

Matching the Symptom Profile of Adolescent Disaster Survivors with Changing Diagnostic Criteria of Posttraumatic Stress Disorder: Focus on ICD-11

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ABSTRACT

Background: Considering recent changes in the diagnostic guidelines for posttraumatic stress disorder (PTSD), it has become imperative to review their influence, especially on the symptoms related to children and adolescent victims of disasters. We intended to assess the profile of posttraumatic stress symptoms (PTSS) of adolescents following an earthquake, especially the gender differences, in relation to the changing diagnostic guidelines, particularly ICD-11.

Methods: In a cross-sectional study, PTSS and functional impairments were evaluated in school-going adolescents in Nepal, one year after the 2015 earthquake, using the Child Posttraumatic Stress Scale (CPSS).

Results: A considerable proportion of adolescent survivors of the earthquake had PTSS. Most common ones were intrusive thoughts (46.7%), avoiding thoughts, conversations and feelings about the disaster

(44.2%), decreased interest in activities (40.0%), distress with reminders (35.6%), and concentration problems (35.6%). Females had a higher prevalence for all the PTSS compared with males, except for avoiding thought, conversations, feelings, and being overly careful/vigilant. Proportion of adolescents who met symptomatic criteria for PTSD diagnosis in different systems ranged from 14.7% in DSM-5 to 15.6% in ICD-11 three-factor model, and 22.2% in DSM-IV and 31.7% in ICD-10. Inclusion of the criterion of significant functional impairment changed the proportions to 10.0%, 10.3%, 12.8%, and 16.4%, respectively. In all of the diagnostic systems, higher proportions of females had possible PTSD.

Conclusion: Adolescent females had a higher prevalence for most of the PTSS and at the diagnostic level. It appears that for adolescents, diagnosis of PTSD in ICD-11 has become more robust with a focus on core symptoms and having a functional impairment criterion.

Keywords: adolescents, classification, disaster, posttraumatic stress, posttraumatic stress disorder

Key Messages: Posttraumatic stress symptoms following earthquakes are common in adolescents, and a higher proportion of females experience these compared to males. Following changes in diagnostic criteria for PTSD, fewer survivors qualify for the diagnosis based on ICD-11 and DSM-5 criteria, compared with their previous editions. Epidemiological studies screening for posttraumatic stress symptoms need to update their approach.

Posttraumatic stress disorder (PTSD) is a heterogeneous disorder that presents with different symptom clusters. Although the symptoms are usually categorized into three major clusters—re-experiencing, avoidance, and arousal—an additional cluster of negative alterations in cognition and mood has been recognized in DSM-5.¹ It

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has been commented that the diagnostic threshold for PTSD was rather low in DSM-IV and ICD-10. The symptoms described under each of the clusters can be combined in many ways to arrive at a PTSD diagnosis,² considering the polythetic nature of the psychiatric diagnoses. As a result, multiple combinations lead to numerous possibilities for diagnoses. There are a few other issues related to PTSD diagnosis, including cultural appropriateness of PTSD²⁻⁵ and the possibility of overuse or misdiagnosis in low resource and humanitarian settings.² PTSD is among the most widely used diagnoses in mental health care used by clinicians, epidemiologists, public health planners, and humanitarian aid workers worldwide. This study explores proposals that aim to maximize clinical utility for the classification and grouping of disorders specifically associated with stress in the forthcoming 11th revision of the International Classification of Diseases (ICD-11).

Age-wise, adults, adolescents, and young children may present in different ways in response to catastrophic stress. By being in a period of development, inadequately established coping strategies mean greater vulnerability and differences in resilience; therefore, children and adolescents may react differently to similar kinds of stressful events. In fact, variations in the type of posttraumatic stress symptoms (PTSS) in different age groups of children and adolescents have been reported.^{6,7} Epidemiological studies report different prevalence figures of PTSS in adolescents, following various types of trauma.^{4,8,10} The findings also suggest gender differences in PTSS reflective of different factors such as trauma type, stress perception, and responses. The impact of PTSD leading to school failure and regressed or delayed development in children and adolescents makes it a relevant area to study.⁷

There are age-specific features in the diagnostic criteria for PTSD; DSM-5 has different criteria for PTSD for children 6 years or under.¹ Considering the variability in the presentation and the ongoing debate about the applicability of adult diagnostic criteria for PTSD for children and adolescents,^{11,12} there

is a need for more evidence regarding symptom structure of PTSD in the younger people. Based on these observations, over the years, concepts and diagnostic methods have changed in the newer diagnostic systems, DSM-5 and ICD-11.^{1,13}

Consequent to this, it is prudent to evaluate the impact of the changing diagnostic methods on the prevalence figures based on the observed symptoms in adolescents. As studies on PTSD symptom structure in children and adolescents are scarce, especially from low- and middle-income countries,¹¹ it may be better to study PTSS in different cultures and age groups. The specific objective of this study was to explore the profile of PTSS in adolescents, following the 2015 Nepal earthquake, focusing on the nature of symptoms, gender differences, and variations based on the different diagnostic guidelines. We tried to ascertain the proportion of children who would meet the suggested diagnostic criteria of PTSD in ICD-11, compared with those in DSM-IV and 5 and ICD-10.

Methodology

Data for this study was obtained from a project evaluating the psychosocial status of adolescents after the April 2015 Nepal earthquake, which affected around eight million people, with 8,659 deaths and over 100,000 injured people.¹⁴⁻¹⁶ The project was a cross-sectional survey of adolescents in 8th to 10th class, studying in ten schools spread over the two affected districts of Nepal. The schools were selected using purposive sampling, and one class out of three classes (8-10) was randomly selected per school. All students in that class were included in the study. Further details are available in an earlier paper from the project.¹⁵

PTSS were assessed by the Child Posttraumatic Stress Scale (CPSS). This scale was developed as the child version of the Posttraumatic Diagnostic Scale.^{17,18} A total of 17 items directly correspond to the criteria for DSM-IV. The responses are on a Likert scale from 0 to 3, where score 0 is *not at all*, 1 is *once a week or less/once in a while*; 2 is *two to four times a week/*

half the time and score 3 is *five or more times a week/almost always*, with a possible maximum score equaling 51. There are seven additional items about the effect of the symptoms on functioning, which have a dichotomized response of yes or no. A higher score is suggestive of greater functional impairment. The CPSS has been validated in Nepali language, and a score of ≥ 20 suggests the need for intervention.¹⁹

Analysis

Internal consistency figures in the three subscales and the whole scale for this sample were as follows: Cronbach's alpha for intrusive items 1-5 in CPSS was 0.75, avoidance items 6-12 was 0.69, arousal items 0.73, and for the full scale was 0.86. For this study, we considered response scores of 2 and 3 in CPSS items as meeting the symptom criteria for the PTSD diagnosis. The prevalence of these symptoms in different genders was analyzed in percentages and 95% confidence interval (CI).

Ethics

Ethical approval for the project was obtained from Research Committee of Maharajgunj Nursing Campus and the Institutional Review Board of Institute of Medicine, Kathmandu. Permission was also obtained from individual schools where data were collected. Written informed consent was taken from the parents. Students were informed that they could withdraw from participating in the study anytime without giving any reason. Information about the effect of trauma on mental health and the support available was provided to the students and school teachers. Psychological help was accessible through the Integrated Community Development Centres in the districts, which had counseling services. These centers could refer cases to psychiatric services when appropriate. Support of a clinical psychologist was available, and the referral methods were explained to the school teachers.

Results

The sample consisted of 360 adolescents: 168 males (46.6%) and 192 females (53.3%) with a mean age \pm SD of 15.2 ± 1.32 and

15.3 ± 1.29 years, respectively (df: 358; *P*: 0.784; *t*: -0.275). The sociodemographic characteristics are provided in **Table 1**. The adolescents were studying in 8th to 10th class, with around one-third of sample in each class. More than half of the adolescents were from a nuclear family background (59.4%) and 47.2% reported financial problems at home. There was no significant difference in the demographic profile of different genders.

Disaster experience such as damaged housing (32.8%), damaged but habitable housing (39.7%), displacement (48.6%), starvation (38.1%), being injured/trapped (15.8%), injury to the family (4.2%), death in the family (1.4%), and damage to livelihood (42.5%) were comparable between the two genders. Significantly, more females (83.9%) were afraid of death during the earthquake compared with males (69.0%, *P* < 0.01). Availability and perceived adequacy of support after the earthquake were comparable between the genders.

PTSS meeting symptom criteria for PTSD (scores of 2 or 3 per item in CPSS) in the two genders are given in **Table 2**. The items of CPSS are matched to the three-factor model of DSM-IV: items 1–5 relate to re-experiencing, items 6–12 are for avoidance, and items 13–17 are for arousal clusters.¹⁸ Mean ± standard deviation (SD) of the CPSS score for males (18.0 ± 7.6) was significantly less (*P* < 0.001) than that for females (21.7 ± 8.7).

The prevalence of functional impairments is given in **Table 3**. Mean ± SD for functional impairment score for males was 3.1 ± 2.4 and for females 3.2 ± 2.3 (not significant). Besides the presence or absence of any functional impairment in the seven areas, we considered an impairment of functioning to be significant, in this study, when the score was in the upper range of 4 or more, from a possible 7.

Based on the symptom criteria and presence of impairment, possibilities of prevalence rates in different genders are given in **Table 4**. For comparison, the impairment criterion was also applied to ICD-10 criteria to observe the changes in rates. Considering the cutoff score of CPSS as 20 and above (validated in Nepal), 39.9% of the males and 57.3% the females (*P* < 0.01) were above this score, which suggest that they had a need for intervention.

TABLE 1.
Sample Characteristics

		Male (n = 168)		Female (n = 192)		Total (n = 360)	
		n	%	n	%	n	%
Class	8	61	36.3	68	35.4	129	35.8
	9	57	33.9	69	35.9	126	35.0
	10	50	29.8	55	28.6	105	29.2
Family type	Nuclear	100	59.5	114	59.4	214	59.4
	Joint	68	40.5	78	40.6	146	40.6
Financial problem at home	No	95	56.5	95	49.5	190	52.8
	Yes	73	43.5	97	50.5	170	47.2

Note: All gender differences were non-significant.

TABLE 2.
Prevalence of PTSS in the Two Genders, Based on CPSS

PTSS	Male (%)	Female (%)	Total (%)	95% CI	P
Re-experiencing cluster					
• Intrusive thoughts	45.2	47.9	46.7	41.5–51.8	0.611
• Nightmares	23.8	33.9	29.2	24.5–33.9	0.036
• Flashbacks	18.5	32.3	25.8	21.3–30.4	0.003
• Distress with reminders	34.5	36.5	35.6	30.6–40.5	0.702
• Somatic distress	23.2	37.5	30.8	26.1–35.6	0.003
Avoidance cluster					
• Avoiding thought, conversation, feelings	44.6	43.8	44.2	39.0–49.3	0.865
• Avoiding activities	23.8	32.3	28.3	23.7–33.0	0.075
• Not able to remember important part of event	28.6	40.1	34.7	29.8–39.6	0.022
• Less interest in activities	34.5	44.8	40.0	34.9–45.1	0.047
• Not feeling close to people	12.5	25.5	19.4	15.4–23.5	0.002
• No strong feelings (unable to cry, to feel happy)	11.3	17.2	14.4	10.8–18.1	0.113
• Foreshortened future	28.6	39.6	34.4	29.5–39.4	0.028
Hyperarousal cluster					
• Sleep difficulties	25.0	36.5	31.1	26.3–35.9	0.019
• Irritable/angry	22.0	35.4	29.2	24.5–33.9	0.005
• Concentration problems	31.5	39.1	35.6	30.6–40.5	0.137
• Overly careful/vigilant	22.0	20.3	21.1	16.9–25.3	0.691
• Easily startled	24.4	36.5	30.8	26.1–35.6	0.013

PTSS: posttraumatic stress symptoms; CPSS: childhood PTSD symptom scale; CI: confidence interval; Note: Considering multiple chi-square tests at the symptom level comparison, Bonferroni correction was applied, and the significance level was adjusted to *P* < 0.00294.

TABLE 3.

Prevalence of Functional Impairments in Different Genders

Impairment areas	Male (%)	Female (%)	Total (%)	95% CI	P
• Doing prayers	32.7	37.0	35.0	30.1–39.9	0.400
• Chores and duties at home	50.0	49.5	49.7	44.6–54.9	0.921
• Relationship with friends	38.7	37.5	38.1	33.0–43.1	0.816
• Fun and hobbies activities	42.9	46.9	45.0	39.9–50.1	0.445
• Schoolwork	57.7	57.8	57.8	52.7–62.9	0.989
• Relationship with family	42.9	40.6	41.7	36.6–46.8	0.668
• General happiness with life	44.6	53.6	49.4	44.3–54.6	0.088
Any functional impairment					
• No impairment (score 0)	17.9	18.2	18.1	14.1–22.0	
• Impairment (score 1–7)	82.1	81.8	81.9	78.0–85.9	0.927
Significant functional impairment					
• No significant impairment (score 0–3)	57.1	56.8	56.9	51.8–62.1	
• Significant functional impairment (score 4–7)	42.9	43.2	43.1	37.9–48.2	0.943

CI: confidence interval.

TABLE 4.

Probable PTSD Diagnoses Based on Different Diagnostic Systems

	Male (%)	Female (%)	Total (%)	95% CI	P
ICD-11 (three-factor model)					
• Symptom criterion	13.1	17.7	15.6	11.8–19.3	0.228
• Symptom and impairment	11.9	17.2	14.7	11.1–18.4	0.158
• Symptom and significant impairment	7.7	12.5	10.3	7.1–13.4	0.138
ICD-11 (two-factor model)					
• Symptom criterion	17.9	22.4	20.3	16.1–24.4	0.285
• Symptom and impairment	16.7	21.4	19.2	15.1–23.2	0.260
• Symptom and significant impairment	10.7	14.1	12.5	9.1–15.9	0.338
ICD-10					
• Symptom criterion	27.4	35.4	31.7	26.9–36.5	0.102
• Symptom and impairment	24.4	32.3	28.6	23.9–33.3	0.099
• Symptom and significant impairment	13.7	18.8	16.4	12.6–20.2	0.196
DSM-5					
• Symptom criterion	8.9	19.8	14.7	11.1–18.4	0.004
• Symptom and impairment	8.9	18.8	14.2	10.6–17.8	0.008
• Symptom and significant impairment	7.7	12.0	10.0	6.9–13.1	0.181
DSM-IV					
• Symptom criterion	14.3	29.2	22.2	17.9–26.5	0.001
• Symptom and impairment	14.3	26.6	20.8	16.6–25.0	0.004
• Symptom and significant impairment	10.1	15.1	12.8	9.3–16.2	0.158

PTSD: posttraumatic stress disorder; ICD: International Classification of Diseases; DSM: Diagnostic and Statistical Manual of Mental Disorders.

Discussion

The results of this study suggested that a considerable proportion of adolescent victims of the earthquake had PTSS. The most common amongst them was intrusive thought (46.7%), followed by avoiding thoughts, conversations, or feelings about the disaster (44.2%); decreased interest in activities (40.0%); distress with reminders (35.6%); and concentration problems (35.6%). Compared with males, females reported all the PTSS more frequently, except the symptoms of avoiding thoughts, conversations or feelings and being overly careful or vigilant. The gender difference of the proportions of each PTSS was comparable; however, not feeling close to people was reported significantly ($P = 0.002$) more by the females at a revised significance level following Bonferroni correction (Table 2).

In all the diagnostic systems (Table 4), higher percentages of females had possible PTSD, compared with that of males. Most post-disaster or posttrauma studies have found the females to be more vulnerable for PTSD.^{20–22} Various possible reasons both biological and psychosocial have been suggested for the increased prevalence of PTSD in females after the disaster.²³ For example, females report a greater sense of threat from the trauma than males, and that perceived threat predicts psychological distress in women, but not in men. Females appear to have more peritraumatic dissociation that is known to be linked to PTSD.^{24,25} The reasons also include the difference in the type of trauma exposure, and differences in neuro-anatomical and physiological responses to traumatic experience between the genders.²³ In this study, significantly more females, compared with males, were afraid of death during the disaster. Fear of death in a situation suggests the magnitude of stress experience, and this could be linked to more PTSS and PTSD in females.

Applying Diagnostic Criteria for PTSD in Different Systems

The changes in diagnostic criteria in ICD-11 and DSM-5 can be summarized as follows. The ICD-11 three-factor model of diagnosis requires the stressor criterion,

one of two of re-experiencing symptoms, one of two avoidance symptoms, one of two hyperarousal symptoms, and impairment.²⁶ ICD-11 two-factor model of diagnosis requires the stressor criterion, two of four of re-experiencing symptoms or avoidance symptoms, one of two hyperarousal symptoms, and impairment.²⁶ Impairment has been specified as significant impairment in personal, family, social, educational, occupational, or other important areas of functioning.¹³

In ICD-10, the criteria for a stressful event to qualify for PTSD are described as exceptionally threatening or catastrophic, which would be likely to cause pervasive distress in almost anyone.²⁷ PTSD diagnosis in ICD-10 required the stressor criterion, one re-experiencing symptom, one avoidance symptom, and specific amnesia or two of five hyperarousal symptoms.²⁷ However, ICD-10 does not specify an impairment criterion. A delayed onset of PTSD beyond six months of the event has been recognized in ICD-10 and ICD-11.

DSM-IV required both stressor and response to stressor for the stressor criterion, as well as one of five of re-experiencing symptoms, three of seven avoidance symptoms, and distress or impairment.^{26,28} DSM-5 recognizes four clusters of symptoms: intrusion, avoidance, negative alterations in cognition and mood, and alteration in arousal and reactivity. Diagnosis is arrived at with ≥ 1 intrusion symptom, ≥ 1 avoidance symptom, ≥ 2 symptoms of negative alteration of cognition and mood, and ≥ 2 arousal and reactivity symptoms.¹ While the general criteria apply to anyone older than 6 years, DSM-5 has a subtype for children 6 years and younger. PTSD diagnosis in DSM requires the impairment in functioning criterion. Both DSM-IV and DSM-5 require clinically significant distress or impairment in social occupational or other important areas of functioning.^{1,28}

Applying the diagnostic criteria based on different systems, the proportions of adolescents who could be diagnosed to have PTSD in the newer systems (DSM-5, ICD-11) were less than those in their predecessors. A similar observation has been reported in studies involving

adults in the developed countries.²⁹ The prevalence had ranged from 10.0% (DSM-5, with significant impairment) to 31.7% (ICD-10, without considering any functional impairment). Based on the three-factor model of ICD-11, with significant impairment, 10.3% could be considered for PTSD, which is comparable to the DSM-5 proportion. In a meta-analysis of 46 studies involving earthquakes, the range of PTSD incidence was 1.2–82.6%, whereas a combined incidence rate of PTSD diagnosed more than nine months after the earthquake was 19.5%.³⁰ Variations of rates of PTSD following disasters are contributed to by many factors such as the nature of trauma exposure and an individual's meaning of personal loss.³¹ The proportions of adolescents with diagnostic possibilities both in ICD and DSM systems were less than the proportion with the cutoff score for CPSS for intervention. Therefore, it is possible that many disaster victims have subsyndromal PTSD and would require help.^{4,32}

The newer concept of PTSD in ICD-11 is more focused, aiming at specific salient features of the diagnosis and simplifying the assessment. It will probably lead to a reduction of overdiagnosis and false-positives.³³ It can be expected that considering fewer core symptoms, the diagnosis of PTSD in new systems will become more homogenous in adolescents. This may help in more focused intervention measures and outcome studies. In addition, ICD-11 introduced the functional impairment criterion similar to DSM-5, which adds another clinically relevant and meaningful component to the diagnosis. Clinical implication of our study finding is that the use of ICD-11 criteria of PTSD in adolescents will lead to fewer diagnoses compared to ICD-10; and the figures will be comparable to DSM-5.

Strength and Limitations

The study was conducted with a validated instrument in the local Nepali language.¹⁹ It could evidence the effect of the change of concept in PTSD in newer diagnostic systems, namely ICD-11 and DSM-5.

However, there were a few limitations. There was no scope for a clinical correlation of the findings, which would

have been ideal. There is no specific description of how to quantify functional impairment as 'significant' in the diagnostic systems, so we have taken significant functional impairment as having more than 50% score of seven functional items to arrive at a diagnostic threshold. However, impairments in the individual areas could be clinically significant. For this purpose, diagnostic probabilities with the presence or absence of functional impairments are also given. It will be better to develop an instrument to measure and quantify the functional impairment associated with PTSD, appropriate for different age-groups. The response to the stressor criterion of DSM-IV was not specifically studied, although the fear of death as a response to the earthquake was ascertained. As PTSS was developed based on DSM-IV, it may not capture all the symptom criteria for DSM-5. There was no information on a couple of items of the PTSD checklist for DSM-5 (PCL-5) diagnosis,³⁴ (e.g., blaming self or other for what happened, and taking too many risks or doing things that could cause harm). The estimated diagnostic prevalence may be lower than the actual value. An updated Child PTSD Symptom Scale for DSM-5 (CPSS-5), is now available.³⁵

Future epidemiologic studies should use updated screening based on the newer criteria for PTSD. It would be preferable to use a measure of functioning to identify significant impairment in a useful way. Similar studies are also required in different cultures, trauma types, and other age groups.

Conclusion

The possible prevalence of PTSD based on the ICD-11 criteria is comparable to that based on DSM-5 criteria, which is lower than figures based on their predecessors. Being focused on the core symptoms of PTSD and due to the inclusion of an impairment criterion, ICD-11 diagnosis of PTSD is expected to be more homogenous.

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