudziwe

Ngatimungakhale ndi mafunso okhuza kafukufuku ameneyi, mutha kufusa ku bungwe loyang'anila ma kafukufuku onse ku College of Medicine research ethics Committee (COMREC) Secretariat, pakuimba pa lamya 0111 937 629. Kapena mutha kufusa amene akuchita kafukufuku ameneyi, Glory Wezi Sopera Mwafulirwa polembela kuKamuzu College of Nursing, P/Bag 1, Lilongwe, kapena kuimba lamya pa0999317410.

Appendix C: CONSENT FORM (Participants information on the study-Tumbuka)

<u>Vyakukhwafya Umoyo Wa Wakutangwanika Ghongo M'musumba wa Mzuzu chifukwa cha maji ghakufulukila</u>

Kwa Imwe mutolengepo lwandi pa kufufuza uku,

Zina lane ndi Glory Mwafulirwa, musambiliwaMasitazi mu za umoyo kukwafya wanthu wamukaya, pa Sukulu yamasambiloghapachanya ya Kamuzu College of Nursing – University of Malawi. Mwakufiskamasambiloghane, nkhuwulakupenja ivyo vikuzingiziwiska umoyo wa awo mbakutangwanikaghongo m'musumbawa Mzuzu. Kwanthewula, nkhukhumbisiskangatimunga-tolapolwandi pa kufufuzauku.

Ulatona uweme wakufufuzauku

Kufufuza uku kukudodoliska kupenjelezga masuzgoagho majiyakufulukira ghizisha pa awombakukwafika naumoyo wakutangwaniskaghongo. Kwanthewula, uthenga uwomungapeleka, wovwilenge kusangaumanyi nakusintha ndondomeko umotingavwirira wakukhwafikanamaji ghakufulukira mu charuichi. Ndichochifukwa mwasankhika kutolapolwandi pa kufufuzauku, pakutimuliwamozawakukhwafikanasuzgoili.

Ndondomeko ya kufufuza na kusunga chisisi chinu

Pala mwazomela kutolapo lwandi pa kufufuzauku, gomezgani kuti uthenga woseuwo mwapeleka tiwutolengekuwawapaderankhanila, ndipo ugwirishikenge ntchito kunyakheso chala. Mulimowakutolera uthenga uwu kuwenge kwamphindipakati pa 30 na 40 pa munthuyumoza. Aliyose wafumbikenge payekha-payekha naumowakhwafikiranakufulukakwamaji, kusintha kwa umoyo wakhe chifukwa cha nthangwanikaiyi, vimanyikwilo vwaulwali wakutimbanizgika

kwaghongo, nawovwili uwo wulipo. Ndipo uthenga wose uwo watoleka kufumakwa wose awowafumbika, uzamuwonekasomakorapamoza, kuti kawilo kamasuzgo na nthangwanika iyi kamanyikwe makora

Wanangwa wa kutolapolwandi

Muli wakuchichizgikacha pakutolapo lwandi pakafukufuku uyu, chitani ichi mwakukhumbakwinu. Kulekakutolapo-lwandi kulive kutimbanizga wovwiri uwo mukupokera. Pala mwazomera kutolapolwandi, muliwanangwa kuleka nyengo yiliyose pala mwasinthamaghano-ghanoghinu.

Vyakofya

Panyengoyakufufuzauku, wanji watikumbushikenge vyakofya umo maji ghakufulukira ghakanangila vinthu. Kufipamtimachala, wakovwilana namwe walipo, ndipomuzamovwilika pa masuzgoghose ghamu maghano-ghano pa ivyovyamuchitikulani chifukwa cha majighakufuluka agha.

Tisangani

Pala mulinamafumbo, panji mwakhwafika na kufufuzauku, chonde manyiskani bungwe lazakufufuzauku kuti movwilikwe pa mafumbo na kuwulawulakwinu;Timmanyishakwizila: College of Medicine Research Ethics Committee (COMREC) Secretariat, foninambala: **0111 937 629**; kweniso, Glory Wezi Sopera Mwafulirwa (Researcher), Kamuzu College of Nursing, P/Bag 1, Lilongwe, Foni **0999317410**

Appendix D: English Consent declaration form

I confirm that I have read/been read to and understood the information for the study and have had the opportunity to ask questions on what I did not understand. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and my rights being affected. I give permission to answer any questions asked to me. I voluntarily agree to participate in this study of my own free will.

Name of Participant …….

Signature/ thumb print …….

Date ……

Appendix E: Chichewa consent declaration form

CHILOLEZO CHOTENGA NAWO MBALI MUKAFUKUFUKU MU CHICHEWA

Ndikuvomeleza kuti ndawelenga/ ndawelengedwa ndikunvetsa zokhuzana ndi Kafukufuku ameneyi ndipo ndafusa mafuso ndinali nawo pazomwe sindinanvetse. Ndikunvetsa kuti kutenga mbali mu kafukufuku ameneyi sikoumilizidwa ndipo nditafuna kutuluka mukafuku ameneyi nditha kuchita motelo opanda ufulu wanga kuphwanyidwa. Ndikupeleka chilolezo chondifusa fuso lililose lamukafukufukuyi. Ndikuvomele kutenga nawo mabali mukafukufuku ameneyu mwakufuna kwanga.

Dzina la otenga mbali …….

Chidindo/ Chisindikizo ……

Tsiku …….…….

Appendix F: Tumbuka Consent declaration form

Chilolezgo chotolapo nawo mbali mukafukufuku mu chitumbuka

Nkhuzyomela kuti nawazga, nakupulikisya vyakukhwafyana nakafukufuku uyu nipo nafumba mafumbo ayo nanguwa nawo apo nindapulikisye. Nkhupulikisya kuti kutolapo mbali mukafukufuku uyu nkhoumilizyana yayi nipo pala nakhumba kufuma mukafukufuku ningachita kwambula ufulu wane kupondelezyeka. Nkhupeleka chilolezgo chonifumba fumbo lililosa lamukafukufuku uyu. Nkhuzyomela kutola nawo mbali mukafukufuku uyu mwakukhumba kwane.

Zina la otola nawo mbali …….

Chidindo/ Chisindikizgo ……

Dazi …….

Appendix G: ENGLISH QUESTIONNAIRE

A. Demographic data

Number of Participant …….

Date……

A1 Gender

I. Female

II. Male

A2. Age

i. 18-29

ii. 30-41

iii. 42-54

iv. 55 and Above

A3. Marital status

i. Single

ii. Married

iii. Divorce

iv. Widow/ widower

A4. Religion

i. Christianity
ii. Islam
iii. Others

A5. Educational level

i. Primary school
ii. Secondary school
iii. Tertiary
iv. Not educated

A6. Tribe

i. Chewa
ii. Tumbuka
iii. Tonga
iv. Ngonde
v. Others

A7. Occupation

i. Employed
ii. Farmer
iii. Pensioner
iv. Business

B. Pre disaster lifestyle (please circle the answer that is applicable to you/participant)

B1. What was your mood before the floods?

i. Happy

ii. Angry

iii. Sad

B2. Did you have any injuries before the floods?

i. Yes

ii. No

B3. If yes in (B2), were you treated?

i. Yes

ii. No

B4. Did You have all necessities in Your home before the floods?

i. Yes

ii. No

B5. What was your source of income before the floods?

i. Casual labor

ii. Employed

iii. Business

iv. Farming

v. Pension

B6. Were You able to provide for your dependents needs before the floods?

i. Yes

ii. No

B7. Were you able to easily access health services when you needed them before the floods?

i. Yes

ii. No

B8. How many hours were you sleeping in a day?

i. Less than 6 hours

ii. More than 6 but less than 8 hours

iii. More than 8 but less than 10 hours

iv. More than 10 hours

B9. How was your appetite?

i. Good

ii. Bad

B10. How many times would you smoke in a day?

i. Less than 3 times

ii. More than 3 and less than 6 times

iii. More than 6 times

iv. I never used to smoke

B11. How many bottles of alcohol would you take on average per day?

i. Less than 3
ii. More than 3 less than 6
iii. More than 6
iv. I never used to take alcohol

C. Stressors experienced by flood victims after the floods (please circle the answer that is applicable to you/participants)

C1. What is your mood after the floods?

i. Happy
ii. Angry
iii. Sad

C2. Were you injured during the floods?

i. Yes
ii. No

C3. If yes on (C.2), were you treated?

i. Yes
ii. No

C4. Did you lose property?

i. Yes
ii. No

C5. What is your current source of income?

i. Casual labor
ii. Employed
iii. Business
iv. Farming
v. Pension

C6. Are you able to provide for you and your dependents' daily needs?

i. Yes
ii. No

C7. Are you able to easily access health services when you need them?

i. Yes
ii. No

C8. How many hours do you sleep in a day?

i. Less than 6 hours
ii. More than 6 but less than 8 hours
iii. More than 8 but less than 10 hours
iv. More than 10 hours

C9. How is your appetite?

i. Good
ii. Bad

C10. How many times do you smoke in a day?

i. Less than 3 times
ii. More than 3 and less than 6 times
iii. More than 6 times
iv. I do not smoke

C11. How many bottles of alcohol would you take on average per day?

i. Less than 3
ii. More than 3 less than 6
iii. More than 6
iv. I do not take alcohol

C12. Did you lose any family member during the floods?

i. Yes
ii. No

D. <u>Signs and symptoms of mental illness on the flood victims as reaction to the floods (please circle the answer that is applicable to you/participant)</u>

D1. Do you usually have no appetite?

i. Yes
ii. No

D2. Do you feel hopeless?

i. Yes

ii. No

D3. Do you have bad reoccurring dreams?

i. Yes

ii. No

D4. Have you ever wished to committing suicide?

i. Yes

ii. No

D5. Are you frequently afraid?

i. Yes

ii. No

D6. Do you feel you are important?

i. Yes

ii. No

D7. Do you usually wish to be left alone mostly?

i. Yes

ii. No

E. Interventions received for reconstitution (please circle the options could be more than two that are applicable to you)

E1. What support have you received from the time you were affected by floods?

i. Counseling
ii. Food
iii. Shelter
iv. Money
v. No support

E2. How often did you receive counseling?

i. None
ii. One time
iii. Two times
iv. Three times
v. More than 3 times

E3. How many times did you receive food?

i. Never
ii. One time
iii. Two times
iv. Three times
v. More than 3 times

E4. How long did you stay in the shelter?

i. Never
ii. One month
iii. Two months
iv. Three months
v. More than 3 months

E5. How many times did you receive money?

i. None
ii. One time
iii. Two times
iv. Three times
v. More than 3 times

E6. What has been the effect of the interventions on you?

i. Able to cope with stress
ii. Able to start business
iii. Able to be doing farming
iv. Able to provide for family
v. No effect

E7. What would you have wanted to be done more to support you?

i. Provide loans for businesses to support self and dependents

ii. Provide housing

iii. Provide counseling services

Thank You for Your Participation!!

Appendix H: CHICHEWA QUESTIONNAIRE

A. Zokhuza ndi umoyo

Nambala ya otenga mbali…….

Tsiku……

A1. Ndinu

i. Akazi

ii. Amuna

A2. Zaka

i. 18-29

ii. 30-41

iii. 42-54

iv. 55 Mpaka Kutsogolo

A3. Ndondomeko yabanja lanu lili bwanji

i. Wosakwatira/ wosakwatiwa

ii. Ndili pabanja

iii. Banja linatha

iv. Nafedwa

v. Business

A4 Chipembezo

i. Khristu
ii. Chisilamu
iii. Zina

A5. Sukulu yanu munafika nayo pati

i. Pulaimale
ii. Sekondale
iii. Kachenjede
iv. Sindinapiteko kusukulu

A6. Mtundu wanu

i. Chewa
ii. Tumbuka
iii. Tonga
iv. Ngonde
v. Zina

A7. Kodi mumapanga chiyani chokhudzana ndi ntchito pamoyo wanu?

i. Ulimi
ii. Ndimagwila ntchito
iii. Opuma pa ntchito
iv. Odalila ena

v. Business

B. <u>Moyo wanu madzi asanasefukile (zungulitsani yankho lomwe likugwirizana ndi zimene zinahitika pa moyo wanu)</u>

B1. Munali munthu wotani kusanachitike ngozi yamadzi?

i. Wansangala
ii. Okwiya
iii. Wodandaula

B2. Kodi munali ndimabala opweteka pamene ngozi yamadzi isanachitike?

i. Eya
ii. Ayi

B3. Ngati eya pa (B2), munalandilako chithandizo chifukwa cha balalo?

i. Eya
ii. Ayi

B4. Kodi munali ndikatundu okukwanilani munyumba mwanu ngozi yamadzi isanachitike?

i. Eya
ii. Ayi

B5. Kodi ndalama mumazipeza munjila yanji yozithandizila pa moyo wanu ngozi yamadzi isanachitike?

i. Ganyu
ii. Ndimagwila ntchito

iii. Bizinesi

iv. Ulimi

v. Opuma pantchito

B6. Mumakwanitsa kukumana ndizofuna za anthu a m'banja mwanu ngozi yamadzi isanachitike?

i. Eya

ii. Ayi

B7. Mumakwanitsa kulandila chithandizo pa zokhuzana ni umoyo wanu ngozi yamadzi isanachitike?

i. Eya

ii. Ayi

B8. Mumagona maola angati patsiku?

i. Kuchepela asanu ndi imodzi

ii. Kuposela asanu ndi imodzi koma kuchepela zisanu ndi zitatu

iii. Kuposela zisanu ndi zitatu koma kuchepela khumi

iv. Kuposela khumi

B9. Chilakolako chanu cha zakudya chinali bwanji ?

i. Bwino

ii. Chovutilapo

B10. Mumasuta kangati patsiku?

i. Kuchepela katatu
ii. Kuposela katatu koma kuchepela kasanu ndikamodzi
iii. Kuposela kasanu ndikamodzi
iv. Sindinkasuta

B11. Mumamwa ma botolo amowa angati pasiku?

i. Kuchepela katatu
ii. Kuposela katatu koma kuchepela kasanu ndikamodzi
iii. Kuposela kasanu ndikamodzi
iv. Sindinkamwa

C. <u>Zovuta munakumana nazo pa moyo wanu madzi atasefukila (zungulitsani yankho lomwe likugwirizana ndi zimene zinahitika pa moyo wanu)</u>

C1. Kodi ndinu munthu wotani kuchokela mmene kunachitike ngozi yamadzi?

i. Wansangala
ii. Okwiya
iii. Wodandaula

C2. Munapweteka pa ngozi yamadziyi?

i. Eya

ii. Ayi

C3. Ngati eya pa (C.2), munathandizidwa?

i. Eya

ii. Ayi.

C4. Katundu wanu anakokoloka ndi madzi?

i. Eya

ii. Ayi

C5. Kodi ndalama mumazipeza munjila yanji yozithandizila pa moyo wanu?

i. Ganyu

ii. Ndimagwila ntchito

iii. Bizinesi

iv. Ulimi

v. Opuma pa ntchito

C6. Mumakwanitsa kukumana ndizofuna za anthu a m'banja mwanu?

i. Eya

ii. Ayi

C7. Mumakwanitsa kulandila chithandizo pa zokhuzana ni umoyo wanu?

i. Eya

ii. Ayi

C8. Mumagona maola angati patsiku?

i. Kuchepela asanu ndi imodzi
ii. Kuposela asanu ndi imodzi koma kuchepela zisanu ndi zitatu
iii. Kuposela zisanu ndi zitatu koma kuchepela khumi
iv. Kuposela khumi

C9. Chilakolako chanu cha zakudya chili bwanji ?

i. Bwino
ii. Chovutilapo

C10. Mumasuta kangati patsiku?

i. Kuchepela katatu
ii. Kuposela katatu koma kuchepela kasanu ndikamodzi
iii. Kuposela kasanu ndikamodzi
iv. Sindisuta

C11. Mumamwa ma botolo amowa angati pasiku?

i. Kuchepela katatu
ii. Kuposela katatu koma kuchepela kasanu ndikamodzi
iii. Kuposela kasanu ndikamodzi
iv. Sindimamwa

C12. Alipo wa m’banja mwanu anatisiya pa ngozi yamadziyi?

i. Eya

ii. Ayi

D. <u>Zizindikilo zamatenda a misala chifukwa chakukhuzidwa ndi kusefukila kwa madzi (zungulitsani yankho lomwe likugwirizana ndi zimene zinahitika pa moyo wanu)</u>

D1. Chilakolako chanu chazakudya sichilibwino?

i. Eya

ii. Ayi

D2. Mumakhala opanda chiyembekezo?

i. Eya

ii. Ayi

D3. Mumakhala ndi vuto lamaloto oopsya?

i. Eya

ii. Ayi

D4. Munafunako kuchosa moyo wanu?

i. Eya

ii. Ayi

D5. Mumakhala a mantha kwa nthawi ndi nthawi?

i. Eya

ii. Ayi

D6. Mumaziona ngati ndinu munthu ofunikila?

i. Eya

ii. Ayi

D7. Mumafuna kukhala panokhanokha kwa nthawi ndi nthawi?

i. Eya

ii. Ayi

E. <u>Zithandizo (zungulitsani mayankho omwe akugwirizana ndi moyo wanu)</u>

E1. Ndizithandizo ziti zomwe mwalandila chisefukileni cha madzi?

i. Uphungu

ii. Chakudya

iii. Pokhala

iv. Ndalama

v. Palibe chithandizo ndinalandilako

E2. Kodi munalandila kangati uphungu?

vi. Palibe

vii. Kamodzi

viii. kawiri

ix. katatu

x. kuposela katatu

E3. Kodi munalandila kangati chithandizo cha zakudya?

i. Palibe

ii. Kamodzi

iii. kawiri

iv. katatu

v. kuposela katatu

E4. Kodi munakhala kumalo kokusungani ngozi itachitika kwa nthawi yayitali bwanji?

vi. Sindinakhaleko

vii. Mwezi umodzi

viii. Miyezi iwiri

ix. Miyezi itatu

x. kuposela miyezi itatu

E5. Kodi munalandila chithandizo cha ndalama kangati?

i. Palibe

ii. Kamodzi

iii. kawiri

iv. katatu

v. kuposela katatu

E6. Mwathandizika motani ndizithandizo zimenezi?

i. Ndikutha kukhala omasuka mmaganizo
ii. Ndinayamba business
iii. Ndikutha kupanga ulimi
iv. Ndikutha kuthandiza banja langa
v. Palibe

E7. Mungafune chani chitachitika kuti muthandizike kwambiri?

i. Kupasidwa ngongole kuti tiyambe ma bizinesi kuti tizitha kuthandiza banja lathu
ii. Kutipasa manyumba
iii. Kumatipasa uphungu

Zikomo kwambiri potenga nawo mbali!!

Appendix I: Acceptance letter from research site

MZUZU CITY COUNCIL

THE CHIEF EXECUTIVE

Telephone: Mzuzu (265) 310 177/310 446/310 319
Fax : (265) 310475
E-mail : mzuzucity@sdnp.org.mw

Civic Offices
P.O. Box 1
Mzuzu
MALAWI.

Your Ref : .....
MCC/
Our Ref:.....

6th January, 2016

Ms Glory Wezi Sopera Mwafulirwa
University of Malawi
Kamuzu College of Nursing
Private Bag 1
Lilongwe

Dear Madam,

REQUEST TO USE MZUZU CITY AS A RESEARCH SITE

Reference is made to your letter dated 24th December, 2016 in line with the above subject matter.

You will be pleased to know that your request has been accepted for you to conduct research on the effects of floods on mental health of flood victims in Mzuzu City.

Wishing you a successful research.

Yours faithfully,

A.L.K. Musukwa
FOR: CHIEF EXECUTIVE OFFICER

ALL CORRESPONDENCE TO BE ADDRESSED TO THE CHIEF EXECUTIVE

Appendix J: Research ethics approval certificate

CERTIFICATE OF ETHICS APPROVAL

This is to certify that the College of Medicine Research and Ethics Committee (COMREC) has reviewed and approved a study entitled:

P.01/17/2101 – Effects of flooding on Mental Health of victims in Mzuzu City version 1 dated January 2017 by Glory Wezi Mwafulirwa

On 20-Mar-17

As you proceed with the implementation of your study, we would like you to adhere to international ethical guidelines, national guidelines and all requirements for COMREC as indicated on the next page

Approved by College of Medicine 20 MAR 2017 (COMREC) Research and Ethics Committee

Dr. YB. Mlombe - Chairperson (COMREC)

22-Mar-17

Date