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Psychological Outcomes of Climate Change among Youth and Adults in Tanzania

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Abstract

Efforts have been made to address climate change and improve people's lives; however, the psychological outcomes of climate change have not been adequately explored. While environmental and economic impacts have been widely studied, the mental health consequences of climate change continue to affect communities, particularly vulnerable populations. This study examined the perceived psychological outcomes of climate change among youth and adults in Kinondoni District, located in the Dar es Salaam region of Tanzania. A total of 360 respondents aged 15 years and above participated in the study. The research employed a convergent parallel design with a mixed-method approach, allowing for the simultaneous collection of both quantitative and qualitative data. Data were collected using structured questionnaires with closed-ended questions and in-depth interviews with key informants, while a documentary review of written and electronic materials was conducted for secondary data analysis. The findings indicate that flooding and increased temperatures were reported at moderate levels, posing significant challenges to daily life and well-being. Furthermore, psychological outcomes such as depression, anxiety disorders, stress, grief, and trauma were found to be moderately prevalent among respondents. The study recommends that the government, through the Ministry of Health, Community Development, Gender, Elderly, and Children, should collaborate with non-governmental organizations (NGOs), community-based organizations (CBOs), and local authorities to develop targeted interventions addressing climate-induced mental health challenges. Psychological support services should be integrated into disaster response mechanisms to ensure timely assistance for individuals experiencing climate-related anxiety, stress, depression, and trauma.

Keywords: *Psychological outcomes, climate change, mental health, Tanzania*

1.0 Introduction

Climate change is affecting the world and Tanzania in particular. Its impacts affect human health and well-being. It contributes to the worsening the situation and status of the affected individuals leading to mental health problems (Cianconi, Betro & Janiri, 2020; UNDP, 2024). Governments play a crucial role in managing and addressing climate change and its impacts. However, despite the efforts of curbing climate change, its psychological effects and

mental health outcomes have continued to be experienced. In addition, few people have access to quality mental health services. The situation is worse in low-and middle-income countries where more than 75 per cent of the people do not receive any treatment despite their mental health challenges (Clayton, Manning & Hodge, 2014). People's vulnerability to the impacts of climate change is catalysed by such factors as economic inequality, poor physical infrastructure, poverty and lower education levels. In addition, extreme poor people in Africa face drought, floods and extreme heat (WMO, 2021).

The impacts of climate change on mental health occur directly and with immediate effect in the short term during extreme events such as floods and acute events that may lead to traumatic stress. The impacts also occur indirectly in the long term (e.g. increased sea level, prolonged droughts, deforestation and increased temperature). These events affect the mental health of a population, leading to psychological disorders such as depression, anxiety, stress and increased aggressive behaviour. In addition, the severity of mental health effects is associated with the intensity of climate change impacts. Thus, climate change undermines mental health and people's well-being. The impacts can also result in health problems leading to different mental health outcomes (Clayton, Manning & Hodge, 2014; Clayton, 2019; Cianconi, Betro & Janiri, 2020).

Thus, there is a close relationship between climate change and mental health since the impacts of the former can lead to anxiety-related responses and other chronic and severe mental health disorders. Climate change-related impacts are also reflected in the loss of social support and community resources (Morganstein, 2019). These impacts contribute to mental health problems to society members who are directly exposed to extreme effects of climate change. Therefore, the impacts of climate change on mental health are increasing rapidly; thus, directly and indirectly affecting mostly disadvantaged groups (WHO, 2017). The sustainable Development goals 2016 - 2030 emphasise measures of protecting mental health including concrete actions for implementation. The SDG goal 13 targets measures of addressing climate change and its impacts. It is argued that climate change increases the frequency of extreme weather and people may encounter health problems resulting from climate change including mental issues such as mood disturbances, irritability and anxiety (UNDP, 2024; Cianconi et al., 2020). Moreover, the sustainable development goal 3 targets the promotion of good health including mental health and well-being. It aims to ensure healthy lives and the promotion of wellbeing for all ages. However, despite its emphasis on measures of protecting mental health little attention is paid to mental health services. (UNDP, 2024; Heymann & Sprague, 2023).

This study contributes to raising public awareness of the psychological and mental health outcomes of climate change. Understanding these outcomes is crucial for ensuring the psychological and social well-being of both youth and adults in Tanzania. The study can also help influence public policy to address the mental health impacts of climate change, ultimately improving people's lives and promoting psychological well-being (Carden, 2009). Furthermore, addressing climate change positively impacts mental health, leading to improved psychological well-being. To enhance the quality of life, particularly for youth and adults, advocacy efforts aimed at influencing policy are essential for fostering social and psychological well-being. Equally important is raising individual awareness of mental health issues to challenge negative attitudes and misconceptions associated with mental health.

1.1 Statement of the Problem

Tanzania has experienced an increase of extreme weather events such as strong winds, heavy rainfall, floods, higher temperatures and drought. These weather extreme events are associated with the destruction of infrastructure and loss of life and properties. Coastal regions, including

Dar es Salaam, are among the severely affected areas. They experience floods and extreme temperatures (URT, 2019; URT, 2021). Tanzania had also responded to growing climate risks by adopting the National Climate Change Strategy (NCCS). The strategy targeted to build human resilience for climate change impacts in order to ensure well-being of Tanzanians (World Bank, 2015). Also, the third five Year Plan (TFYDP III) focused on climate change in the national development agenda. It aimed to strengthen resilience against the impacts of climate change and to reduce vulnerability of marginalized groups including women, children and people with disability (URT, 2021). Likewise, the Tanzania Health Sector Adaptation Plan (HNAP) aimed to address climate change impacts (URT, 2012, URT, 2021). However, despite these efforts the occurrences of climate variability which include extreme droughts, temperatures above normal and floods have been experienced and have continued to increase health risks among communities. Even though, there are efforts targeted to address climate change and to improve people lives, the mental health outcomes of climate change were not adequately focused and addressed in the study area (Stiftung, 2010; World Bank, 2015, URT, 2021).

1.2 Objectives of the Study

The purpose of this study was to examine the perceived psychological outcomes of climate change in Kinondoni District, Dar es Salaam. The specific objectives of the study were;

- i. To examine the perceived impacts of climate change in the study area.
- ii. To analyze the perceived psychological outcomes of climate change in the study area.

1.3 Research Questions

This study sought to answer the following research questions:

- i. How are the impacts of climate change perceived in the study area?
- ii. How are the psychological outcomes of climate change perceived in the study area?

2.0 Literature Review

The literature review is presented in sections

2.1 Theoretical Frame work

This study is informed by Stern's Value- Belief-Norm Theory. The theory explains how values affect behaviour through behaviour specific beliefs and norms. The theory posits that value orientation can influence directly the way people formulate and structure environmental beliefs (Stern, 2000). The theory identifies three types of value orientations, egoistic, altruism and biospheric. It assumes that egoistic, social altruism and biospheric value orientation influence people's cognitive structure on beliefs about adverse environmental consequences (Steg et. al., 2014). The theory holds that people with stronger biospheric and altruism values are likely to be aware of climate impact of their actions which help them to recognise behaviour that will help to address climate change (Van der Werff et. al., 2013).

Likewise, values also affect behaviour through emotions. For example, inability to take climate actions can lead to negative emotions including (sadness, shame and guilt). Thus, people with altruistic values and strong biospheric values are more likely to be intrinsically motivated to engage consistently in climate actions (Van der Werff et. al., 2013). It is suggested that perceiving the effects of climate change could promote mitigation behaviour that help to reduce mental health problems among individuals. The study therefore, used this theory to explain the relationship between values, awareness of consequences, and description of responsibility, self- beliefs and personal norms.

2.2 The Social Psychological View of Climate Change

Climate change as applied in this study refers to the long-term shifts in temperatures and weather patterns. It leads to less predictable weather patterns and it is also associated with damaging events such as intense floods, storms and heat waves (UNCFCC, 2011; UN, 2024). In a social psychological view, our attitudes influence and determine our behaviour. Attitudes include affective and emotions, behaviour and cognitive components. It is argued that sometimes our actions are not in line with our belief and attitudes. This can be a barrier in addressing problems that can be encountered including climate change (Stoknes, 2015). Thus, climate change actions can be influenced by both attitudes and opinions. Attitudes can influence our behaviour however; our actions cannot align with the belief. This can be a barrier in addressing challenges that are encountered including climate change impacts. Hence, attitudes are associated with the lack of climate change response. It is argued that people can perceive that climate change has no direct impacts despite its severity. Thus, the social roles people play determines how they interact with climate change issues and to take actions (Doherty, 2011; Stoknes, 2015).

Moreover, people understand and act differently on climate issues and have personal meaning and ways of addressing climate change. People may believe that climate change has no direct impact on them or on their community. It is argued however, that if people believe that climate change is real and has negative consequences they will engage in climate change mitigation behaviour (Van Valkengoed et. al., 2021). In addition, climate change beliefs affect climate actions indirectly. Therefore, people perception about reality, and causes of climate change can determine whether to take positive or negative measures against climate change (Zawadzki et. al., 2020, Illingworth, et. al., 2023).

2.3 Psychological Impacts of Climate Change

The psychological impacts of climate change can be in three categories, direct impacts, indirect impacts and social and community impacts (Doherty, 2011).

Direct psychological impacts

These are immediate effects of extreme weather events including floods and heat waves. The extreme weather events have traumatic effects that can lead to mental health issues such as, post traumatic disorder, stress disorder, somatic disorders, depression, and drug and alcohol abuse. Also, severe heat waves are associated with suicide ideation, violence and abuse. Moreover, disrupted physical environment leads to environmental distress and placement, which are associated with chronic psychological impacts (Doherty, 2011; Hayes et. al., 2018).

Indirect Psychological Impacts

Indirect psychological impacts involve emotional and affective responses associated with climate change effects such as climate degradation and human suffering. Indirect impacts threaten emotional well-being caused by uncertainty about future risks of climate change. They also include anxiety and worry about climate change. Scholars argue that cognitive factors and experiences of stress can determine how people are affected by climate change psychologically and behavioural wise. In addition, reactions to climate change are determined by values, beliefs and experience (Val valkengeod et. al., 2021).

2.4 Social and Community Impacts of Climate Change on Mental Health

Mental health refers to mental illness and disorders, the state of mental wellness, emotional resilience and psychosocial wellbeing (WHO, 2017; Hayes et. al., 2018). Mental health includes a variety of different illnesses, which differ in their severity but can be broadly

understood as some combinations of abnormal thoughts, emotions, behaviour and relationships with others (WHO, 2017). Mental health is the foundation for emotions, thinking, communication, learning, resilience, and self –esteem. It is a key to relationships, personal and emotional wellbeing (Hayes et. al., 2018). Social impacts of climate change are the determinants of mental health problems as they may contribute to homelessness, unemployment as well as food and water scarcity. They may also result in high risk of isolation, limited social support and poor living conditions among the affected individuals (UNDRR, 2023). In addition, social and community impacts of climate change include social, economic and environmental disruptions such as displacement, violence, damage of social and physical infrastructures (Cianconi, et. al., 2020).

At community level, the impacts include threats to a sense of belongingness and loss of community identity as people may be forced to move out of their settlements (Hayes, et. al., 2018). Social and community impacts include violence, conflicts, migration and dislocations and environmental crisis. It also increases criminal behaviour, violence and aggression. Destruction of homes and communities is associated with stress and anxiety reactions, sleep disruptions, a decrease sense of self and self-identity (Goodman et. al., 2021). Community impacts also include reduced social cohesion, distorted social relationships, and interpersonal violence, increased stress and PTSD. Displacement can cause negative mental health impacts attributed by loss of shelter and livelihoods. It is argued that loss of autonomy and control can lead to mental distress, insecurity towards self –worth and aggression (Rifat, et. al., 2020). Scholars argue that other causes of mental health can be war, poverty, drought, floods and hurricanes. Mental health can also be determined by social and ecological factors that can affect physical health including climate change. Thus, mental health impacts can be attributed by complex pathways and climate change is considered as an accelerator of mental health (Palinkas & Wong, 2020; Hayes et. al., 2018).

2.5 Conceptual Framework on Climate Change and Mental Health Outcomes

A conceptual Framework in Figure 1 shows that direct impacts of climate change such as floods, heat and drought may lead to social impacts such as loss of property, infrastructure destruction, family separation and homelessness. These impacts can disrupt people emotions, behaviour as well as cognition process. Thus, the psychological disruptions may lead to mental health problems that can then be experienced including depression and despair, anxiety and worry, grief and low- self-esteem (Donehity, 2011, Hayes et. al., 2018).

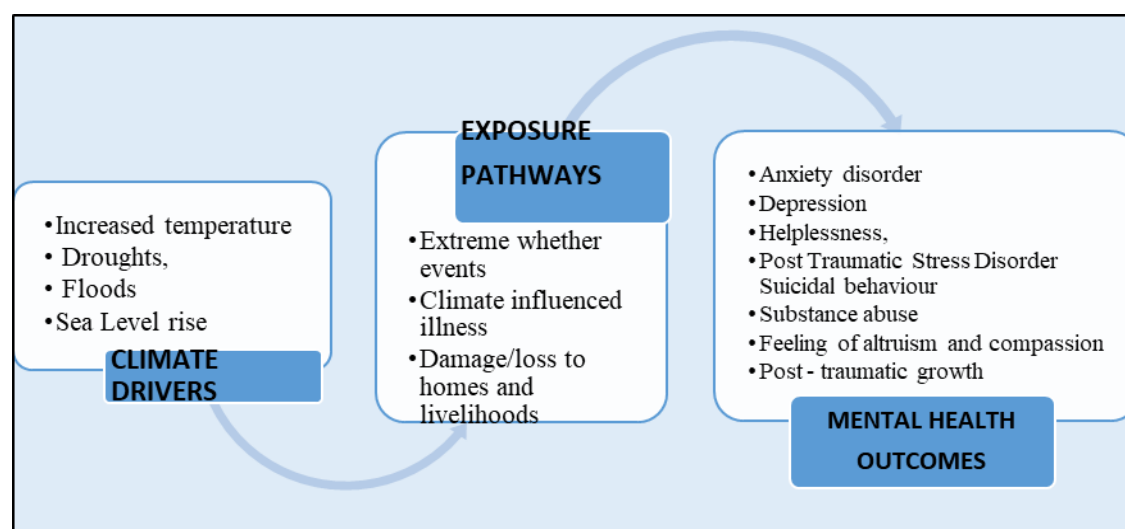


Figure: 1 Climate Change and Mental Health Outcomes

Modified from Hough, E & Counts, N (2023). *How climate Change Affects our Mental Health, and What we can do About it*. Commonwealth Fund. <https://doi.org/1026099/rk6r-ne98>

The conceptual framework in Figure 1 shows that climate drivers such as high temperature, droughts, floods and the rise of water levels of seas and rivers can lead to the destruction of homes and livelihoods. It also lead to mental health outcomes such as anxiety, stress, depression, post- traumatic stress disorder and substance abuse. However, there can be positive psychological consequences of climate change for example post-traumatic growth, feeling of altruism and compassion which can allow involvement in climate mitigation (Hayes, et. al., 2018).

3.0 Methodology

This section presents the methodology that guided the study

3.1 The Study area

This study was conducted in Kinondoni Municipal Council in Dar es Salaam region. Dar es Salaam region was purposely selected because it is vulnerable to climate change due to its location closer to the Indian Ocean. It is vulnerable to floods, sea level and coastal erosion, water scarcity and outbreak of diseases (URT 2018). Kinondoni Municipal is preferred in this study because there are whether changes that lead to climate drivers such as floods during rain seasons and soil erosion along the sea and rivers. The area is humid and hot throughout the year. An average temperature is 29⁰C. It is bordered by Indian Ocean to the North East (URT 2018). The study was specifically conducted in Kunduchi and Msasani Wards. The population in Kunduchi Ward is 89,814 with 43,232 males and 46,582 females and 26,125 households. The population in Msasani Ward is 40,406 comprising 19,985 males and 20,421 females and 12,397 households (URT 2022).

3.2 Design of the Study

This study employed a convergent Parallel design with a mixed research method. This research design allowed the collection of quantitative and qualitative data simultaneously, which were analysed separately and the results were compared to determine whether the findings confirm or disconfirm each other (Cresswell & Cresswell, 2018).

3.3 Study population, Sampling Procedures

The study targeted male and female residents of Kinondoni Municipal, aged 15 or above selected from the population of 13,220 residents in Msasani and Kunduchi Wards. The study used probability sampling technique where by simple random sampling techniques was used to select households and study respondents. Youth and adults residents were selected through random sampling from 32 randomly selected households in each ward where five respondents were involved in the study from each household. Through this sampling procedure 160 respondents were selected in each ward. The study also involved 40 key informants, who were selected purposively from each ward, and this comprised twenty youth and twenty adults where ten males and ten females were selected from each ward. The sample size for this study therefore, involved 360 respondents aged 15 years and above.

3.4 Methods of Data Collection

The study used triangulation technique where both quantitative and qualitative methods were used to collect data. Questionnaire survey with structured and closed-ended questions and in – depth interviews with key informants were used to collect primary data. Documentary review of written and electronic materials was used to collect secondary data for triangulation purposes. The triangulation allowed completeness and accuracy of data (Babbie, 2010;

Creswell 2018). In this study, questionnaire was used to collect socio demographic data such as age, sex, education level, and marital status. The questionnaire was also used to collect data regarding the perceived climate change impacts and psychosocial outcomes of climate change. The respondents were required to rate their perceived psychological outcomes of climate change. Data were collected in June- July 2021 after Elnino rainfalls in 2020. Scholars argued that psychosocial impacts of climate change can be most significant, six months after extreme events such as floods and drought (Hayes, et. al., 2018).

3.5 Quantitate analysis

Quantitative data were entered in a computer and analysed using Statistical Package for Social Sciences. Missing responses were not included in the analysis. The chi- square test with p-values were used to test statistical differences of the responses in perceived climate change and psychological outcomes. Quantitative data were presented in Tables and graphs.

3.6 Qualitative Analyses

Thematic analysis was used to analyse field notes of non - participant observation and in- depth interviews. Thematic analysis involved reviewing the content, coding and categorizing the information into themes based on the study objectives. Then a thematic analysis was made from the overall theme categories. In- depth interviews with key informants took 30 to 45 minutes long.

4.0 Findings and Discussion

The findings and discussion were done in sections.

4.1 Quantitative Survey Findings

4.1.1 Demographic Characteristics of Respondents

The study findings show that the percentage of females was slightly higher than that of males in age groups of 15- 29 (11%) years, 30-39 (23%) years and 40 - 49 (13%) years. The findings show further that the percentage of males was higher (18.1%) compared to that of females (14.9%) at the age group of 50 years and above. Figure 2 presents the age groups, education level and marital status by sex of the respondents.

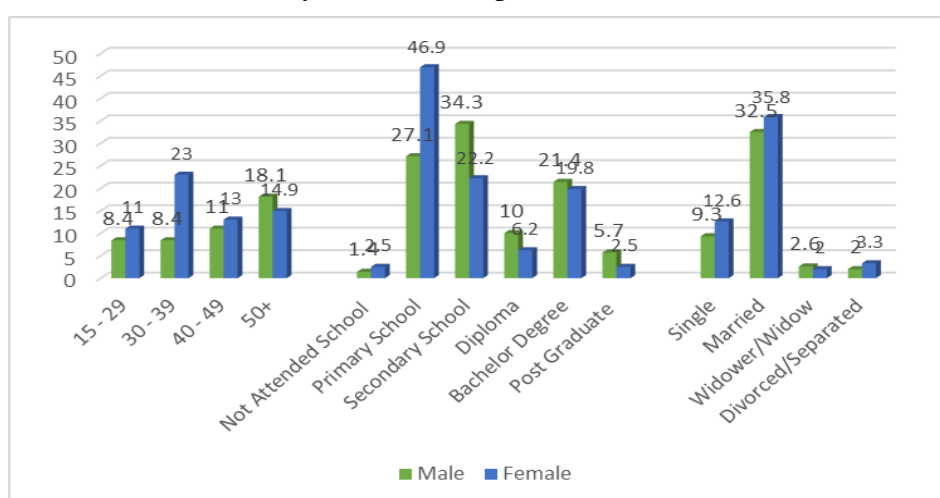


Figure 2: Characteristics of Respondents

Education Level of Respondents

Regarding education level, about a half (46.9%) of females and about one quarter (27.1%) of males had primary school education. Furthermore, one third (34.3%) of males and about a quarter (22.2 %) of females had attained secondary school education. The findings in Figure 2 show further that about a quarter of males (21.4%) had attained higher education while 19.8 per cent of females had attained that level of education. In addition, the findings show that about 1.4 and 2.5 per cent of males and females respectively did not attend school.

Marital Status

Findings in Figure 2 show further that more than one third, that is, 32.5 and 35.8 per cent of male and female respondents respectively were married while 9.3 and 12.6 per cent of male and female respondents respectively were single.

4.1.2 Perceived Climate Change Impacts in the Study Area

The first research question sought to examine perceived impacts of climate change as experienced by the respondents in their area. The findings show that more than three quarters of the respondents that is, 96.7 and 92.8 per cent of male and female respondents respectively reported that deforestation and drought were not commonly experienced in the area. Furthermore, more than a half of the respondents reported that pollution of rivers and sea (66.7%) and poor waste management (63.4%) were at the low levels. Also, more than a half of the respondents (62.7%) reported flooding to be moderate. Figure 3 provides more details.

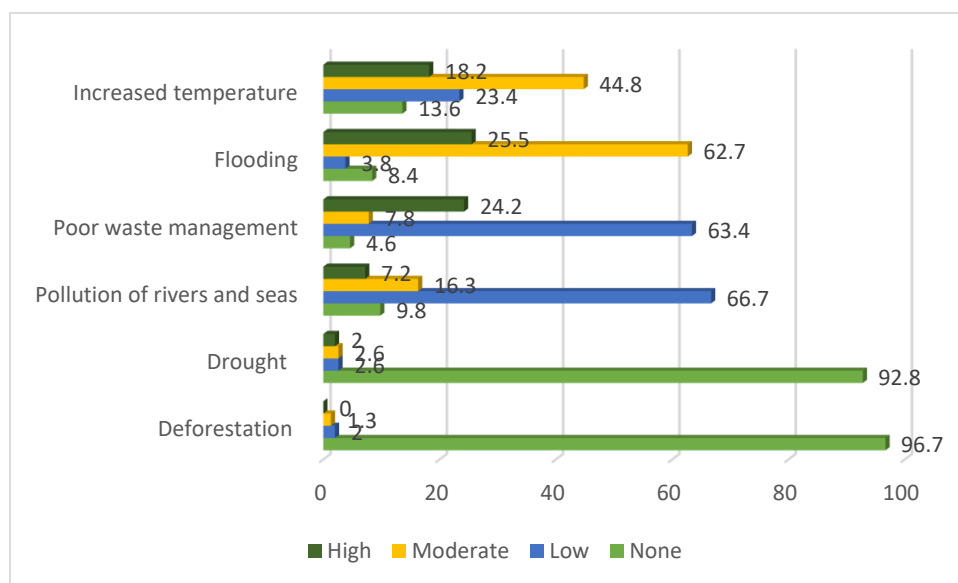


Figure 3: Perceived Impacts of Climate Change

The results show further through Chi Square test that pollution of rivers and sea, poor waste management, flooding and increased temperature had significant differences where $p < 0.05$. Furthermore, the climate drivers such as deforestation and drought had no significant differences in their results. Table 1 gives the details.

Table 1: Perceived Climate Change Impacts in the Study Area

Climate drivers	χ^2	df	p value
Deforestation	3.11	4	0.539ns
Drought	2.453	6	0.874ns
Pollution of rivers and seas	31.621	6	0.000*
Poor waste management	65.974	6	0.000*
Flooding	18.425	6	0.005*
Increased temperature	43.28	6	0.000*

*Significant at $p < 0.05$, ns - Not significant

4.1.3 Perceived Psychological Outcomes of Climate Change in the Study Area

The second research question sought to find out perceived psychological outcomes of climate change among youth and adults in the study area. The study investigated the perceived of level psychological outcomes of climate change as none, low, moderate and high. The results showed that the perceived psychological outcomes mainly ranged from low to moderate level as shown in Figure 4.

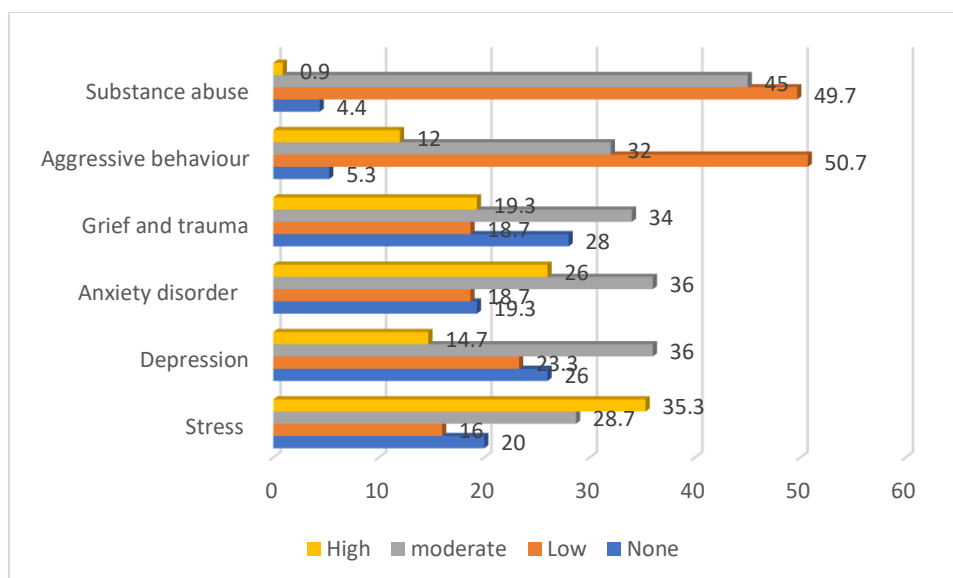


Figure 4: Perceived Psychological Outcomes of Climate Change

Findings in Figure 4 show that a half of the respondents (50.7%) reported aggressive behaviour to be low. The findings show further that, one third of the respondents reported depression (36%), anxiety disorder (36%), and grief and trauma (34%) to be at a moderate level. Moreover, one third of the respondents (35.5%) reported stress to be high. Furthermore, the findings obtained through chi square test show that all psychological outcomes had significant differences in all the categories that were reported where $p < 0.05$. Table 2 provides the details.

Table 2: Perceived Psychological Outcomes of Climate Change

	χ^2	df	P value
Substance abuse	11.35	2	.003*
Aggressive behaviour	21.21	6	.002*
Depression	54.72	6	.000*
Anxiety disorder	22.40	6	.001*
Stress	29.57	6	.000*
Grief and trauma	24.29	6	.000*

*Significant at $p < 0.05$

4.2 Qualitative Findings

Two main themes were identified based on the study objectives and the coding of the results. The first theme was perceived climate change impacts and the second was psychological outcomes of climate change.

4.2.1 Perceived Climate Change Impacts

The findings obtained through in depth – interviews with Wards Executive Official show that people in the study area experienced floods in their areas and destroyed people's belongings and water tend to enter inside their houses and surround peoples' households. A Ward Executive Officer aged 52 years from ward B had this to say,

We experienced heavy rainfalls and floods in our residents. Various cases were reported including destructions of residential areas and people's properties. We played our role to report such incidences to higher authorities and we received quick responses. Further actions are taken by giving help and support depending on the reported cases. People are also insisted to vacate from areas that are at the risk of floods.

The findings show further that increased sea level was experienced in the study area and it resulted in the destruction of people's residential areas. The findings show that climate changes that occurred over time lead to increased sea level along their area. A male aged 62 years reported,

The boundary for this plot area used to be there, where you can now see the mangroves trees.... Now the lower part of this plot is occupied by sea water. You can see how this plot had been destroyed by sea water overtime... We are still living in near this area however we are worried and uncomfortable....

The findings obtained through in depth – interview show further that families' livelihoods were affected and family members were disrupted psychologically due to flooding. Moreover, findings show that affected individuals were given support and this helped them to bounce back and cope with the challenges. A woman aged 41 years old had this to say,

I am a mother of three children. I earn a living through petty business. I used to sell vegetables and fruits. My petty business was interrupted during heavy rainfall and floods because the area

was surrounded by water. My family relied on this small business activities. I thank that I got different support that helped my family to get through that challenging situation.

These findings suggest further that families experienced challenges that affected their livelihoods activities. This has implications on households' ability to meet their needs and vulnerability to mental health problems.

4.2.2 Perceived Psychological Outcomes of Climate Change

The finding obtained through in-depth interview show that people were affected psychologically following the heavy rainfall and floods in their residential areas. A female aged 45 years from Ward A had this to say,

We are worried a lot when it rains. It is even more stressful when it starts to rain during the night. I don't sleep at all. How can I sleep while we are surrounded by water? I totally get confused... We moved to other areas for a while and all of our belongings were destroyed by water... Our schedules of activities were affected..... We also experience outbreaks of diseases such as cholera, dysentery and diarrhoea following heavy rainfalls in our area."

The findings also show that during hot seasons people experience high temperatures that lead to physical health challenges including lack of comfortable sleep, skin problems and psychological problems such as stress and anxiety. A man aged 60 years from Ward B said,

It is very hot from December through February in our area. Adults and children experienced skin rashes and poor sleep due to hot weather. This situation is very common during hot season. These situations tend to increase stress and anxiety among people.

These findings suggest that people in the area experience stressful moments including sleep disturbances attributed by hot weather.

4.3 Discussion of Findings

This study used a mixed method to collect quantitative and qualitative data to describe characteristics of respondents, perception and understanding of climate change, perceived impacts of climate change and psychological outcomes of climate change.

4.3.1 Characteristics of Respondents

The findings show that the number of emerging adults and adults was higher compared to other age groups. Emerging adults are considered to be more likely to experience mental health problems associated with climate change when compared to other age groups (Schwartz, et. al., 2022). The findings show further that the level of education varied among the respondents. This implies that even the level of understanding about climate change and mental health issues may differ among the respondents by their age groups. These findings are consistent with findings in other studies that revealed that education helps people to understand the impacts of climate change and to motivate changing of attitudes and behaviour. According to scholars (i.e., Dhal, 2021; Kumar, 2023), education increase climate literacy and understanding of climate change.

4.3.2 Perceived Impacts of Climate Change in the Study Area

The findings show that flooding was experienced by the majority of the respondents. Other studies also show that flooding was most frequently reported as a major climate driver that affects physical and mental health of people as compared to other climate drivers. It was further revealed that floods lead to stress attributed by the loss of lives and property. This situation affects people psychologically leading to depression, anxiety and mood disorder (Cianconi et. al., 2020). Other studies show further that extreme weather events such as floods, high temperature and droughts contributed to increased rates of mental health issues (USGCRP,

2016). Likewise, floods lead to stress due to loss of property and lives causing depression, anxiety, mood disorder and PTSD to flood victims. In addition, the high levels and frequency of climate drivers contribute to severity of mental health problems (Cianconi et al., 2020). Other studies also found that extreme weather events have an effect on people's physical and mental health (Torres & Casey, 2017).

The findings show that people in the study area experienced climate change impacts that affected them physically and psychologically leading to mental health problems. Thus, climate events had psychological outcomes that have implications on people's social and psychological well-being. Studies showed that increased anxiety is associated with increased use of substance among youth; thus, disrupted families and communities tend to experience high level of anxiety, stress and sleep disturbance (Goodman et. al., 2021). The findings imply that people in the area encounter physical health problems as well as psychological problems that affect their mental health.

4.3.3 Perceived Psychological Outcomes of Climate Change

The findings show that mental health outcomes of climate change such as stress, depression, anxiety disorder, grief and trauma were experienced in the study area. Other studies show that impacts of climate change include anxiety disorders, depression and Post Traumatic and stress Disorder. Furthermore, PTSD (Post Traumatic and stress Disorder) is considered to be the most severe mental health impact of climate change (Burton, et al., 2014; Chand & Murthy, 2018). The findings imply that people in the area experience stressful moments and mental disturbances attributed by extreme climate variability. This suggest that such situations result in anxiety, stress, depression and sometimes mood and behaviour changes which affect them psychologically.

The findings show further that families that experienced challenges have their livelihoods activities affected. The findings suggest further that destruction of people's property make them unable to engage properly in social and economic activities for survival thus affect them psychologically resulting in mental health challenges. Other scholars argued that communities living in coastal areas are vulnerable to loss of property, infrastructural damage and loss of lives (Rifat et. al., 2020) leading to psycho-physical conditions such as irritability, mood disturbances, anxiety and mental and physical weaknesses (Cianconi et al., 2020).

Furthermore, scholars argued that mental health outcomes of climate change are indirectly caused by the damages to physical and social infrastructure, physical health effects, water and food shortages, conflict and displacement. Mental health outcomes also include the threats to a sense of belongingness and loss of community identity because people have to move out of their settlements. There can also be an increase of criminal behaviour, despair, hopelessness, violence and aggression (Hayes et. al. 2018; Cianconi et al., 2020). This can affect people psychologically leading to anxiety, stress, depression and aggressive behaviour. Other studies also found that extreme weather events have an effect on people's physical and mental health (Torres & Casey, 2017).

5.0 Conclusions

The study concludes that despite efforts by various stakeholders to mitigate climate change impacts, psychological outcomes linked to climate variability continue to be prevalent in Tanzania. The research examined the perceived impacts of climate change and the resulting psychological effects among youth and adults in Kinondoni District, Dar es Salaam. Using a mixed-method approach, the study effectively integrated quantitative and qualitative data to provide a comprehensive understanding of the issue. The findings indicate that climate-related stressors, particularly flooding and increased temperatures, were experienced at moderate

levels, impacting the daily lives and well-being of the residents. Respondents reported experiencing psychological distress, with conditions such as depression, anxiety disorder, stress, grief, and trauma being moderately prevalent. These findings highlight the intricate relationship between climate change and mental health, demonstrating that exposure to extreme weather events not only affects physical infrastructure and livelihoods but also significantly disrupts emotional and psychological stability. The qualitative data further supported these findings, as participants shared personal experiences of distress and uncertainty, particularly during and after extreme weather occurrences.

Psychological distress manifested through disrupted sleep patterns, heightened anxiety, and increased vulnerability to stress-related disorders. The results reinforce existing literature that links climate change to adverse mental health outcomes, particularly among communities with limited access to mental health resources. The study underscores that climate-induced psychological distress is influenced by both direct and indirect factors, with extreme weather events acting as immediate stressors, while prolonged exposure to environmental changes contributes to long-term emotional strain. The findings also emphasize the socio-economic implications of climate change, as disruptions to daily livelihoods exacerbate financial insecurity, further aggravating mental health challenges. The study highlights the need for increased awareness and acknowledgement of the mental health dimensions of climate change, recognizing that psychological well-being is an integral aspect of climate resilience. By shedding light on the perceived psychological effects of climate change, the study adds to the growing body of knowledge on climate-related mental health challenges and provides valuable insights into the lived experiences of individuals facing environmental stressors.

6.0 Recommendations

The study recommends that awareness campaigns should be intensified to educate communities on the risks associated with climate change and the importance of residing in areas that are not highly vulnerable to flooding. The government, through the Ministry of Health, Community Development, Gender, Elderly, and Children, should collaborate with various stakeholders, including non-governmental organizations (NGOs) and community-based organizations (CBOs), to provide psychological support to individuals affected by climate change-induced stressors. Public awareness initiatives should focus on equipping individuals with coping mechanisms to mitigate the psychological effects of extreme weather events such as flooding and increased temperatures. Mental health services should be integrated into climate change response strategies, ensuring that individuals experiencing anxiety, depression, or trauma due to environmental changes receive adequate psychosocial support. Additionally, policies should be formulated to address climate change's mental health impacts by incorporating mental health interventions into disaster preparedness and response programs.

Community resilience programs should be established to promote adaptive strategies that enable individuals to withstand and recover from climate-related psychological distress. Furthermore, the government should invest in research to expand understanding of the long-term psychological consequences of climate change, ensuring that future interventions are evidence-based and contextually relevant. Future studies should explore how climate-induced stress varies across different demographic groups and regions, enabling the development of targeted interventions that address the unique needs of affected populations. Policymakers should also ensure that climate adaptation measures consider the social and psychological dimensions of climate change, recognizing mental well-being as a critical component of overall resilience.

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