RESEARCH PAPER

Post-Traumatic Stress Disorder Among Flood-Affected Population Residing at Dadu

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ABSTRACT

Background: Flood is one of the most destructive natural disaster in the world. Floods have significant negative effects on people's physical, social, economic, and psychological well-being. Over the past few decades, floods have frequently occurred in Pakistan. Millions of people were severely affected, especially in Sindh Province. The population of Tehsil Johi in District Dadu faces severe risks from climate-related disasters, yet studies have not explored how these disasters affect their mental health over time.

Objective: The study aimed to determine the the post-traumatic stress disorder (PTSD) among the flood affected population residing in tehsil Johi district Dadu, Sindh.

Methods: A descriptive cross-sectional study was conducted at the flood affected areas of tehsil Johi, district Dadu, Sindh, from November 2024 to April 2025. A total of 341 flood affected population were recruited, aged at least 18 years old, lived in the area during the most recent flood event and were willing to participate, using a non-probability purposive sampling method. Data was collected using a semi structured and structured questionnaire covering demographics characteristics, flood related experiences, and PTSD assessment. PTSD was evaluated using PCL-5. Data was analyzed using SPSS v24, with descriptive statistics presented as frequencies, percentages and mean ± SD, and inferential analysis performed using the Chi-square test, t-test and Anova test. A p-value of <0.05 was considered significant.

Results: The majority of participants were aged 31–45 years (42.5%). Most of the participants were female gender (53%), having low monthly income (55.7%) and were literate (64.8%). (81.8%) participant reported Displacement as most traumatic experience. A significant portion of the participants (71.8%) suffered property loss, and (61.6%) faced acute food insecurity. Poor housing condition were found as the significant risk factors for PTSD ($p<0.001$). Notably, homeowners exhibited significantly higher PTSD rates than renters ($p=0.042$), larger family size shows higher PTSD than smaller ($p<0.005$), and also long-term residents (>20 years) showed a greater PTSD compared to short-term residents ($p<0.001$).

Conclusion: Floods affected population showed significantly PTSD, that highlighting the need for preventive programs, particularly for vulnerable and economically disadvantaged population.

Keywords: Flood, Disaster, PTSD

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INTRODUCTION

Floods are one of the most common devastating natural disasters, affecting millions of people in world, causing widespread damage, economic loss, and disruption of livelihoods. People suffer from many consequences after a flood, such as the loss of possessions or properties, family relocation, the death of a loved one, shortage of food or a lack of social support. Beyond the physical consequences, all of these factors increased the psychological susceptibility of the victims.[1-2]

Floods have been identified as a major burden internationally and on national level as well. Globally, World Health Organization (WHO) estimates about 30-50% of the disaster affected population suffer from diverse psychological distresses.[3-4] Flood in Jammu Kashmir, Gujrat, Kerala India reported PTSD were most common psychological effect among flood affected population almost 70%. Notably, the following characteristics may predispose people to PTSD: extreme age (elderly and children), female gender, socioeconomic position, pre-existing mental health conditions, and financial difficulties after a tragedy.[5]A study of United Kingdom reported that disaster has great impact on the victim's mental health. 21.35% suffered from depression, 19.8% had anxiety and 30.36% found with PTSD. In 2020, global analysis reported 20% of flood victims had depression, 28.3% had anxiety and 36% found with PTSD.[6--7] Globally, PTSD is on the most common psychiatric illness following a disaster.[3]

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National studies have also been conducted to assess the psychological impact among flood affected population. Pakistan, due to its geographical and climatic conditions, is highly susceptible to flood. 2022 flood has significant impact on socio-economic and health status of people residing in flood-stricken area of Pakistan. 40% people became homeless, 48.7% lost their income earning sources,83.4% found with illness or disability, 22.6% subject expressed difficulty in accessing food.[8-9] Flood of 2010 revealed a notable prevalence of severe PTSD (59.2%) among the flood affected population in Sindh.[10] In a recent study at Dera Ghazi Khan, PTSD was as common as 28.2% among flood sufferer.[11] Humatarian interventions focus on food security, shelters, and communicable diseases while psychological health of flood population receive less attention.

Therefore, this study helps in determining the factors associated with PTSD among flood affected population, which helps in developing and implementing effective strategies to increase psychological support for vulnerable population.

OBJECTIVE

1. To assess the factors associated with PTSD among the flood affected population residing in tehsil Johi district Dadu, Sindh.

MATERIAL & METHODS

This descriptive cross-sectional study was carried out at the Flood affected regions of Tehsil Johi of Dadu district, Sindh, during the period of November 2024 to April 2025. The study population consist of population residing in Tehsil Johi in Dadu district affected by flood. The sample size was calculated using the prevalence of PTSD among flood sufferer 28.2%, with a 95% confidence interval and 5% margin of error, resulting in 310, which was increased to 341 after adding 10% to account for non-respondents. A non-probability purposive sampling technique was applied for selection of participants. Inclusion criteria were adults aged 18 years or older, residents of flood affected regions of Tehsil Johi, lived in the area during the most recent flood event, and who were willing to participate by providing informed written consent. Participants diagnosed with a mental health disorder prior to the floods or active substance abuse issues or who refused to participate were excluded from the study.

Data was collected using a semi structured and structured questionnaire, which was administered by the researcher directly to ensure accuracy and maintain strict privacy. The questionnaire had two main sections: the first captured demographic and background details such as age, gender, income, housing type, housing details, about family etc and disaster related exposure including; displacement history and traumatic losses due to flood were recorded in the semi-structured questionnaire, while second asses the PTSD. Post-traumatic disorder (PTSD) was evaluated using the Post-traumatic stress disorder checklist (PCL-5).[12]The questionnaire was prepared in English and translated into the local language to facilitate better understanding and participation.

All collected data was coded and entered into Microsoft Excel before being analyzed with the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics including frequencies, percentages, mean ± SD and graphical presentations (bar and pie charts) were used to summarize demographic, categorical and quantitative variables. Inferential analysis was performed using the Chi-square test, t-test and ANOVA test. A p-value less than 0.05 was considered statistically significant.

RESULTS

Table 1 summarizes the demographic characteristics of the study participants. The majority of respondents were female (n=181; 53%) compared to their counterparts (n=160; 47.0%) and the most frequent age was within the 31–45 years age, comprising 42.5% while the smallest proportion was observed in the 46 and above years group, which represented only 25.2%.

In terms of educational status, a larger proportion of participants were literate, constituting 64.8% (n=221), while 35.2% (n=120) were illiterate.

With respect to socio-economic status (SES), more than half of the participants (55.7%, n=190) fall in the very low monthly income category of <15,000 PKR, followed by 30.8% (n=105) in the middle income category of 15,000-30,000 PKR, and only 13.5% (n=46) earning >30,000 PKR monthly. This indicates that the study population was largely drawn from economically disadvantaged groups.

Table 1: Socio-Demographic Characteristics of the Study Population (n=341)

Variable	Frequency	Percentage **(%)**
Gender		
Male	160	47.0
Female	181	53.0
Age Group (Years)		
18–30	110	32.3
31–45	145	42.5
46 and above	86	25.2
Education Level		
Illiterate	120	35.2
Literate	221	64.8
Monthly Income (PKR)		

< 15,000	190	55.7
15,000 – 30,000	105	30.8
Above 30,000	46	13.5

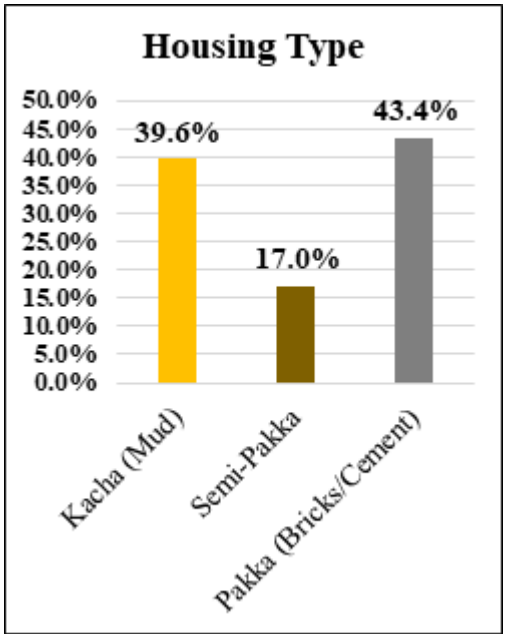

Figure 1: Distribution of type of Housing reported by Participants (n=341)

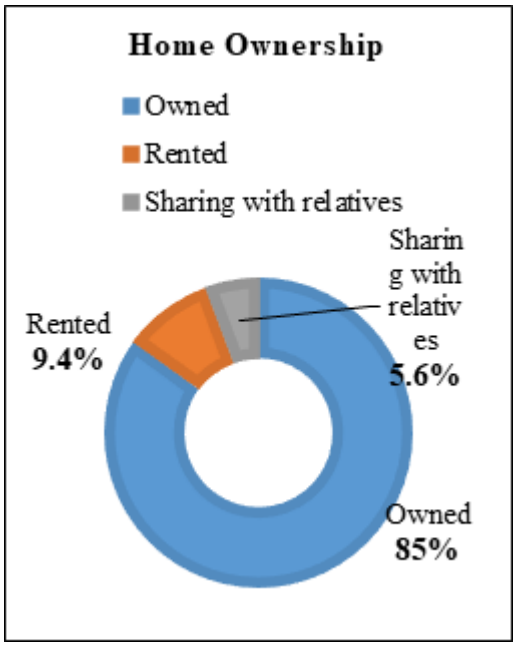

Figure 2: Home ownership status of the participants (n=341)

Figure 1 is presenting the distribution of housing type in which participants reported to live at the time of flood. Majority (n=148; 43.4%) participants reported that they were living in Pakka (brick/cement) houses followed by Kacha (Mud) houses (n=135; 39.6%) and n=58; 17.0% were living in Semi-Pakka houses.

Figure 2 According to the participants, over two-thirds (n=290; 85.0%) were owner of the houses they were living, whereas, n=32; 9.4% were living on the rental basis and n=19; 5.6% were living in sharing with their relatives.

Table 2: Frequency of Traumatic Experiences During Floods

Traumatic Experience	**Yes**	**No**
	n (%)	**n (%)**
Displacement from home	279 (81.8%)	62 (18.2%)

Loss of property/belongings	245 (71.8%)	96 (28.2%)
Food Insecurity	210 (61.6%)	131 (38.4%)
Livelihood Disruption	195 (57.2%)	146 (42.8%)
Death of a family member/friend	45 (13.2%)	296 (86.8%)

Table 2 highlights the traumatic experience of the participants. Displacement was the most common trauma as majority of participants (n=279; 81.8%) reported it as their most traumatic experience. A significant portion of the participants (n=245; 71.8%) suffered property loss, and n=210; 61.6% faced acute food insecurity, which are primary stressors for psychological distress.

Table 3: PTSD among Flood affected population According to Family Size, Housing type and Length of Residence

Variable	Category	Mean	Std.D	p-Value
Family Size	**Small Family (≤6)**	28.4	9.2	0.049
	Large Family (>6)	32.1	10.5	
Housing Type	**Kacha (Mud)**	38.5	10.2	<0.001
	Semi-Pakka	30.2	8.5	
	Pakka (Brick)	22.4	6.1	
Length of Residence	**Long-term (>20 yrs)**	38.6	11.2	<0.001
	Short-term (≤20 yrs)	24.2	8.5	

Table 3 showing the comparative analysis of PTSD score according to the family size. As the findings revealed that the participants with large families (>6 persons) showed a significantly higher mean scores for PTSD (32.5±10.5) compared to those with small family (28.4±9.2). Statistical analysis showed significant association between family size and PTSD prevalence ($p<0.05$).

The findings of housing type revealed that housing stability is a major determinant of psychological distress. Participants residing in "Kacha" (mud) houses showed a higher mean scores on PTSD scales (38.5±10.2) compared to those residing in "Pakka" houses (22.4±6.1). The p-value (<0.001) suggests statistical significance.

The findings of residence revealed that participants residing for long term (> 20 years) in the study site had significantly higher PTSD (PCL-5) mean scores (38.6±11.2) compared to those residing for a shorter duration (≤ 20 years) 24.2±8.5) while $p<0.05$ indicate statistical significance.

Table 4: Association between Pre-Flood Home Ownership and PTSD Status

Ownership Status (Pre-Flood)	PTSD Positive (n=96)	PTSD Negative (n=245)	Total (n=341)	p-value
Homeowners	88 (30.3%)	202 (69.7%)	290	**0.042***
Renters / Others	8 (15.7%)	43 (84.3%)	51	

The findings of the home ownership showed homeowners suffer more compared to the renters/others. A higher prevalence of PTSD (30.3%) among the homeowners compared to renters (15.7%) with a statistically significant association ($p<0.05$).

DISCUSSION

Flood-affected populations experience severe psychological effects, which frequently result in serious mental health problems like depression, PTSD. According to the studies, these disorders may continue long after the initial catastrophe, requiring focused mental health treatments.[13] Present study has been conducted to assess the PTSD among flood affected population.

Total 341 participants from the flood effected areas of Dadu, tehsil Johi were part of this study. Most common age group lies in between 31-45 with 42.5% while the smallest group in between 46 and above years with 25.2%. Educational background show 64.8% were literate women and the remaining 35.2% were illiterate. On the basis of housing type majority of participants 43.4% reported that they were living in Pakka (brick/cement) houses followed by Kacha (Mud) houses 39.6% and 17.0% were living in Semi-Pakka houses. According to the ownership of participants, over two-thirds 85.0% were owner of the houses, whereas 9.4% were living on the rental basis and 5.6% were living in sharing with their relatives. Displacement was the most common trauma as majority of participants (n=279; 81.8%) reported it as their most traumatic experience. A significant portion of the participants (n=245; 71.8%) suffered property loss, and n=210; 61.6% faced acute food insecurity, which are primary stressors for psychological distress. PTSD were observed among 28.2% of the participants.

This study found out that the participants with large families (>6 persons) showed a significantly higher mean scores for PTSD (32.5±10.5) compared to those with small family (28.4±9.2). According to a study of Bangladesh reported that family consisting of more than 7 persons are more prone to severe mental health symptoms which is

around 32.86% than the family having less than 7 person. People living in flood prone area always live stressed life due to fear of loss life, livelihood, unable to feed family deepen their level of stress. Larger households may face more financial hardship, overcrowding, and caregiving obligations, which can lead to increased emotional stress.[15—16]

On the basis of housing stability this study found out that housing stability is a major determinant of psychological distress. Participants residing in "Kacha" (mud) houses showed a statistically significantly higher psychological distress ($p<0.001$) with higher mean scores on PTSD scales 38.5 (±10.2) compared to those residing in "Pakka" houses 22.4 (±6.1). One of the study conducted in South of England showed that PTSD was more common among those who reported persistent home damage compare to those who didn't reported persistent home damage while the p value indicate statistically significant ($p<0.002$).[14] Another study conducted in Canada reported that participants whose home damage because of flood having more PTSD 88.9% compared to others 36.8% while p value indicate statistically significant ($p<0.01$).[17]

The findings of this study revealed that participants residing for long term (> 20 years) in the study site had significantly higher PTSD mean scores (38.6±11.2) compared to those residing for a shorter duration (≤ 20 years) (24.2±8.5) while the $p<0.05$ indicate statistically significance. One of the study conduct in Bongaigaon district of Assam in India showed participants residing for longer time significantly higher PTSD compare to those residing for shorter duration) while the $p<0.05$ showed statistically significance.[18]

This study found out that homeowners suffer more compared to the renters/others. A higher prevalence of PTSD (30.3%) among the homeowners compared to renters (15.7%) with a statistically significant association ($p<0.05$). One of the study conducted in Canada revealed that participants having own home and damage due to flood having more PTSD 40% compare to renters 38.2%.[17]

Housing type, ownership and longer residence are important predictors of mental health. Individuals who lived in kacha (mud) house, living for longer duration and having ownership had greater rates of PTSD, compared to those people who lived in permanent structures, for lesser duration and in rental house,. Losing houses and shifting to camps for shelter increase susceptibility for mental health. Mud homes are especially susceptible to flood damage which raises the possibility of recurrent relocation and financial loss in the event of subsequent calamities. Therefore, strengthening resilient housing infrastructure may help to improve mental health outcomes in addition to reducing the chance of disaster.

CONCLUSION

The study's findings demonstrate that factors such as female gender, poor household income, displacement, bigger family size, longer duration resident, house owners and vulnerable housing situation have significant effect on mental health of flood affected population. These insights fulfill the research objectives by identifying factors causing PTSD among flood affected population and providing a basis for developing strategies to improve mental health services.

REFERENCES

1. Twiddy M, Trump B, Ramsden S. Understanding the long-term impact of flooding on the wellbeing of residents: A mixed methods study. PLoS one. 2022 Sep 22;17(9):e0274890.
2. Ao Y, Bahmani H. Flood-Prone Rural China: Famers' Livelihood Capital and Strategy Choices. InNavigating Complexity: Understanding Human Responses to Multifaceted Disasters 2023 Nov 28 (pp. 71-99). Singapore: Springer Nature Singapore.
3. Cvetković VM, Renner R, Aleksova B, Lukić T. Geospatial and temporal patterns of natural and man-made (technological) disasters (1900–2024): insights from different socio-economic and demographic perspectives. Applied Sciences. 2024 Sep 10;14(18):8129.
4. Marthoenis M. Public Health, Community Resilience, and Psychosocial Recovery after the 2025 Sumatra Floods and Landslides. Asian Journal of Public Health and Nursing. 2025 Dec 30;2(3):1-3.
5. Dar T, Aziz K. Assessment and Management of Flash Floods in the India Himalayas: Challenges, Strategies, and Solutions. Water Resources Management in Mountain Regions. 2025 Apr 1:301-17.
6. Cruz J, White PC, Bell A, Coventry PA. Effect of extreme weather events on mental health: a narrative synthesis and meta-analysis for the UK. International journal of environmental research and public health. 2020 Nov;17(22):8581.
7. Minakshi PC, Kumar R. Mental Health Problems in Wake of Disaster: A Gendered Perspective. Rupkatha Journal on Interdisciplinary Studies in Humanities. 2020;12(1):1-2.
8. Yousuf J, Mehmood H, Aquil S, Rija A, Rahmat ZS, Malikzai A. Effects of floods on the mental health of Pakistanis: a commentary. Annals of Medicine and Surgery. 2023 May 1;85(5):2253-5.
9. Ullah W, Dong H, Shah AA, Xu C, Alotaibi BA. Unveiling the Multi-Dimensional Vulnerabilities of Flood-Affected Communities in Khyber Pakhtunkhwa, Pakistan. Water. 2025;17(2):198.
10. Bhutto S, Khoso AR, Jintu G, Suyuhan W, Akhtar F. QUANTIFYING THE HUMAN HEALTH BURDEN OF FLOOD DISASTERS: AN EMPIRICAL ANALYSIS FROM SHAHDADKOT, SINDH PROVINCE OF PAKISTAN. Journal of Media Horizons. 2025;6(3):1484-95.

11. Khan SA. A Sociological Study of the Health Problems of the Rural Area of Dera Ghazi Khan. Al Khadim Research Journal of Islamic Culture and Civilization. 2025 Mar 31;6(1):93-100.

12. Holman H, Eggert K, Xiong Y, Nietert PJ, Sidles SJ, Kelly RR, LaRue AC, Mulholland PJ, Rinker JA, Jones JA. Development of a novel analysis method for evaluating PTSD-like behavior in mice based on DSM-V criteria. Stress. 2026 Dec 31;29(1):2612332.

13. Klör T, Bubeck P, Bell R, Thieken AH. Factors Influencing Mental Burden Caused by Flooding: Insights from the 2021 Flood in the Ahr Valley (Germany). Journal of Flood Risk Management. 2025 Dec;18(4):e70116.

14. Mulchandani R, Armstrong B, Beck CR, Waite TD, Amlôt R, Kovats S, Leonardi G, Rubin GJ, Oliver I. The English National Cohort Study of Flooding & Health: psychological morbidity at three years of follow up. BMC public health. 2020 Mar 30;20(1):321.

15. Rahman MM, Shobuj IA, Alam S, Sadia AM, Khanam S, Hossain MT, Alam E. The unforeseen tide: exploring mental health impacts of the 2024 flash flood in Bangladesh. BMC Public Health. 2025 Aug 11;25(1):2728.

16. Cvetković VM, Ivković T. Social Resilience to Flood Disasters: Demographic, Socio-economic and Psychological Factors of Impact. Academic Perspective Procedia. 2022 Nov 1;5(2):299-317.

17. Mao W, Eboreime E, Shalaby R, Nkire N, Agyapong B, Pazderka H, Obuobi-Donkor G, Adu M, Owusu E, Oluwasina F, Zhang Y. One year after the flood: prevalence and correlates of post-traumatic stress disorder among residents in Fort McMurray. Behavioral Sciences. 2022 Mar 2;12(3):69.

18. Borah G, Saikia N. Effect of ‘losses’ and other secondary stressors on the association between flooding and psychological health outcomes: A cross-sectional study in Bongaigaon District, India. Journal of Biosocial Science. 2025 May;57(3):400-28.