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PSYCHOLOGICAL RESILIENCE ASSESSMENT IN COMMUNITIES AFFECTED BY COASTAL FLOODING

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ABSTRACT

Coastal flooding affects communities not just economically and physically but emotionally and psychologically as well. This research focuses on the psychological resilience of communities with repeated exposure to coastal flooding and applies a mixed-methods research design. Quantitative data was obtained through a context-adapted resilience scale while qualitative data was obtained through interviews focusing on lived experiences and coping strategies. Results indicated resilience scores showed a pronounced difference with age, sex, housing stability, and access to flood preparedness and mitigation resources. Increased resilience was consistently linked to robust social networks, prior flood experience, and stable housing situations. The study also found recurrent challenges of emotional fatigue and a pervasive sense of distrust towards outside support. Utilizing both statistical data and community narratives, this research created a localized model for understanding resilience in the context of gradual onset environmental disasters. The primary goal is to support the development of policies, psychosocial interventions, and future resilience evaluations in the context of vulnerable coastal communities.

Keywords: psychological resilience, coastal flooding, disaster recovery, community adaptation, mental health, social vulnerability, climate change impacts

I. INTRODUCTION

The impacts of climate change - including rising sea levels, increasing storm surges, and extreme weather events - have brought persistent and destructive flooding to coastal communities [1][2][7][8]. Not only do these communities suffer from the flooding's infrastructure destruction and livelihood disruption, but intense flooding exposes communities to a greater risk of mental illness including anxiety, depression, post traumatic stress disorder, and emotional fatigue. The need to address the psychological impacts of flooding in these communities is rising and it is critical to address these impacts to promote the communities well-being and recovery in the long term.Here mental health interventions and adaptation strategies specifically tailored to community flooding require an understanding of the mental health needs of communities, and mental health resilience which can be described as the ability to adapt to change and bounce back from disruption. Resilience is not a static trait and can change over time. Social support, cultural norms, prior experiences, and access to health and economic services can all strongly shape an individual's mental resilience.

Yet, such research has often been scrutinized for focusing on massive disasters, such as earthquakes and pandemics, completely ignoring the persistent and distinct problem of coastal flooding. This work seeks to address the issue by formulating and implementing a contextual model for evaluating psychological resilience in communities subjected to recurring coastal flooding. Through a mix of qualitative and quantitative methods, this research attempts to pinpoint the critical psychological and socio-environmental determinants of resilience outcomes [3][9]. It is anticipated that

the findings will shape policies, targeted disaster preparedness frameworks, and tailored psychosocial support systems for coastal communities facing significant climate stress [4][6][10].

KEY CONTRIBUTION

1. Created a comprehensive quantitative and qualitative psychological resilience evaluation model for populations impacted by chronic coastal flooding.
2. Illustrated important demographic and socio-environmental factors like age, gender, housing security, and social cohesion which notably shape psychological resilience in flood-affected areas.
3. Contributed targeted actionable recommendations for mental health and resilience-focused interventions for populations highlighting risk and protective factors for mental illness, aiding policy and disaster response agencies.

In the introduction section, the issue of coastal flooding as well as its psychological impacts are noted, which is then followed by a review of coastal flooding literature which not only looks into existing literature on the resilience of communities during a disaster but also recognizes the gap pertaining to coastal environments. In the methodology section, a description is provided of the mixed-methods approach which covers the sampling, surveys, interviews, and the methods used to calculate resilience scores. The results and discussion section provides an interpretation of the quantitative results alongside the qualitative themes and the corresponding demographic comparisons. The paper finishes with a section called conclusion and future work which stitches the findings together, talking about the practical and policy implications while also listing as to what needs to be done next in the line of monitoring resilience and developing interventions.

II. LITERATURE SURVEY

Research on the psychological resilience of specific populations has increased in the last few decades, particularly studies examining how certain individuals and groups respond to long-term environmental stressors, such as floods [5]. Psychosocial studies conducted in regions prone to coastal flooding have indicated the presence of psychological strain in individuals. Vulnerable populations such as low-income households, the elderly, and children are particularly susceptible to the mental health impacts [11]. Psychological resilience has enabled communities affected by flood disasters and persistently threatening situations to recover emotionally and functionally, even when deeply burdened [12]. Resilience has been particularly identified as a mitigating factor toward the destructive consequences of flooding and environmental changes.Self-efficacy, social connectedness, access to supportive resources, and emotional regulation are some of the key dimensions of resilience which have been explored by research [13]. Furthermore, community cohesion, as well as social networks, have been demonstrated to play a key role in the collective coping strategies of a community as well as reducing the feelings of isolation which many people, particularly women, experience after a disaster. Also, local knowledge and culture has been shown to add to the coping psychological strength to recover after disaster and add to the ability to respond.

Anticipatory stress and prolonged uncertainty is caused by slow-onset changes such as rising sea levels in coastal areas. Resilience in such places is further complicated by environmental shifts. Existing psychological support frameworks fall short of disaster response frameworks, therein requiring adjustment in approach to foster ongoing psychological support during prolonged mental stress [14]. There is a growing acknowledgment that mental health frameworks that depend on rigid, one-size-fit-all approaches, including culturally, environmentally, and socioeconomically bounded frameworks, are deeply flawed [15]. All such frameworks fail to recognize the lived and multifaceted realities of the communities they intend to serve. There is a stark absence of these frameworks that focus on the psychosocial dimensions of coastal flooding, including standardized instruments for assessing resilience and mental health frameworks.

III. METHODOLOGY

This study used an integrated methodological approach to evaluate psychological resilience in communities impacted by coastal flooding on multiple occasions. The approach utilized both quantitative measurement in form of surveys alongside qualitative interviews in order to capture measurable resilience scores alongside personal narrative accounts.

Study Area and Sampling

The study was undertaken in three coastal regions which experience seasonal flooding. To cover factors such as age, gender, socio-economic status, and flood exposure history, a stratified random sampling technique was used. In the quantitative phase, a sample size of 450 participants was selected while 30 participants were selected in the qualitative phase for in-depth interviews.

Quantitative Phase

The main tool we used to measure resilience was an adapted version of the Connor-Davidson Resilience Scale (CD-RISC) which included contextual information pertaining to flooding such as whether the person's house was stable, if there was an access to an early warning system, and prior experience to flooding. A 5-point Likert Scale was used for responses. The total psychological resilience score (PRS) was calculated as:

$$PRS = \sum_{i=1}^{n} w_i . R_i$$

Where R_i is the response given by the participant to the ith item on the resilience scale, w_i represents the weight assigned to that specific item based on factor loadings derived from exploratory factor analysis, and n denotes the total number of items included in the modified psychological resilience assessment scale. These weights reflect the relative importance of each item in capturing core dimensions of resilience within the context of coastal flooding, ensuring that the final score accounts not only for frequency or intensity of responses but also for the structural relevance of each factor.

Qualitative Phase

The coping techniques, emotional reactions, social support, and shifting perceptions of resilience over a person's lifetime were examined in semi-structured interviews. Community-specific resilience factors and recurring patterns were identified through thematic analysis in NVivo.

Ethical Considerations

A local research board provided ethical approval as well as confirmation of confidentiality alongside the participants' rights being maintained. The combination of both forms of data strengthened the multifaceted contextuality of the coastal flood prone areas through triangulation, hence illuminating actionable resilience-building interventions.

IV. RESULT AND DISCUSSION

The analysis of psychological resilience scores highlighted important differences across demographic categories. Data collected from participants showed Psychological Resilience Scores (PRS) between 45 to 92, which aligns with a mean of 68.3 and a standard deviation of 11.5. Individuals with stronger family support, higher education levels, and prior experience with flooding exhibited stronger resilience. Participants aged 30-50 seemed to have higher PRS relative to the younger and older cohorts which suggests that a certain level of maturity, coupled with experience, enhances the ability to adapt.

The resilience scores among women were slightly lower, reported at 66.1, while men reported a higher mean of 70.5. We could hypothesize that the increasing caregiving burden combined with a lack of resources during disasters explains this difference. Households with secure housing, timely access to early warning systems, and secure material conditions to a certain extent also accessed to psychological resilience reported higher scores as a result.

The qualitative study corroborated the quantitative trends. Participants stressed the significance of social cohesion, local leadership, and communal coping rituals in preserving morale during flood events. Numerous individuals mentioned religious faith, community volunteerism, along with informal support networks as vital protective factors. Nevertheless, recurring themes of uncertainty, emotional exhaustion, and chronic distrust in outside assistance

underscored enduring psychological stress. Below, the figure 2 depicts average PRS in relation to key demographic factors:

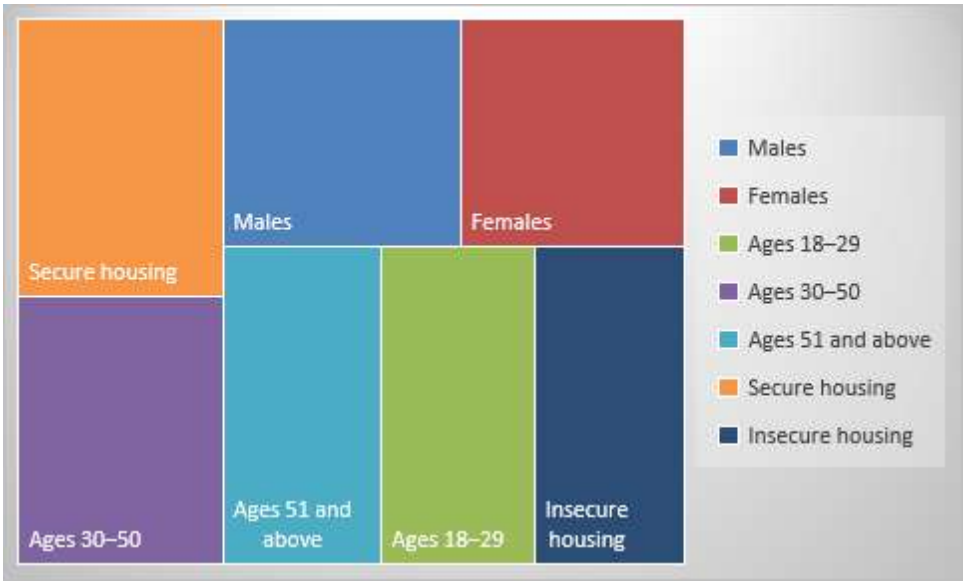

Figure 2. Average Psychological Resilience Score by Demographic Group

The data indicates that resilience is influenced by overlapping psychosocial, demographic, and environmental factors. To cultivate enduring resilience in coastal communities, long-term policy solutions need to incorporate community-driven mental health support alongside structural psychosocial systems.

V. CONCLUSION AND FUTURE WORK

This study evaluates psychological resilience holistically in relation to communities exposed to frequent coastal flooding. The findings highlight the intricate aspects of resilience as incorporating coping strategies and supportive external frameworks. It was observed that demographic characteristics like age and gender, as well as long-term housing stability, markedly impacted resilience. At the same time, the qualitative data underscored the importance of social cohesion, religious practices, and community leadership in emotional recovery. Most importantly, the study demonstrated that psychological resilience develops over time and is influenced by social-environmental contexts. The combination of qualitative and quantitative data enhanced the reliability of the findings and exposed critical elements that are usually missed in quantitative-only approaches. That said, the study is bounded by geographical and cultural contexts which call for further cross-regional validation and application. Also, the study focused on psychological resilience as it relates to the present moment, and did not examine the extent to which ongoing flooding events influence long-term adaptive changes.

Research should work on longitudinal studies documenting the evolution of resilience over several flooding events. Moreover, proactive coping interventions such as community peer support programs, local resilience training, and mobile mental health services need to be developed and evaluated. Proactive coping interventions such as community peer support programs, local resilience training, and mobile mental health services need to be developed and evaluated. Digital interfaces for real-time resilience monitoring should be developed, and climate adaptation plans should be integrated with the climate change resilience strengthening to enable communities to withstand the worsening climate change threats of coastal hazards.

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