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Environmental Quality of life, Mental Health and Coping Strategies among Individuals Affected by Flood in Assam

Kankita Lekharu[1], Deepmala Sutar[2]

[1]Student, Msc Clinical Psychology, Kristu Jayanti College Autonomous, Bengaluru
[2]Assistant Professor, Kristu Jayanti College Autonomous, Bengaluru

Abstract

Floods are periodic natural calamities in Assam, India, which not only impact the physical environment but also the psychological well-being of the affected population. The present study examines the association between Environmental Quality of Life (EQL), coping mechanisms (adaptive and maladaptive), and mental health outcomes—depression, anxiety, and stress—among flood victims in the state. There were 140 participants in total. A quantitative approach was used, and data were collected through structured questionnaires from a purposive sample of flood-affected people. Mental health was measured through the Depression, Anxiety, and Stress Scale (DASS-21); coping was assessed through the Brief COPE inventory; and environmental quality was measured through the environment domain of the WHOQOL-BREF. The results indicated that Adaptive and maladaptive coping were positively associated with mental health distress, while Environmental quality had a significant relationship with mental health distress. Furthermore, regression analysis showed EQL and coping styles as predictors of mental health. People adopted both coping mechanisms while coping with floods in Assam, indicating the contextualization of post-disaster mental health interventions.

Keywords: Environmental Quality of life, Mental Health, Adaptive Coping Strategies, Maladaptive Coping Strategies

Introduction

Flooding is a periodic natural disaster that destroys infrastructure and affects human health. Assam is one of the states in India with frequent flooding incidences (Basistha et al., 2024). The incidence of floods with high frequency results to permanent displacement, loss of income, as well as severe psychological effects such as post-traumatic stress disorder (PTSD), depression, anxiety, and suicidal ideation (Asim et al., 2022). In the state of Kerala, the major mental health problem among flood affected people was PTSD characterized by sleeping disorders, emotional numbness, and hyperarousal (Asim et al., 2022). Similarly, studies conducted in Brazil demonstrated that due to consecutive flooding, populations experienced very high psychological distress, lower quality of life, and highly maladaptive coping strategies (Silva et al., 2022). Psychological consequences of flooding in Assam become serious due to the susceptible population, absence of comprehensive disaster mitigation preparedness, repeated deprivation of basic resources, and limited access to mental health facilities (Borah et al., 2023). Environmental Quality of Life (EQOL), which contains physical, social, and economic surroundings, is a key factor in determining

the well-being of the mentally ill. Poor sanitation, water pollution, poor housing, and degradation of their surrounding environment by agricultural land and forced migration, worsened the psychological conditions in the flood-affected regions of Assam (Dutta & Deka, 2024; Basistha et al., 2023). Studies reveal that facing recurrent environmental hazards makes the community more stressed, depressed, anxious, and less satisfied with life, among other things (Silva et al., 2022; Asim et al., 2022). Coping strategies, broadly categorized into adaptive (e.g., problem-solving, emotional regulation, seeking support) and maladaptive (e.g., avoidance, substance use, denial), are crucial in managing the flood-related stress experience of an individual. For example, the lack of institutional support in Assam results in maladaptive behaviors such as alcohol use and social withdrawal, especially applicable to rural areas that have no government aid (Dutta & Deka, 2024; Borah et al., 2023). Vulnerable groups that include women, elderly people, and the economically disadvantaged experience greater suffering due to their limited coping resources and poor access to services (Asim et al., 2022; Basistha et al., 2024). As noted by Compas et al. (2014), early in life developing emotion regulation lays the core for efficient future coping strategies; however, even those efficient adaptations may be placed in high-strain scenarios of protracted or uncontrollable adversity. A well-woven theoretical framework helps give a better understanding of these dynamics. Hobfoll's Conservation of Resources (COR) Theory maintains that psychological stress is any situation in which valuable resources—material, social, or emotional—are actually or potentially being lost, while their gain or protection reduces such stress. The Social Support Theory (House, 1981) points to the buffering influence of emotional, informational, and instrumental support in enhancing the mental health of an individual, thereby strengthening resilience with a strong social network. Bronfenbrenner's Ecological Systems Theory provides a broad explanation of human development through five interrelated systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Therefore, the characteristics of experience, community structures, cultural values, and transitions across life stages interact with one another to create avenues of mental health outcomes. All these frameworks, therefore, accentuate the complexity and multidimensional nature of flooding impact on mental health, coupled with the urgent need for holistic and intervention-specific for the most affected areas, such as Assam.

Need and Significance of the Study

The psychological impact of natural or environmental disasters, especially floods, on the people of Assam, is an important aspect of the research study since this is a highly disaster-prone region. While the psychological impact of natural disaster has been researched widely, not much research has been carried out to look into the environmental quality of life as a source for mental well-being, and coping mechanisms of people living in disaster-prone areas with disaster events. This research fills an important gap in literature, especially in the Indian context, by investigating these interrelationships. Such finding does imply helping disaster management teams, policy makers, and even mental health professionals in formulating target interventions for resilience and well-being. Similarly, the study can benefit respective local NGOs and the support groups in designing community-based mental health programs, meeting the needs of the flood-affected communities.

Review Of Literature

Silva et al.(2022) have compared effects of recurring floods of Capivara River with respect to psychological aspect on the residents of Vila Ipiranga in Brazil by a quantitative cross-sectional study (n=60 aged 15–75) with instruments including Coping Strategies Inventory, WHOQOL-BREF, and

Hamilton Scales which has shown gender sensitivity as females displayed severe anxiety and depressive symptoms despite coping attempts through social and emotional means along with a net lower quality of life therefore requiring gender-sensitive mental health interventions. Asim et al. (2022) interviewing adults in Kerala who surveyed with PHQ-9, GAD-7, and PCL-5 instruments. It has unearthed slightly persistent anxiety, depression, and PTSD symptoms one year after floods with women's symptoms more severe initially, but decreased with age control, and moderate-positive relationship of PTSD with anxiety and depression. Basistha et al. (2023) investigates the effects of flooding on young adults (18-25) in Assam, using WHOQOL-BREF and DASS-21 tools, and found that stress, anxiety, and depression responses did not significantly differ between victims and non-victims of property damage, but lesser perceived health and environmental quality were most associated with greater distress. Borah et al. (2023) qualitatively assess post-flood psychological well-being through interviews and focus groups in five villages in Bongaigaon, with themes such as social capital, secondary stressors, and institutional inefficiencies identified as key influences on mental health. Major stressors had poor housing and education disruption and economic hardship. Deka and Dutta (2024) have applied mixed methods to study the impact of floods and disaster management in the Brahmaputra valley of Assam, integrating geospatial data with field surveys and secondary data from government sources for critique and advice on local mitigation strategies. Bastami et al. (2024) surveyed 470 Iranian flood survivors in the aftermath of the floods of 2019 using CRI and PCL-5 scales and reported a prevalence of PTSD of 12.8% - more common among women, older, married, less educated, and lower-income individuals - and described moderate association between maladaptive coping strategies and symptoms of PTSD, leading to the recommendations for screening and promotion of adaptive strategy. Coming in 2024, Karim et al. found that adverse consequences suffered in relation to victims or ameliorated in terms of loss between women, matched by a systematic PRISMA review of 17 studies conducted in Bangladesh, with PTSD, anxiety, depression, suicidal ideation, and sleep disorders identified among losses from disasters such as floods and erosion. The research pointed to socioeconomic, behavioral, demographic, and environmental risk factors and called for integrated mental health policies. Dziwornu and Kugbey (2015) made a comparison of 200 Ghanaian flood victims and 200 non-victims with various scales such as BSI, CSI, Brief RCOPE, SPSS. The analysis revealed that flood victims suffered significantly more psychological distress and maladaptive coping than the comparison group without much differential from social support or religiosity. Finally, Compas et al. (2014) integrated research theoretically regarding coping and emotion regulation across stages of development, realizing that adaptive coping itself is very often a reactive mechanism rather than an index of resilience.

Method

Aim

The aim of the study is to assess the effect of environmental quality of life on mental health and coping strategy in individuals affected by floods in Assam.

Research Questions

Is there any impact of environmental quality of life on mental health outcome, and coping strategies in individual affected by floods in assam?

Hypotheses

H01- There is no significant relationship between environmental quality of life and mental health among

the flood affected individuals in Assam.
H02- There is no significant relationship between adaptive coping strategies and mental health in flood affected individuals in Assam.
H03- There is no significant relationship between maladaptive coping strategies and mental health in flood affected individuals in Assam.
H04- There is no significant relationship between environmental quality of life and adaptive coping strategies in the context of flood affected areas in assam.
H05- There is no significant relationship between environmental quality of life and maladaptive coping strategies in the context of flood affected areas in assam.
H06- There is no significant relationship between adaptive coping strategies and maladaptive coping strategies among the flood affected individuals in Assam.
H07- There is no significant impact of environmental quality of life on mental health among the flood affected individuals in Assam.
H08- There is no significant impact of adaptive coping strategies on mental health in flood affected individuals in Assam.
H09- There is no significant impact of maladaptive coping strategies on mental health in flood affected individuals in Assam.
H010-There is no significant impact of environmental quality of life on adaptive coping strategies in the context of flood affected areas in Assam.
H011-There is no significant impact of environmental quality of life on maladaptive coping strategies in the context of flood affected areas in Assam.

Sample

The participants were selected using the purposive sampling method. Total 140 participants were there. Participants from different demographic backgrounds who have been directly affected by floods in Assam were brought for the study.

Inclusion Criteria

- Individuals above age of 18 and older.
- Individuals affected by flood in Assam.
- Individuals currently resident of Assam.

Exclusion Criteria

- Individuals considered uneducated.
- Individuals suffering from any kind of mental illness.

Tools for the Study

WHOQOL-BREF: The WHOQOL-BREF is a questionnaire for self-reporting that is intended to cover perceptions of an individual's quality of life in various domains. It has 26 items that are grouped into four broad areas: physical health, psychological health, social relationships, and environmental quality of life. The environmental component is concerned with issues like safety, housing conditions, financial resources, and access to health services. Such a measure considers how human beings experience their environment and the direct implications of their surroundings on their well-being.
DASS-21: The DASS-21 is a self-administered questionnaire developed by Sydney Lovibond and Peter Lovibond, which provides information regarding the frequency and severity with which individuals have

experienced negative emotions over the past few weeks. The whole scale comprises 21 items, distributed equally into three factors-namely depression, anxiety, and stress, with 7 items allocated for each factor.
Brief COPE: It was developed by Charles S. Carver a 28-item tool assesses adaptive and maladaptive coping strategies

Research Design and Statistical Technique

Quantitative research method was used in this study, which aimed at collecting and analyzing numerical data to answer research questions and then test some hypotheses. It adopted a correlational research design with regression analysis aimed at examining the relationships of the study's key variables: environmental quality of life (EQL), mental health, adaptive coping strategies, and maladaptive coping strategies.
Data collected were through structured questionnaires and then applied statistical methods for data analysis. Data analysis was through Jamovi statistical software. Descriptive statistics which included mean, median, and standard deviation were calculated for summarizing the collected data. In addition, further tests to show the relationships between these variables included parametric tests such as Pearson's Correlation Coefficient. Regression analysis was also done to test for prediction in relationships linking EQL to both adaptive and maladaptive coping strategies, as well as the outcome of mental health.

Results

Table 1: Table 1: Shows the sample size as N, Missing, Mean, Median, Standard deviation of the individuals affected by flood in Assam

Descriptives

	Environmental quality of life	Mental health (DASS)	Adaptive coping total	Maladaptive coping total
N	140	140	140	140
Missing	0	0	0	0
Mean	21.9	29.4	41.3	29.1
Median	20.0	34.5	43.0	33.0
Standard deviation	5.30	13.4	6.81	6.28

Tables 1 shows the results of the descriptive statistics show a mean score of 21.9 for Environmental Quality of Life (EQL) with a standard deviation of 5.30, indicating that the perceived environmental quality among the participants was moderate, with somewhat dispersed responses. The mean score for Mental Health (DASS) was 29.4 with a standard deviation of 13.4; this indicates that participants reported a wide range of mental health statuses, with higher numbers indicating greater distress. As regards the coping mechanisms, the adaptive coping score had a mean of 41.3 and a standard deviation of 6.81, indicating high engagement in adaptive coping strategies. In contrast, the maladaptive coping score reflects moderately less effective coping systems, with a mean of 29.1 and a standard deviation of 6.28.
Table 2: Correlation coefficient between environmental quality of life, mental health, adaptive coping

strategies and maladaptive coping strategies among individuals affected by flood in Assam.

		Environmental quality of life	Mental health (DASS)	Adaptive coping total	maladaptive coping total
Environmental quality of life	Pearson's r	—			
	df	—			
	p-value	—			
Mental health (DASS)	Pearson's r	-0.637	—		
	df	138	—		
	p-value	<.001	—		
Adaptive coping total	Pearson's r	-0.111	0.398	—	
	df	138	138	—	
	p-value	0.190	<.001	—	
maladaptive coping total	Pearson's r	-0.442	0.680	0.702	—
	df	138	138	138	—
	p-value	<.001	<.001	<.001	—

It was found that there was a very strong negative correlation between Environmental Quality of Life (EQL) and mental health ($r = -0.637$, $p < 0.001$), which indicates that better environments link with improved mental health; therefore, H01 was rejected. Adaptive coping was positively correlated with distress ($r = 0.398$, $p < 0.001$), which means that individuals might be under stress even when adopting healthy coping strategies; hence, H02 was rejected. Maladaptive coping was strongly correlated with adverse mental health outcomes ($r = 0.680$, $p < 0.001$), resulting in the rejection of H03. There was no significant relationship found between EQL and adaptive coping ($r = -0.111$, $p = 0.190$); therefore, H04 was fail to reject. However, maladaptive coping was lower when EQL was high ($r = -0.442$, $p < 0.001$), which led us to reject H05. A strong correlation between adaptive and maladaptive coping ($r = 0.702$, $p < 0.001$), indicates that individuals use both strategies concurrently, therefore H06 was rejected.

Table 3: Showing the impact of Environmental quality of life on Mental health among the flood

affected individuals in Assam.

Model Fit Measures

				Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**F**	**df1**	**df2**	**p**
1	0.637	0.406	0.401	94.2	1	138	<.001

Omnibus ANOVA Test

	Sum of Squares	**df**	**Mean Square**	**F**	**p**
Environmental quality of life	10051	1	10051	94.2	<.001
Residuals	14726	138	107		

Note. Type 3 sum of squares

Model Coefficients - Mental health (DASS)

Predictor	**Estimate**	**SE**	**t**	**p**	**Stand. Estimate**
Intercept	64.51	3.725	17.32	<.001	
Environmental quality of life	-1.60	0.165	-9.71	<.001	-0.637

According to the table 3 there is a 40.6% of the variation on mental health can be explained by environmental quality (R2 = 0.406, p < 0.001). The negative beta coefficient (-1.60, p < 0.001) verifies that mental health is considerably deteriorated by lower environmental quality. This validates H07, which states that there exists a strong inverse correlation between environmental quality of life (EQL) and mental health (DASS). As distress levels diminish when mental health outcomes are better along with environmental factors.

Table 4: Showing the impact of adaptive coping strategies on Mental health among flood affected individuals in Assam.

Model Fit Measures

				Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**F**	**df1**	**df2**	**p**
1	0.398	0.159	0.152	26.0	1	138	<.001

Note. Models estimated using sample size of N=140

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
Adaptive coping total	3929	1	3929	26.0	<.001
Residuals	20847	138	151		

Note. Type 3 sum of squares

Model Coefficients - Mental health (DASS)

Predictor	Estimate	SE	t	p	Stand.Estimate
Intercept	2.827	6.397	0.442	0.659	
Adaptive coping total	0.780	0.153	5.100	<.001	0.398

According to the table 4, it means 15.9% of mental health variance being accounted for by coping adaptively alone. There is a significant positive correlation between mental health and adaptive coping, $r = 0.398$, $R^2 = 0.159$, $p < .001$. This indicated that more use of adaptive coping mechanisms was related to worse mental health.

Table 5: Showing the impact of Maladaptive coping strategies on Mental health among the flood affected individuals in Assam.

Model Fit Measures

				Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**F**	**df1**	**df2**	**p**
1	0.680	0.462	0.459	119	1	138	<.001

Note. Models estimated using sample size of N=140

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
maladaptive coping total	11457	1	11457.3	119	<.001
Residuals	13319	138	96.5		

Note. Type 3 sum of squares

Model Coefficients - Mental health (DASS)

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	-12.76	3.955	-3.23	0.002	
maladaptive coping total	1.45	0.133	10.90	<.001	0.680

Table 5 shows 46.2% of mental health variance is accounted for by maladaptive coping styles (R2 = 0.462, $p < 0.001$). Greater dependence on maladaptive coping is linked with significantly poorer mental health status, as per a positive beta coefficient (1.45, $p < 0.001$). This aligns with H09, which asserts that maladaptive coping styles have a positive relationship with mental health (DASS). This would imply that higher levels of psychological distress exist for those who participate in avoidance, denial, or self-blaming.

Table 6: Showing the impact of Environmental quality of life on Adaptive coping strategies in the context of flood affected areas in Assam.

Model Fit Measures

				Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**F**	**df1**	**df2**	**p**
1	0.111	0.0124	0.00523	1.73	1	138	0.190

Note. Models estimated using sample size of N=140

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
Environmental quality of life	79.9	1	79.9	1.73	0.190
Residuals	6372.3	138	46.2		

Note. Type 3 sum of squares

Model Coefficients - Adaptive coping total

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	44.384	2.450	18.11	<.001	

Model Coefficients - Adaptive coping total

Predictor	Estimate	SE	t	p	Stand. Estimate
Environmental quality of life	-0.143	0.109	-1.32	0.190	-0.111

Table 6 shows 1.24% of the adaptive coping variation is accounted for by environmental quality (R2 = 0.0124, p = 0.190, not significant). The absence of a significant correlation between environmental quality and adaptive coping is reflected by a negative beta coefficient (-0.143, p = 0.190, not significant). This supports H010, which argues that adaptive coping strategies and environmental quality of life (EQL) are not significantly correlated. From this study, it seems that personal psychological traits as opposed to environmental variables could be the main motivators of adaptive coping.

Table 7: Showing the impact of Environmental quality of life on Maladaptive coping strategies in the context of flood affected areas in Assam.

Model Fit Measures

				Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**F**	**df1**	**df2**	**p**
1	0.442	0.196	0.190	33.5	1	138	<.001

Note. Models estimated using sample size of N=140

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
Environmental quality of life	1072	1	1071.7	33.5	<.001
Residuals	4409	138	31.9		

Note. Type 3 sum of squares

Model Coefficients - maladaptive coping total

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	40.612	2.0382	19.93	<.001	
Environmental quality of life	-0.524	0.0905	-5.79	<.001	-0.442

Table 7 shows, 19.6% of the maladaptive coping variance is explained by environmental quality (R2 = 0.196, p < 0.001). Environmental quality is negatively related to dependence on maladaptive coping mechanisms, as the negative beta coefficient (-0.524, p < 0.001) indicates. This supports H011, which states that maladaptive coping mechanisms are negatively associated with EQL. This would indicate that because they experience greater stress and fewer problem-solving opportunities, individuals in less supportive environments will be more likely to use avoidance or self-blame.

Discussion

The examination of environmental quality of life (EQL) in this study may include coping strategies together with their resultant effects in terms of mental health (as captured by DASS scores) among flood-affected individuals from Assam. Pearson correlations and regression analyses significantly imported patterns that sharpen the lens about how environmental and psychological factors interact in post-disaster scenarios.

Environmental Quality of Life and Mental Health

A strong negative correlation has been found between EQL and mental health which means that poor environmental conditions lead to the development of stress, anxiety, and depression among flood victims. This is in line with Bronfenbrenner's Ecological Systems Theory which states that disturbed environments- dominated by unsafe housing, contaminated water, or noise- lead to worsening mental health. This concurs with findings by earlier studies (Basistha et al., 2024; Silva et al., 2022) who had discovered similar outcomes among flood survivors in Brazil and Assam, respectively. Further regression analyses have shown that EQL predicted 40.6% variance in mental health scores.

Coping Strategies and Mental Health

Adaptive coping skills are positively correlated with poor mental health meaning that people with higher distress may be actively using such coping strategies as planning or seeking support in reaction to their overwhelming emotions. This is further reaffirmed by previous studies (Compas et al., 2014; Bastami et al., 2024) that adaptive coping does not provide all-time defense to one's mental health where chronic stress prevails along with systemic support. Regression analysis proved adaptive coping by 15.9% of variance in mental health but not a significant one: hence predictor.There was also a strong positive correlation between maladaptive coping and poor mental health while predicting 46.2% variance. Denial, substance use, self-blame, these were types of currently related causes with increased depression, anxiety, and PTSD as evidenced by earlier findings (Asim et al., 2022; Karim et al., 2024). These maladaptive coping styles would likely be dangerous to the specific vulnerable groups that lack resources most in their environment.

Environmental Quality and Coping

The link between EQL and adaptive coping was weak and non-significant, supporting studies (Basistha et al., 2024), who found resilience was not strongly influenced by environmental factors. However, a moderate negative correlation was found between EQL and maladaptive coping, with regression showing EQL explained 19.6% of the variance in maladaptive coping. Poor living conditions may contribute to unhealthy coping due to chronic stress and a lack of support. (Bastami et al., 2024; Deka and Dutta, 2024)

Coping Flexibility

While the degree of adaptive coping correlates negatively with maladaptive coping, proportionately, the degree of negative correlations does not determine a zero-sum situation because individuals often adopt both styles of coping. Adaptive coping predicted 49.3% of the variance in maladaptive coping, demonstrating the complexity and fluidity of the behavior of coping. This furthers the argument of coping flexibility, and it suggests intervention procedures that encourage adaptive coping while discouraging maladaptive coping, especially in times of prolonged crisis. (Dziwornu and Kugbey,2015)

Conclusion

The results have found that there are strong correlations between mental health, coping strategies, and environmental quality of life for flood victims. Improvement of living conditions with encouragement of adaptive coping mechanisms while forbidding maladaptive responses will alleviate psychological distress to a large extent.

Limitations

The small sample size of the study (N = 140) restricts the generalizability of the findings among the large populations of flood victims. The use of standardized psychological and coping measures that were not culturally or linguistically adapted to the Assamese context may have hampered accurate and relevant responses from participants. Finally, the fact that this was a cross-sectional study limits conclusions about causality or change over time.

Recommendations for Future Research

Longitudinal designs should be adopted for future research to capture transformations in coping and mental health across time. Culturally relevant coping tools must be developed that conform to Assamese practices. Further, an in-depth investigation into the contribution of institutional and community support systems, such as disaster response organizations, NGOs, and local governance, on psychological outcomes, is warranted, as is an examination of the role of social factors in assessing vulnerability and resilience, including gender, caste, and education.

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