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Research Paper

Prevalence of post-traumatic stress disorder and its relationship with coping strategies among flood victims: Evidence from Iran

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ABSTRACT

Introduction: Post-traumatic stress disorder (PTSD) is a prevalent and highly debilitating mental disorder that often occurs following accidents and natural disasters. This study aimed to assess the prevalence of PTSD among flood victims in Lorestan, Iran and examine its relationship with coping strategies.

Methods: This descriptive-analytical study included 470 flood victims in Lorestan, Iran within the first year after the flood in 2019. Participants were selected through simple random sampling. The research utilized the PTSD checklist and coping strategies questionnaire as data collection instruments. Data analysis involved independent *t*-tests, one-way analysis of variance, and the Pearson correlation coefficient, with a significance level of 0.05, using SPSS software version 22.

Results: The prevalence of PTSD among flood victims in Lorestan, Iran was found to be 12.8 %. Women, individuals over 35 years old, those with an education level below high school, married individuals, and people with low income exhibited higher PTSD prevalence and average total coping strategies scores. Passive coping strategies ($r = 0.267$, $p < 0.001$), social coping strategies ($r = 0.148$, $p = 0.004$), and the overall coping score ($r = 0.153$, $p = 0.003$) demonstrated a direct and significant correlation with the average PTSD score.

Conclusion: This study highlights the prevalence of post-traumatic stress disorder (PTSD) among flood survivors, especially among vulnerable groups such as the elderly, women, and those with low socio-economic status. To enhance post-disaster adaptation, support organizations should implement various strategies including resilience-building, mental health awareness campaigns, and improved access to healthcare services. Effective screening and promoting positive coping strategies are crucial for supporting survivors' psychological well-being.

1. Introduction

Floods, being the most prevalent natural disasters globally, have caused the deaths of 53,000 people in the past decade alone (Alderman et al., 2012; Doocy et al., 2013). Iran, among the top 10 countries prone to disasters globally, experiences over 30 out of 40 identified natural disasters within its borders, including frequent and damaging floods and earthquake (Merati et al., 2018).

Floods profoundly impact people's daily lives, affecting their quality of life in various ways (Othman et al., 2016). In addition to economic losses, floods give rise to a wide range of social issues and psychological disorders among affected individuals, including anxiety, depression, and post-traumatic stress disorder (Ahern et al., 2005; Mason et al., 2010).

PTSD is the most prevalent and debilitating mental disorder that arises following a flood (American Psychiatric Association and Association, 2013; Norris et al., 2002). The Diagnostic and Statistical Manual of Mental Disorders (DSM) introduced PTSD for the first time in 1980, defining it as a complex and chronic disorder triggered by extraordinary threats or catastrophic events (Breslau et al., 2004; Kessler, 2000; Roberts et al., 2015; Sijbrandij et al., 2015). In a global context, a meta-analysis reported a combined PTSD prevalence of 17.52 %. Meanwhile, a systematic review and meta-analysis indicated a

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prevalence of 49.2 % for PTSD following earthquakes in Iran. These findings underscore the severe impact of natural disasters on individuals' daily lives and societies, leading to the emergence of social and psychological disorders, including PTSD (Hosseinnejad et al., 2022; Yunitri et al., 2022) individuals with PTSD may face a prolonged recovery process following a traumatic event, with approximately 10 % of patients experiencing long-term psychological impacts and being diagnosed with chronic PTSD (Zhang, 2008). Research has shown that PTSD often leads to other mental health problems such as depression, anxiety, and substance abuse disorders (Fernandez et al., 2015). Moreover, individuals with PTSD frequently seek help from general practitioners and utilize healthcare services more frequently, placing a significant burden on the healthcare delivery system (Greene et al., 2016). They are also at a higher risk of developing non-psychiatric illnesses compared to those without PTSD, even when controlling for factors such as age, socioeconomic status, and major depression (Kimerling, 2004).

In an umbrella review study, the results showed that the identified risk factors for PTSD are sociodemographic factors such as being female or belonging to the indigenous people of the Americas. Pretrauma factors associated with PTSD include a history of physical illness and a family history of psychiatric disorders. Additionally, peritrauma factors, such as cumulative exposure to potentially traumatic experiences, trauma severity, and being trapped during an earthquake, have shown convincing or highly suggestive evidence of an association with PTSD (Tortella-Feliu et al., 2019). individuals exhibit varied responses to accidents and crises, with some demonstrating resilience through effective coping mechanisms (Agaibi and Wilson, 2005; Tedeschi and Calhoun, 2004).

Coping is explained as a person's use of cognitive and behavioral strategies to moderate unfavorable aspects of their environment, as well as to minimize or escape from internal threats caused by stress or trauma (Thompson et al., 2018; Weinberg et al., 2014) styles can be classified into problem-focused coping (e.g., dealing with stress sources and taking proactive steps to change them) and emotion-focused coping (e.g., regulating one's emotions to reduce stress) (Wu et al., 2013).

While coping and adaptation to crises and incidents have received considerable attention, there is still limited understanding of coping response patterns and how these patterns vary in response to different types of trauma. It is crucial to identify effective coping strategies and adaptive response patterns to guide clinical practices and policymaking (Cleveland et al., 2022). This can lead to the implementation of more cost-effective measures aimed at protecting the majority of the population from adverse psychological consequences (Li, 2020). In March 2019, the provinces of Khuzestan, Lorestan, and Golestan in Iran faced a severe flood crisis (Yavarian et al., 2019). Lorestan, Iran in particular, experiences annual flooding due to heavy rainfall, resulting in significant human and financial losses. During the 2019 flood, Lorestan, Iran suffered more severe damage compared to other affected provinces in Iran. The flood in Lorestan province in 2019 resulted in 15 fatalities and 256 injuries. The counties of Pol-e Dokhtar and Mamulan experienced the heaviest rainfall and the onset of flooding in Loresta.The cities of Poledokhtar and Mamoullan, located along the path of the Kashkan River, were particularly devastated (Hamidi Farahani et al., 2019). The water level in Pol-e Dokhtar and Mamulan had reached the rooftops of houses. According to initial estimates, the damage incurred in Pol-e Dokhtar County in various locations was approximately 2 billion Tomans.Widespread flooding and landslides severed many roads, disrupted traffic and communication, and resulted in the loss of clean water. The main railway line connecting Tehran to southern Iran was also blocked due to the flood. The airport in Khorramabad experienced flooding, and the air route from Lorestan to other parts of Iran was cut off.

In a study conducted in 2023, the results indicated that the prevalence of psychological distress and depression among Iranian flood survivors in 2019 was 33.6 % and 23 %, respectively (Tiyuri et al., 2023). Despite the repeated occurrence of such major disasters, no study has been conducted to investigate the psychological complications and prevalence of PTSD in these areas. Obtaining essential information about the epidemiology of PTSD following floods, the most common psychological disorder in these situations, not only contributes to existing knowledge but also serves as a foundation for estimating the severity of psychological complications. Furthermore, it provides a basis for the provision of effective services to flood victims and individuals affected by other crises. Therefore, the aim of this study is to determine the prevalence of PTSD following the flood in Lorestan, Iran, and explore its relationship with coping strategies among flood victims.

2. Methods

2.1. Study design

This descriptive-analytical study was conducted in 2020 among flood victims residing in Lorestan, Iran during the first year after the flood (2019 March 24). Previous studies have shown that PTSD can last from 6 months to 30 years, and even throughout a person's lifetime (American Psychiatric Association, 2013; Y, 2013).

2.2. Participants

The study population consisted of flood victims from the cities of Poledokhtar and Mamoulan in 2019. The inclusion criteria were being a resident of Poledokhtar or Mamoulan citie at the time of flood, being literate, and being over 18 years of age. Exclusion criteria included pre-existing chronic physical illnesses (according to clinical interview) unwillingness to continue participation and incomplete questionnaires. Additionally, in this study, individuals with pre-existing psychiatric conditions who were undergoing psychological treatment and receiving psychological services were excluded to mitigate potential confounding variables.

2.3. Sampling method and sample size

The participants were selected using a simple random sampling method. The list of flood victims from the 2019 flood in the mentioned cities was obtained from the Red Crescent Department of Lorestan, Iran. The samples were randomly selected from the list of flood victims, taking into account the population of each city. The researcher, accompanied by a mental health expert, conducted home visits to individuals affected by the flood. To mitigate recall bias and social desirability bias inherent in self-report methods, interviews were employed as the preferred approach for completing the questionnaires.

The sample size was determined based on a study by Eivazi et al. with an α level of 0.05 (Eivazi et al., 2017). The prevalence of PTSD was reported as 57.1 %, with a desired accuracy of 0.05. Based on these parameters, the sample size was estimated as 376. It was estimated that there was 25 % drop out in the samples due to flood conditions. Therefore the final sample size was estimated as 470.

2.4. Research instruments

The data collection tools comprised three sections. The first section included a questionnaire on demographic characteristics, encompassing age, gender, education, occupation, income, and type of injury. The second section incorporated The Post-Traumatic Stress Disorder Checklist, and the third section involved the Coping Responses Inventory.

The Post-Traumatic Stress Disorder Checklist (DSM-5 PCL-5): This self-report scale is used for diagnosing PTSD. The scale is brief, taking approximately 10 min to complete. It consists of 20 items based on DSM-5 diagnostic criteria, with 5 items related to avoidance of stimuli, 7 items related to negative changes in cognition and mood, and 6 items related to arousal and reactivity. Scores range from 0 to 80, which is obtained by summing the scores of 20 criteria based on the

Likert scale (not at all = zero, very little = 1, moderate = 2, much = 3 and very much = 4) (Adhikari Baral and KC, 2019; Blevins et al., 2015; Jia et al., 2010). The validity of this questionnaire was confirmed in a study by Sadeghi et al. (Sadeghi et al., 2016), and its reliability was satisfactory with a Cronbach's alpha of 0.79 and test-retest method (r = 0.77) in a sample of 30 participants.

Coping Responses Inventory (CRI): This questionnaire consists of 41 items divided into 5 subgroups: religious coping, passive coping, active coping, social coping, and self-distraction coping (Adhikari Baral and KC, 2019).

The CRI scale was translated from English to Farsi by two bilingual individuals, and the translations were combined to obtain a final translation. The final translation was then re-translated into English by two other bilingual individuals who were not involved in the initial translation.

2.5. Validity and reliability of the questionnaires

To assess the content validity quantitatively, the modified questionnaire was sent to 10 experts who were asked to rate each question as "necessary," "not necessary but useful," or "not necessary." The content validity ratios (CVR) were calculated based on Lawshe's table, and items with CVR values higher than 0.62 were retained. The same 10 experts were also asked to rate the relevance, simplicity, and clarity of each item using a four-point Likert scale. Items with content validity index (CVI) scores below 0.79 were discarded.

2.6. Data analysis and statistical tests

Descriptive statistics were used to describe the data, including measures of central tendency and dispersion for quantitative variables, and frequency and percentage for qualitative variables. The normality of data distribution was assessed using the Kolmogorov-Smirnov test, and since the data were found to be normally distributed, independent t-tests, analysis of variance (ANOVA), and Pearson's correlation coefficient were used for data analysis. All statistical tests were two-tailed and performed using SPSS software version 22. A significance level of $P < 0.05$ was set.

2.7. Ethical considerations

This study was conducted after obtaining permission from the ethics committee of Lorestan University of Medical Sciences with the ethics code IR.ZAUMS.REC.1400.052. The objectives of the study were explained to the participants, and their participation was voluntary with informed consent. Participants were assured of the confidentiality of their information, and data were recorded and analyzed without any reference to individual identities. The results will only be used for the purpose of this research and will not be shared with other organizations. It should be noted that the aim of this study was to screen individuals affected by the flood for symptoms of PTSD and not to provide a diagnosis, which should be done by psychiatrists. The questionnaires were completed by a mental health expert through clinical interviews. Participants displaying PTSD symptoms, as identified by the mental health experts, were referred to a psychiatrist for further evaluation and treatment.

3. Results

Among the 374 participants, 48 individuals (12.8 %) were found to have PTSD. The distribution of demographic variables among the study participants is presented in Table 1. Gender distribution was evenly split, with 50 % men and 50 % women. The majority of participants were housewives (41.7 %) and married (75.1 %). The most common type of damage reported was related to residential buildings and household appliances and utensils (71.1 %), while the least common type of damage was associated with shops and stores (8.3 %). The education level of most participants was at or below the high school diploma level.

Table 1
Demographic variables of study population and their correlation with PTSD (N = 374).

demographic variables		N(%)	PTSD score (mean ± SD)	P-value[1]
Gender	Male	187(50)	13.64 ± 29.28	0.029
	Female	187(50)	33.90 ± 35.13	
Age	<35	174	14.86 ± 27.83	0.002*
	≥35	200	32.25 ± 36.02	
Occupation	employee	51 (13.6)	13.03 ± 25.86	0.024
	Self-employed	146(39)	13.65 ± 29.36	
	Laborer	21(5.6)	12.97 ± 35.43	
	Housewife	156 (41.7)	36.48 ± 36.51	
Marital Status	Married	281 (75.1)	28.70 ± 33.62	0.011*
	Single	81 (21.7)	12.83 ± 25.48	
	Widowed	12(3.2)	12.43 ± 44.58	
Type of damage	Residence and household [1]	266 (71.1)	29.90 ± 32.50	0.956
	Shop building	31(8.3)	13.86 ± 29.93	
	Individual	6(1.6)	19.15 ± 29.83	
	Other	71(19)	9.84 ± 32.31	
Education	≤high school diploma	258(69)	29.36 ± 34.65	0.007
	Higher education	116(31)	14.73 ± 26.77	
Income	≤US$ 190 per month	189 (50.5)	33.77 ± 35.18	0.025*
	>US$ 190 per month	185 (49.5)	13.55 ± 29.17	

Table 1 provides a summary of the mean PTSD scores among different demographic subpopulations. The table reveals significant differences in PTSD scores between men and women ($p = 0.029$), as well as between age groups younger than 35 years and those aged 35 years and older ($p = 0.002$). Occupational groups also demonstrated a significant difference in mean PTSD scores ($p = 0.024$). Regarding marital status, individuals who had lost a spouse exhibited the highest average PTSD score, which was significantly higher than other groups ($p = 0.011$). Additionally, individuals without a high school diploma had a significantly higher average PTSD score compared to those with higher education ($p = 0.007$).

The average scores for religious coping, passive coping, active coping, self-distraction coping, and social coping strategies were (26.11 ± 4.59), (24.47 ± 5.32), (21.75 ± 3.92), (7.28 ± 2.32), and (4.96 ± 2.32) respectively.

Table 2 compares the average scores of coping strategies across demographic variables. The younger than 35 age group displayed a statistically significant difference in the mean total score of adaptation strategies compared to the older than 35 age group ($p < 0.001$). Moreover, job groups exhibited a significant difference in mean coping strategy scores ($p = 0.023$). Regarding marital status, the widowed group had the highest mean total score of coping strategies, which was considerably higher than the other groups ($p = 0.003$). Individuals without a high school diploma had a remarkably higher average score of coping strategies compared to those with higher education degrees ($p = 0.008$).

Table 2 also presents the average scores of various coping strategies across demographic variables. Females had significantly higher average scores for passive ($p = 0.036$), active ($p = 0.078$), and religious coping strategies ($p < 0.001$) compared to males, while males had a significantly higher average total coping strategy score than females ($p < 0.001$). The older-than-35 age group had significantly higher average scores for passive ($p = 0.001$), social ($p < 0.001$), and religious ($p =$

Table 2
Demographic variables of the study population and their correlation with Coping strategies ($N = 374$).

Variables		Coping strategies score (mean ± SD)	Passive strategy (mean ± SD)	Active strategy (mean ± SD)	Social Strategy (mean ± SD)	Self-distraction strategy (mean ± SD)	Religious strategy (mean ± SD)
Gender	Male	102.89 ± 10.69	23.89 ± 5.33	21.39 ± 3.79	5.61 ± 2.49	7.40 ± 2.99	25.25 ± 4.37
	Female	103.84 ± 11.99	25.05 ± 5.27	22.11 ± 4.03	4.31 ± 1.93	7.17 ± 2.34	26.95 ± 4.67
	P-value	0.129	0.036*	0.078	< 0.001	0.350	< 0.001
Age	< 35	100.62 ± 11.20	23.46 ± 3.92	23.46 ± 3.92	4.42 ± 2.03	7.41 ± 2.21	7.18 ± 4.36
	≥ 35	104.97±11.18	25.36±5.29	25.36±3.92	5.43±2.45	7.18±2.41	7.41±4.82
	P-value	<0.001	0.001	0.125	<0.001	0.354	0.048
Education	≤ High school diploma	103.98±11.21	25.20±5.03	21.83±3.92	5.25±2.45	7.20±2.25	26.15±4.61
	Higher education	100.63±11.46	22.85±5.61	21.58±3.95	4.32±1.85	7.47±2.46	26.00±4.58
	P-value	0.008	<0.001	0.561	<0.001	0.30	0.782
Occupation	labor	98.70±11.38	21.37±5.54	21.76±4.37	4.56±2.35	7.01±2.46	25.80±4.68
	Self-employed	103.02±10.65	24.46±5.32	21.55±3.59	5.63±2.46	7.58±2.33	25.34±4.36
	Laborer	102.33±13.26	25.42±5.29	19.85±4.44	5.95±1.92	7.04±2.20	25.27±4.78
	Housewife	104.33±11.53	25.37±4.91	22.19±3.94	4.33±2.32	7.12±2.26	27.02±4.64
	P-value	0.023	<0.001	0.065	<0.001	0.250	0.011
Marital Status	Married	103.04±10.903	24.80±5.02	21.56±4.02	5.08±2.39	7.12±2.34	26.17±4.54
	Single	101.09±11.28	22.56±5.58	22.13±3.34	4.38±1.92	7.88±2.11	25.70±4.75
	Widowed	113.16±17.34	29.67±5.64	23.58±4.98	6.17±2.21	7.08±2.57	27.17±4.80
	P-value	0.003	<0.001	0.134	0.011	0.031	0.516
Damage Type	Residence and household	102.47±12.17	24.27±5.43	21.77±4.12	4.84±2.29	7.13±2.29	26.02±4.68
	Shop building	104.80±10.08	24.74±6.09	22.19±3.88	4.67±2.31	7.67±2.47	27.22±4.47
	Individual	108.5 ± 12.75	23.00±7.58	25.83±2.92	4.83±3.54	9.16±1.33	26.00±4.43
	Other	103.43±8.28	25.23±4.31	21.12±2.95	7.53±2.27	7.53±2.34	25.94±4.37
	P-value	0.417	0.499	0.033	0.127	0.079	0.570
Income	≤ US$ 190 per month	103.68±12.02	25.13±5.08	21.68±3.92	4.80±2.33	7.23±2.35	26.40±4.64
	> US$ 190 per month	102.18±10.66	23.80±5.49	21.82±3.95	5.12±2.30	7.34±2.29	25.80±4.54
	P-value	0.203	0.015	0.742	0.175	0.670	0.202

*$p \leq 0.05$.

0.048) coping strategies compared to the younger-than-35 age group. Individuals with a high school diploma and higher education exhibited significantly higher average scores for passive ($p = 0.001$) and social ($p < 0.001$) coping strategies compared to those without a high school diploma. Laborers had significantly higher average scores for passive ($p < 0.001$) and social ($p < 0.001$) coping strategies, while housewives had higher average scores for active ($p = 0.065$) and religious ($p = 0.011$) coping strategies compared to other occupational groups. The mean scores for passive ($p < 0.001$) and social ($p = 0.011$) coping strategies were significantly higher in individuals who had lost their spouse compared to married and single individuals. Additionally, the average score for self-distraction coping strategies was significantly higher in single individuals ($p = 0.031$). The average score for active coping strategies was significantly higher in cases where the person was injured compared to situations where the home or shop was damaged ($p = 0.033$). Furthermore, individuals with an income higher than $US 190 per month had significantly higher average scores for passive coping strategies ($p = 0.015$).

Table 3 displays the correlation between PTSD and coping strategies. The average scores for passive coping strategies ($r = 0.267$, $p < 0.001$), social strategies ($r = 0.148$, $p = 0.004$), and the total coping score ($r = 0.153$, $p = 0.003$) were directly and significantly correlated with the average PTSD score.

4. Discussion

The objective of this study was to determine the prevalence of PTSD following a flood and examine its relationship with coping strategies among flood victims in Lorestan, Iran.

The findings of this study revealed a prevalence rate of 12.8 % for PTSD among flood victims. A review study examining PTSD prevalence in flood victims reported a prevalence rate of 29.48 % (Golitaleb et al., 2022). A meta-analysis demonstrated prevalence rates of 19.2 %, 30 %, 24.4 %, and 20.4 % for PTSD among children and adolescents in the first, second, third, and fourth six-month periods after earthquakes and floods (Rezayat et al., 2020). The prevalence rate of PTSD in the current study was lower than that reported in previous studies. It is well-documented that the prevalence of PTSD and anxiety tends to decrease over time following a traumatic event. This could explain why the prevalence of PTSD in this study was lower compared to studies with shorter intervals for diagnosing PTSD (Wang et al., 2005). Comparing the results of this study with previous research highlights the consistently high prevalence of PTSD after floods, which is similar to the rates observed in other natural disasters. These findings emphasize the need for continued support and intervention for flood victims, even beyond the immediate aftermath of the event.

The results of this study indicated that women had higher mean PTSD scores compared to men. This finding is consistent with previous studies that have demonstrated the influence of gender on the

Table 3
PTSD with coping strategies: correlations statistics ($n = 374$).

		Total coping strategy score	Passive strategy	Active strategy	Social Strategy	Self-distraction strategy	Religious strategy
PTSD score	R	0.153*	0.267*	0.14	0.148**	−0.089	0.008
	P-value	0.003	<0.001	0.791	0.004	0.087	0.881

* $p \leq 0.05$.
** $p \leq 0.01$.

prevalence of PTSD among flood and earthquake victims. Research has shown that PTSD is more commonly diagnosed among female earthquake survivors than males (Adhikari Baral and KC, 2019; Dai et al., 2016). The higher risk of PTSD among women could be attributed to their heightened perception of danger and loss of control. Additionally, women may have a limited understanding of available social support resources. Recognizing the gender disparity in PTSD prevalence among flood victims is crucial for tailoring effective support and intervention strategies.

The mean PTSD score was higher among individuals older than 35 years. These findings align with studies conducted in Nepal, China, and Italy, indicating a significant association between PTSD prevalence and age among adult survivors (Adhikari Baral and KC, 2019; Blevins et al., 2015). Additionally, research has shown that older adolescents are more likely to be impacted by catastrophes compared to younger children, potentially due to cognitive immaturity protecting younger individuals from fully comprehending the consequences of a catastrophe (Mathew et al., 2021). These findings suggest that older adults and elderly individuals are more vulnerable to experiencing mental disorders following a natural disaster such as a flood. The increased risk among this age group may be attributed to a variety of factors. Older adults may have accumulated more life experiences, making them more likely to have faced previous traumas or to be affected by current traumatic events. Additionally, the aging process itself can contribute to decreased resilience and coping mechanisms, potentially amplifying the impact of the traumatic experience. Understanding the age-related differences in the prevalence of PTSD among flood victims is crucial for tailoring appropriate support and intervention strategies. Healthcare providers and support organizations should take into consideration the unique needs and vulnerabilities of older adults and elderly individuals in their response efforts.

The mean PTSD score was also higher among individuals with lower educational levels. A meta-analysis examining PTSD risk factors has demonstrated a direct association between PTSD and lower education (Othman et al., 2016). Gender and education can differentially influence the development of post-earthquake PTSD, with women and those with lower education levels being more susceptible to the disorder (Dai et al., 2016). Education can enhance self-confidence, emotional control, and the establishment of trust-based relationships, aiding individuals in overcoming psychological difficulties (Ijadi-Maghsoodi et al., 2022). Recognizing the impact of educational attainment on the prevalence of PTSD among flood victims is essential for developing targeted interventions and support systems. It is important for healthcare providers, educators, and policymakers to address the specific needs of individuals with lower education levels in post-disaster contexts.

In terms of marital status, the highest PTSD scores were observed among widowed individuals. Some studies have indicated that factors such as older age, lower education levels, and lacked familial support and protection, such as being single (including divorced and widowed) contribute to the development of PTSD and anxiety (Kolltveit et al., 2012; Lin et al., 2014). Understanding the association between marital status and PTSD scores among flood victims is crucial for developing tailored interventions and support systems. It is important for healthcare providers, support organizations, and communities to address the specific needs of widowed individuals and those who have experienced significant losses.

The mean PTSD score had an inverse relationship with income. A previous study supported this finding by demonstrating a significant association between PTSD and socioeconomic status (Ganie et al., 2022). (Lamond et al., 2015).. Lower-income individuals often face multiple challenges that can exacerbate the psychological impact of a flood. Limited financial resources may restrict access to necessary healthcare services, including mental health support. Additionally, individuals with lower incomes may experience higher levels of stress due to financial strain, which can further contribute to the development and persistence of PTSD symptoms. The influence of socioeconomic status on post-flood health outcomes extends beyond individual-level factors. It encompasses the availability of social support networks, housing stability, and overall community resources. These factors collectively shape the context in which individuals recover from the psychological effects of a flood.

This study observed the highest mean scores for religious coping, followed by active and passive coping strategies. A study conducted in Nepal also identified active, social, and religious coping strategies as the most commonly used (Adhikari Baral and KC, 2019). Another study suggested that participants who did not use spirituality as a coping strategy were four times more likely to develop PTSD (Arebo et al., 2022). Spirituality is often used as a means to find comfort and protection, and studies have demonstrated its role in enhancing well-being, facilitating positive processing of traumatic experiences, and better adaptation to PTSD symptoms (Arebo et al., 2022; Hamader and Noehammer, 2013). Recognizing the importance of religious coping and spirituality in the aftermath of a flood is crucial for providing comprehensive support to affected individuals. Healthcare providers, support organizations, and communities should acknowledge and respect the role of spirituality in individuals' lives, integrating it into the overall support framework.

Based on the results of this study, individuals with lower educational levels had significantly higher mean scores for passive and social coping strategies. Previous studies have also reported that illiterate adult survivors rely more on religious and passive coping strategies, while literate individuals employ more active and self-distraction strategies (Adhikari Baral and KC, 2019; Roohafza et al., 2009). Women and those with lower levels of education tend to utilize fewer positive coping strategies, exhibit heightened sensitivity to threats, and have a tendency to interpret disasters in a negative light (Dai et al., 2016).. Healthcare providers and support organizations should recognize the specific needs of individuals with lower educational attainment and provide resources and interventions that promote active coping strategies. This can include skills training, education programs, and psychosocial support that empower individuals to adopt more effective and adaptive coping strategies.

The study also revealed that widowed individuals had significantly higher mean scores for passive and social coping strategies compared to single and married participants. The results of other studies have also confirmed that individuals who lost their possessions or were not supported by their families, such as widows and divorcées used passive, instead of active, coping strategies (Telles et al., 2009). The absence of a supportive partner and the emotional burden of grief and loss may lead widowed individuals to employ more passive coping strategies as they navigate the challenges and uncertainties brought on by the disaster. Psychosocial support programs should be tailored to address the specific needs of this vulnerable group, focusing on promoting active coping strategies, fostering social connections, and providing resources for emotional healing and resilience-building.

Women had higher mean scores for active, passive, and religious coping strategies, while men more frequently utilized social coping strategies. Gender differences in coping strategies have also been observed among earthquake survivors, with female survivors using religious and passive coping strategies more frequently, while male survivors employing active, social, and self-distraction coping strategies more commonly (Xu and He, 2012). Therefore, by addressing gender-specific coping strategies, we can enhance the overall resilience and well-being of flood victims.

The findings of the present study showed that the score of passive and social strategies had a direct and significant correlation with the average PTSD score, while the average score of self-distraction strategy had an inverse correlation with the average PTSD score. The findings of previous studies have also shown that adult survivors with PTSD obtained remarkable scores in the passive coping domains. In contrast, survivors without PTSD generally used adaptive coping mechanisms such as active strategies and strategies to deal with absent-mindedness

(Adhikari Baral and KC, 2019; Cofini et al., 2015). In general, active or positive coping mechanisms either had an inverse relationship with PTSD symptoms or showed positive correlation on a smaller scale than passive or negative coping mechanisms (Powell et al., 2021).

The findings of this study demonstrated a positive correlation between the scores of passive and social coping strategies, such as emotion-focused coping mechanisms, and PTSD. This relationship has also been observed in other studies (Charuvastra and Cloitre, 2008). However, a study by Thompson et al. did not find a correlation between social support and the development of PTSD symptoms (Thompson et al., 2018). The inconsistency may be due to differences in the assessment of social support strategies, as this study focused on people's perceptions of their social support. Given the contradictory results of previous studies, further research is recommended to investigate the correlation between different coping strategies and PTSD.

5. Limitations

The present study has several limitations: **1:** The study included participants from Lorestan, Iran who were flood victims within the first year after the event. This specific sample might limit the generalizability of the findings to other populations affected by different types of disasters or residing in different regions. Therefore, caution should be exercised when applying these results to broader contexts.**2:**. Lack of follow-up data: The study only assessed PTSD prevalence and coping strategies within the first year after the flood. The absence of follow-up data limits the understanding of the long-term effects of the flood on PTSD symptoms and the potential changes in coping strategies over time. **3:** Due to the difficulty in collecting data in rural areas, the study was conducted only in urban areas of Lorestan.

6. Conclusion

The findings of this study highlight PTSD among flood survivors even one year after the event. Particularly vulnerable groups identified include the elderly, women, individuals with low literacy levels, and those with a low socio-economic status. Understanding the relationship between PTSD and coping strategies is crucial for supporting the short-term and long-term psychological well-being of survivors.

Screening programs should be implemented to identify individuals at higher risk for PTSD, such as women, older adults, those with lower education levels, widowed individuals, and those with lower income levels. Additionally, interventions should focus on promoting adaptive coping strategies, such as active problem-solving and self-distraction, while providing support and resources for individuals utilizing passive coping strategies. By considering these factors and implementing targeted interventions, support organizations and government agencies can better address the psychological needs of flood victims and facilitate their recovery process.

CRediT authorship contribution statement

Fatemeh Bastami: Conceptualization, Investigation, Supervision, Writing – original draft, Writing – review & editing. **Rasool Mohammadi:** Methodology, Software. **Zahra Asadi Piri:** Writing – original draft, Writing – review & editing. **Elham Valipour:** Conceptualization, Data curation. **Parisa Ahmadi:** Conceptualization, Data curation. **Mohammad Almasian:** Writing – original draft, Writing – review & editing. **Soraya Nouraei Motlagh:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare they have no conflicts of interest.

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Author Statement

Each of the authors confirms that this manuscript, titled "Prevalence of Post-Traumatic Stress Disorder and Its Relationship with Coping Strategies among Flood Victims: Evidence from Iran," has not been previously published and is not currently under consideration by any other journal. Additionally, all of the authors have thoroughly reviewed and approved the contents of this paper and are in agreement with the submission policies of the Journal of Affective Disorders.

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