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POSTTRAUMATIC STRESS DISORDER IN CHILDREN FOLLOWING DISASTERS IN SOUTHERN PUNJAB PAKISTAN

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Abstract

The study aimed to examine the incidence of post-traumatic stress symptoms (PTSD) in children and adolescents following two types of disasters i.e. flood and oil tanker explosion. Non-probability purposive sampling technique was used to conduct present research. A total sample of 630 school-going children and adolescents (257 boys and 373 girls) aged 9 - 17 years (M=13.61 years and SD = 1.76) was selected from ten Government Schools located at disaster sites, Southern Punjab, Pakistan. Among them, 273 (43.3%) were flood-affected and 357(56.7%) were explosion affected children. Urdu version of the Child PTSD symptom scale for DSM -V was used to assess the prevalence of PTSD in them. Demographic information form was also used to assess demographics features. The results revealed that most of the children (69.84%) experienced PTSD; Man-made disaster had a pronounced impact on children and adolescents to develop PTSD as compare to the natural disaster; Girls experienced more intrusive recall and arousal symptoms than boys; and adolescent group aged 13-17 years showed more symptoms of re-experience and cognitive mood along with overall PTSD than younger group aged 9-12 years. Thus, the findings of the study draw attention to the need to provide specialized post- disaster mental health services to survivors. Keeping in view the limited resources in developing countries it is high need that trauma care at preventive level must be added in syllabus of school going children.

Keywords
Posttraumatic stress disorder (PTSD), flood, oil tanker explosion, disasters

1. Introduction

Both natural and man-made disasters occur quite regularly in Pakistan. The flood as a form of natural disaster is very common in Pakistan, which results in physical, psychological, emotional and financial damage. On the other hand, accidents are the second worst type of manmade disaster after terrorism in Pakistan. Such incidents cause enormous destruction in one's mental health (Huang, 2010; Paranjothy *et al*., 2011). Studies suggested that survivors, especially children and young adults were at high risk to develop a number of mental disorders including PTSD, anxiety, depression, and phobias (Barenbaum *et al*., 2004; Huang *et al*., 2010; Norris *et al*., 2001). After exposure to disaster, PTSD is the most prevailing disorder in all age groups living in such communities (Ahmad *et al*., 2011). It is defined by continuous disturbing memories about the shocking experience, continuous avoidance of traumatic cues and experiencing the symptoms of increased arousal again and again (APA, 2013). Existing literature on disasters suggests that people who have directly exposed the disaster are prone to develop more symptoms of PTSD as compared to the general public (Pridemore *et al*., 2008; Yule *et al*., 2000). There are many studies which have shown the prevalence of PTSD in population affecting by different traumatic situations. However, these studies also highlighted number of contributing factors that leads to PTSD which includes harshness of experience, time and duration of incident, and developmental level (Deering, 2000). As far as flood survivors are concerned, studies suggested 9.2% (2336) PTSD among a sample of total 25,478 in Hunan, China (1998); 35% PTSD among elementary school children was reported. In them children with mild problem were 22.7% and the remaining 12.3% children reported moderate to severe symptoms. Furthermore, 65% were experienced subclinical symptoms of PTSD after experience Typhoon Rusa (Lee *et al*., 2004); 12.7% prevalence of PTSD was reported in Tamil Nadu, India after exposing flood (Kumar *et al*., 2007). In Pakistan, statistics found a high prevalence of PTSD among flood-affected school children e.g., in Khyber Pukhtunkhwa 57.3 % among a sample of 522 students (10-16 years) (Ahmad *et al*., 2011); in Nowshera, 90.8% respondents had moderate PTSD and 9.2% reported to have severe PTSD level (Sana & Khatak, 2014); in 3 relief camps set-up around Karachi, 59% (249) out of 422 individuals had PTSD (Mubeen *et al*., 2013). However, the prevalence of PTSD in response to man-made disasters is high as compared to the natural disaster. Countries exposed to war, terrorism or political trauma estimated high prevalence rate of PTSD (e.g., 37%, 18 %, 28% and 16% PTSD reported in Algeria, Gaza, Cambodia, and Ethiopia respectively) (DeJong, 2001). About 80% of the Netherland people experience a traumatic incident and among them, 14% showed significant symptoms of PTSD (De Vries & Olff, 2004). Another statistic reported a 41% prevalence of PTSD in the Netherlands after exposing accidents (Dekkers *et al*., 2010).

Another man-made disaster i.e. The Formosa Fun Coast Water Park explosion was massive in Taiwan. It showed a 12.9% prevalence of PTSD among 116 burn participants after two years of explosion (Su, 2018). However, not much evidence is available on the subject of heavy accident as a manmade disaster and its horrible impact on the mental well-being of people of Pakistan. Therefore, the present study was an effort to find out the prevalence of PTSD in children and adolescents following different disasters i.e. flood and oil tanker blast in southern Punjab, Pakistan. As a result, based on current literature the paper presents three hypotheses: Survivors of manmade disaster would experience more PTSD than survivors of a natural disaster; Girls would experience more PTSD than boys and would be different in symptoms manifestation; and there are likely to be age differences in symptoms manifestation.

2. Methodology

2.1 Research design and Sample

For this cross-sectional study, purposive sampling was used. Thus, the bank of River Chenab was marked as a flood-affected area. Villages including Muradabad, Khangan Shumali, Thata Syala, and Langer Saray of Muzaffargarh District of South Punjab were visited and data of 273 children were gathered in the year of 2016 from six government schools. As a form of manmade disaster accidents are a huge source of mental stress in Pakistan. In Ahmedpur East, Bahawalpur, there was a horrific incident that was seen on 25th June 2017. The tanker that carried 5,500 gallons of fuel had a wheel blow out. After half an hour, this oil tanker exploded in a huge fireball and took 200 people's lives at the spot. The dead bodies were remained there for a few days and later buried in a mass grave. Thus, villages including Tibbi Izzat and Mahrabwala of Ahmedpur East, South Punjab were marked as the site of manmade disaster. Four government schools were visited to collect data of 357 children in the year of 2018. See Table 1 for detail of the demographic characteristics of the children.

Table 1: Frequencies and Percentages of the demographic variables

Demographics	**Flood affected**	**Explosion affected**		**Total Children**
	Children	Children		N= 630
	N=273	N=357		
	f (%)	*Nb*	*f (%)*	*f (%)*
Disaster Type				
Natural disaster	-	-		273 (43.3)
Man-made disaster	-	-		357 (56.7)

Gender			
Male	103 (37.7)	154 (43.1)	257 (40.8)
Female	170 (62.3)	203 (56.9)	373 (59.2)
Class			
6th	69 (25.3)	61 (17.1)	130 (20.6)
7th	60 (22.0)	99 (27.7)	159 (25.2)
8th	67 (24.5)	91 (25.5)	158 (25.1)
9th	30 (11.0)	55 (15.4)	85 (13.5)
10th	47 (17.2)	51 (14.3)	98 (15.6)

2.2 Inclusion and Exclusion Criteria

To be eligible in this study, children must have experienced the disaster i.e. flood or oil tanker explosion at least one time in their lives. Furthermore, understanding of the Urdu language, the age range of 10-17 years, and their enrollment in schools located at the disaster site were also considerable factors for the inclusion of the study. Children who were exposed to any other traumatic event except a flood or explosion in the period of the last 6 months from data collection; had a history of developmental delays, cognitive impairment, serious psychological illnesses, or behavioral issues were excluded.

2.3 Measure

2.3.1 Demographic information form

It was prepared by the researcher to acquire the basic information about children including age, sex, schooling, religion, and trauma type.

2.3.2 Child PTSD symptom scale for DSM – V (CPSS-5)

PTSD was assessed using the CPSS-5 developed by FOA. Its 20 items measure intrusion, avoidance, changes in cognition & mood, and arousal on a 5 point (0-4) Likert scale. Moreover, 7 items are related to daily functioning and its score is not included in the total scale score. Scores were further divided in categories and interpreted as (11-20) mild; (21-40) moderate; (41-60) severe and (61-80) very severe. A cutoff score of 31 was used for considering the problem of PTSD in children in this study. Children were supposed to rate each item after observing the particular symptom in them from the previous month (FOA *et. al*., 2018). It was translated by the researcher and found to be highly reliable with Cronbach's alpha = 0.84 for the present sample.

2.4 Procedure

2.4.1 Ethical approval and consent

The study was approved by two different research boards of University of the Punjab Lahore. Then, permission to use and translate CPSS-5 in Urdu language was sought out from the authors. Later, MAPI guidelines were followed by the authors to get done its Urdu version. For the recruitment of children, schools in affected areas were approached after getting permission from Punjab Education Commission. School authorities were briefed about the nature, purpose and procedure of the research. They were given an opportunity to ask any questions. Moreover, they signed the consent form on behalf of their students. However, children were also informed about the purpose of research, matters of confidentiality, handling of their information and their rights to leave research at any stage. Children who studied in Class 8 – 10 also signed the consent form. Later, group administration of self-report questionnaires were executed in their classrooms, in absence of their local teachers.

2.4.2 Pilot study

Pilot study was done on a sample of 10 children of different Classes; two from each Class (Class 6^{th} – Class 10^{th}) were taken to assess their comprehension and conceptual clarity of the assessment items. As all procedure was new for them and they had no previous exposure of such activity. Thus, they took this assessment as a school test and seemed to be nervous. So they were given the time to get familiar with researcher, research procedure and assessment tool. After that to maintain discipline and to control their nervousness, each item of the questionnaire was read aloud and explained what it meant by the researcher to the group. It was also time saving, only15 to 20 minutes were spent to complete the measure. No item was revised. They understood well and gave positive feedback.

2.4.3 Main study

Same style was carried out to complete the main study.

2.5 Statistical Analysis.

Data were analyzed through SPSS software version 21. Descriptive statistics were tabulated for frequencies. An Independent sample t-test along with cross-tabulation for categorical variables with PTSD was done. The level of statistical significance was set as $p<0.05$.

3. Results

3.1 Prevalence of PTSD in Both disaster sites

Figure 1 and 2 show that 630 children were taken to assess the prevalence of PTSD. Among these children, 69.84% of children were having PTSD while 30.16% of children were without PTSD symptoms. Details suggested that 26.51% of children were having moderate PTSD, 37.46% children were with severe PTSD and 5.87% were having very severe PTSD (see Figure 2). Among 273 children who exposed to flood only 37.36 % children reported no PTSD. On the other hand, 28.94% of them were with moderate PTSD, 29.67% of children were having severe PTSD and 4.03% of them were having very severe PTSD (see Figure 3).

Figure 4 shows that in sample, 357 children were survivors of the manmade disaster. In them 24.65% were safe, 24.65% of children suffered from moderate PTSD, 43.42% of them suffered from severe PTSD while 7.28% of them were with very severe PTSD.

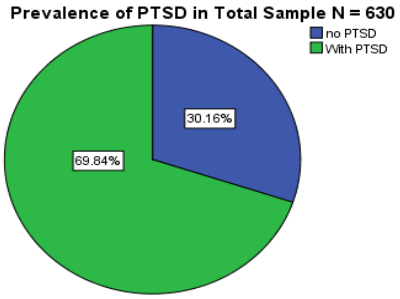

Figure 1

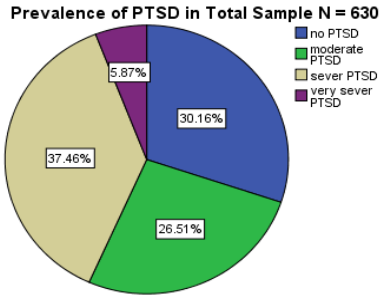

Figure 2

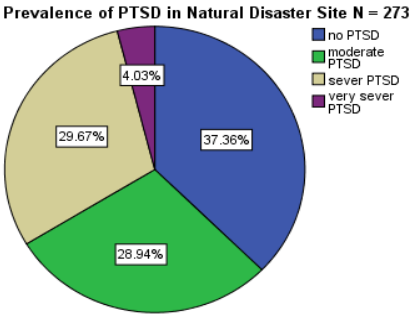

Figure 3

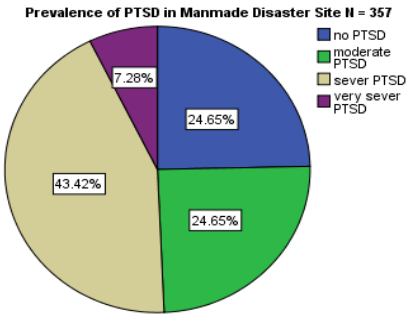

Figure 4

Chi-Square analysis was applied to identify the association between disaster sites and PTSD ranges. Table 2 revealed significant association between them.

Table 2: Chi Square Analysis between Disaster Sites and PTSD Ranges

Disaster sites	No PTSD	Moderate PTSD	Severe PTSD	Very Severe PTSD	x^2	Significance	df
Natural	37.4	28.9	29.7	4	19.95	$p < 0.001$	3
Man made	30.2	26.5	37.5	5.9			

Furthermore, detailed comparison of prevalence rate on PTSD between both disaster sites show significant differences. A total of four subscales i.e. re-experience, arousal, cognitive mood, and avoidance and total PTSD score showed significant results (see table 3).

Table 3: Independent Sample t-test Comparing Post Traumatic Stress Symptoms (PTSS) between Disaster Sites

	Natural D (N = 273)		Manmade D (N = 357)				95% CI	
PTSS	*M*	*SD*	*M*	*SD*	t (628)	*p*	LL	UL
Re experience	9.76	4.16	10.68	4.51	-2.60	.01**	-1.60	-.22
Arousal	9.18	5.28	10.91	5.70	-3.88	.00***	-2.59	-.85
Cog mood	12.66	5.38	13.47	6.13	-1.72	.04*	-1.72	.11
Avoidance	3.83	2.16	4.63	2.16	-4.60	.00***	-1.14	-.46
Total PTSD score	35.44	13.54	39.69	14.85	-3.69	.00***	-0.50	-1.98

Note: CI = Confidence Intervals, LL = Lower Limit, UL = Upper Limit

Results depict that man-made disasters have more impact on developing PTSD symptoms, re-experiencing, and arousal of these symptoms, cognitive mood, and avoidance of triggers of the traumatic event than natural disasters.

3.2 Gender differences in Prevalence of PTSD

Initially, descriptive of PTSD severity ranges according to gender was noted. No marked differences were seen. Table 4 illustrated its details.

Table 4: Frequencies and Percentages of PTSD Presence in Gender (N=630)

	PTSD Severity Ranges						
Gender	No PTSD	Moderate PTSD	Severe PTSD	Very severe PTSD	x^2	Significance	df
Boy	82 (31.9%)	68 (26.5%)	93 (36.2%)	14 (5.4%)	.762	P > .05	3
Girl	108 (29.0%)	99 (26.5%)	143 (38.3%)	23 (6.2%)			

However, further comparison on symptoms manifestation revealed that among the 4 subscales of CPSS, two subscales i.e. re-experience and arousal showed significant results (p<0.05).

Table 5: Independent Sample t-test Comparing Post Traumatic Stress Symptoms (PTSS) between Genders

	Boys (N = 257)	Girls (N = 373)	95% CI

PTSS	*M*	*SD*	*M*	*SD*	t (628)	*p*	LL	UL
Re experience	9.79	4.26	10.61	4.44	-2.31	.01*	-1.51	-.12
Arousal	9.73	5.64	10.46	5.53	-1.60	.05*	-1.61	.16
Cog mood	13.25	5.80	13.03	5.84	.45	.32	-.71	1.14
Avoidance	4.15	2.14	4.38	2.23	-1.30	.09	-.58	.11
Total PTSD	36.92	14.37	38.48	14.47	-1.33	.09	-3.85	.73

Note: CI = Confidence Intervals, LL = Lower Limit, UL = Upper Limit

Table 5 depicts that girls (*M*=10.61) have more tendency to re-experiencing PTSD symptoms than boys (*M*=9.79); similarly, arousal was high in girls (*M*=10.46) than boys (*M*=9.73). While the rest of the two subscales i.e. cognitive mood and avoidance as well as total PTSD scores showed insignificant results.

To see difference of PTSD symptoms manifestation both age groups were compared. Among subscales, two subscales i.e. re-experience and cognitive mood and total CPSS showed significant results ($p<0.05$). The finding revealed that adolescent age group is more prone to develop PTSD than younger group.

3.3 Prevalence of PTSD in Both age groups

Table 6: Independent Sample t-test Comparing Post Traumatic Stress Symptoms (PTSS) between Age Groups

	Children 9-12 Years (N = 166)		Adolescents 13-19 Years (N = 464)				95% CI	
PTSS	*M*	*SD*	*M*	*SD*	t (628)	*P*	LL	UL
Re-experience	9.79	4.15	10.45	4.46	-1.68	.04*	-1.44	0.11
Arousal	9.69	5.75	10.33	5.52	-1.25	0.1	-1.62	0.35
Cog mood	12.26	5.56	13.43	5.89	-2.22	.01**	-2.20	-0.13
Avoidance	4.24	2.33	4.30	2.14	-0.30	.38	-0.45	0.33
Total CPSS	35.98	14.17	38.51	14.49	-1.94	.02*	-5.09	0.02

Note: CI = Confidence 35Intervals, LL = Lower Limit, UL = Upper Limit

Table 6 depicts that the adolescent aged 13-19 years (*M*=10.45) have more tendency to re-experiencing PTSD symptoms than the children aged 9-12 years (*M*=9.79); similarly, cognitive mood symptoms were high in the age group of 13-19 years (*M*=13.43) than 9-12 years age group (*M*=12.26). Moreover, the rest of the two subscales i.e. arousal and avoidance showed insignificant results.

4. Discussion

The present study found a 69.84% prevalence of PTSD among a total of 630 flood and oil tanker blast affected school children and adolescents in Pakistan. The results are in line with previous findings that children have high vulnerability towards posttraumatic stress (Piyasil *et.al*., 2007; Kar, *et al*., 2007). Furthermore, comparison between disaster sites showed that manmade disaster has a strong impact on children as well as adolescents to develop PTSD than natural disasters. Significant mean differences were found between each subscale of PTSD between manmade and natural disaster sites. The results are in line with Norris *et al*. (2002) that the prevalence of PTSD after natural disasters is generally lower than prevalence after manmade disasters. It was further supported by Riaz *et al*. (2015) as they found more prevalence of PTSD in adults who exposed terrorism as compared to adults who experienced flood. Moreover, disaster sites seem to be related to PTSD severity. Most of the children exposed to flood showed moderate symptoms of PTSD, whereas, children who experienced oil tanker blast mostly showed severe symptoms of PTSD. However, it seems that children experienced moderate to severe levels of PTSD and found to be vulnerable after exposing the different types of trauma. The hypothesis of gender differences was partially approved as girls showed more symptoms of re-experience and arousal of PTSD as compared to boys. Otherwise, on developing PTSD along with alteration in mood/cognition and avoidance symptoms no gender differences were seen. The finding was somewhat related with previous study (Schlenger *et al*., 2002); however, some studies suggested female were more vulnerable than male (e.g., Elklit, 2002; Groome & Soureti, 2004). The presence and absence of gender differences may depend on various factors including pre-trauma mental health or nature of exposure and related experiences (Schlenger *et al*., 2002). The age of survivors at the time of trauma can play an important role in developing PTSD. Evidence suggested 11-13 years old children are at risk to develop PTSD (Kar *et al*., 2007). In this study, to see the role of age in manifestation of symptoms, children were divided into two groups i.e., children (9-12 years old) and adolescents (13-17 years old). The comparison showed that adolescents showed more symptoms of re-experience and cognitive mood along with overall PTSD than children ($p<0.05$) that was supported by prior research (Kar *et al*., 2007). Middle age seems too important to discuss as in this age children learn to verbalize their feelings and get cognitive maturity to observe the underline relationship between conditions. However, this cognitive immaturity protect them to develop PTSD in younger age, whereas, in older age, they learn coping style or handling of uncertainty thus may report fewer symptoms (McDermott & Palmer, 2002).

4.1 Limitation

The sample was homogeneous as the majority of children belonged to the same rural background. An urban area is not included in this study

specifically in terms of exposure to disasters and standards of living, thus this aspect needs to be considered in future research.

4.2 Clinical Implications

Keeping in the view the Pakistani society, the study would help professionals and policymakers in making different strategies for disaster survivors to deal with their mental health demands. It shed light on the concern to raise awareness in the community at a preventive level about the handling of psychological problems, particularly PTSD. Survivors, especially children and adolescents should be well-informed about the role of intrusive images and thoughts, ways to handle arousal symptoms, and the use of constructive activities to function normally and increase their support system.

5. Conclusion

The presence of PTSD in children and adolescents after the experience of different disasters i.e flood and oil tanker blast is not an ignorable thing. It is noticeable that PTSD in children and adolescents can go unnoticed in such areas after exposing disaster and become a high risk for youngsters' future. Planning is required to establish clinical screening and further implementation of community mental health programs at the gross level.

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