

## Psychiatric Morbidity in Children and Adolescent Survivors of a Snowstorm Disaster in South Kashmir, India

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### Abstract

**Objective:** To determine the long term psychiatric morbidity in children and adolescents in a snowstorm affected area in South Kashmir, India.

**Methods:** It is a cross sectional study done in a disaster affected population of children and adolescents in South Kashmir 5 years after the disaster. Mini International Neuropsychiatric interview for children and adolescents (MINI-KID) was applied for evaluation of symptoms and diagnosis on a randomly selected group of 100 children and adolescents. A semi-structured proforma was prepared for socio-demographic profile. Kuppaswamy's Socioeconomic Status Scale, 2007 was used for determining socio-economic status. Oslo-3 Social Support Scale (OSS-3) was used to calculate social support.

**Results:** Of the 100 children and adolescents studied (41.32% of the affected population of children and adolescents) 41 were noted to have at least one psychiatric diagnosis (patients). PTSD (14%) was the commonest diagnosis followed by GAD (5%), MDD (4%) and separation anxiety disorder (4%). Psychiatric morbidity was found to be more prevalent in Pre-Adolescents, Females, Primary schoolers, joint families, upper & lower socio economic classes, only-children and in those with poor social support.

**Conclusion:** Prevalence of psychiatric disorders remain high in children and adolescents long after the disaster has happened.

**Keywords:** Psychiatric Morbidity Children and Adolescents Disaster

### Introduction

India ranks second in world not only in terms of its population but also in disaster proneness.<sup>1</sup> Disasters, whether they are natural or man-made, result in a wide range of mental and physical health consequences.<sup>2</sup> International public agenda has taken notice of protection and care of children in natural and man-made disasters. This, in large part, is due to observations that those affected and overlooked often include children and adolescents.<sup>3</sup> There is continuous controversy about the impact of disasters on victims including children<sup>4, 5</sup> and some investigations deny that serious psychological effects occur.<sup>6, 7, 8</sup> However further research has found that the criterion used in these studies were extremely narrow and inadequate and hence more systematic, clinically relevant investigations are required.<sup>9</sup> For children and adolescents, response to disaster and terrorism involve a complex interplay of pre-existing psychological vulnerabilities, stressors and nature of support in the aftermath. Previous research has shown that direct exposure to different types of mass traumatic events is associated with an increase in post-traumatic stress symptoms,<sup>10, 11, 12, 13</sup> anxiety, and depression,<sup>11, 14</sup> which are frequently comorbid with post-traumatic stress reactions among youth.<sup>15</sup> To the best of our knowledge, studies on long term psychological effects of disasters on younger age groups from South Asian countries are only a handful even though the frequency and the extent of natural disasters in this part of the world are considerable. As

trauma during childhood and adolescents can etch an indelible signature in the individual's development and may lead to future disorder,<sup>16</sup> it underscores the need for such studies.

A snowstorm followed by an avalanche took over a small mountainous village "Waltengu Nard" in South Kashmir, India on 19th Feb. 2005, about a month after the devastating Indian Ocean Tsunami. Of the total population, 24.77% (n=164) had perished.<sup>17</sup> As reported, the total population of children and adolescents prior to disaster was 242, of whom 52 died (21.49%).<sup>17</sup> The present study is a discreet one which aims to determine long term psychiatric morbidity among the surviving children and adolescents of this disaster affected region five years after the snowstorm disaster. This is based on the notion that psychiatric disturbances can be present in children and adolescents years after a disaster has occurred.<sup>18, 19, 20</sup> The socio-demographic variables of the patients are also studied. The results may support the need to apply wide area epidemiological approaches to mental health assessment after any large scale disaster.

### Material and Methods

The study was designed as a survey of children attending school. Children from ages 6 years to 17 years from the high school near Waltengu Nard were taken up for the study. Only those children who were present in the area during the disaster were included in the study. Those with presence of any

psychiatric disorder prior to the time of disaster, mental retardation, organic brain disorder, serious physical disability prior to disease (e.g. blindness, polio, amputated limbs etc.) or severe medical condition (e.g. congenital or rheumatic heart disease, tuberculosis, malignancy etc.) were excluded from the study. Within the school, an alphabetically ordered list was prepared including all classes of school with children aged 6-17 years 11 months. Every 3<sup>rd</sup> student on this list was chosen and subjected to inclusion and exclusion criteria until a sample size of 100 children was complete. Informed consent was obtained both from the child and one of his/her caregivers or parents.

Selected children were subjected to the Mini International Neuropsychiatric interview for children and adolescents (MINI-KID) for evaluation of symptoms and diagnosis which is a DSM-IV based diagnostic interview with high reliability and validity.<sup>21, 22</sup> A semi structured proforma was prepared for socio-demographic profile. Kuppuswamy's Socioeconomic Status Scale, 2007 was used for determining socio-economic status.<sup>23</sup> Oslo-3 Social Support Scale (OSS-3) was used to calculate social support.<sup>24</sup>

Interviews were conducted following formal training in instituting MINI-KID by trained psychiatrists of the Department of Psychiatry GMC Srinagar. The data was then subjected to appropriate statistical methods. A p-value less than 0.05 was taken as significant.

## Results

Of the 100 children and adolescents studied (41.32% of the affected population of children and adolescents) 41 were noted to have at least one psychiatric diagnosis (patients). The socio-demographic profile of these patients is represented in Table 1. Age and sex distribution of diagnoses is presented in Table 2 and Table 3 respectively.

A total of 54 diagnoses were observed in these 41 patients (Figure 1), with comorbidities present in 12 patients (29.27%). 11 of these 12 patients were experiencing two psychiatric disorders present concurrently and 1 was enduring three concurrent psychiatric diagnoses. Post-Traumatic Stress Disorder (PTSD) was the commonest comorbidity seen in 6 patients. This comes to 42.86% of total PTSD cases. This was followed by Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), Suicidality, Social Phobia, Panic Disorder, Agoraphobia and Separation Anxiety Disorder (SAD) in 2 each. Attention Deficit/Hyperactivity Disorder (ADHD), Conduct Disorder (CD), Specific Phobia (dark), Substance Abuse and Dysthymia were comorbid in one patient each. Studies have consistently shown presence of psychiatric comorbidities post-disaster.<sup>48, 49</sup> Of the total 54 diagnoses, the commonest were Anxiety disorders (except PTSD), PTSD and affective disorders (includes MDD, dysthymia and mania) comprising 37.04% (N=20), 25.93% (N=14) and 14.81% (N=8) of total diagnosis respectively.

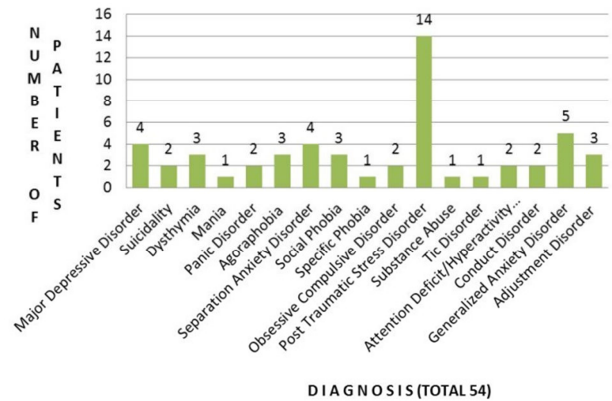


Figure 1: Diagnostic profile of the patients

## Discussion

When children and their families are involved in natural or man-made disasters they may be exposed to diverse stressors which may impact mental health of the survivors, including children.<sup>25</sup> Studies have suggested that reliance on parental reports of children's distress may not be valid as parents typically under-report symptoms compared with child and adolescent self-report in mental health surveys.<sup>26</sup> Thus in our study the psychiatric interview of each child was done individually without getting leads from their parents. In the early "heroic" and "honeymoon" phases of disaster relief there is much energy, optimism, and altruism. As fatigue sets in over the time and frustrations and disillusionment accumulate, more stress symptoms may appear.<sup>27</sup> Accordingly, the study was carried out five years after disaster to catch this delayed response to disaster in the form of psychiatric morbidity.

Consequences of the extensive amount of stress on our sample population due to the snowstorm resulted in a high prevalence of psychiatric disorders in our sample which was apparently not due to any other psychological stress during this period. Despite the fact that the study was done five years after the disaster, the research generated high psychiatric morbidity. Many young survivors reported restlessness and fear with the return of the season in which snowstorm occurred. All these kept the memories of the disaster and the losses fresh in their mind thus not allowing the wounds to heal. Some said that they couldn't keep their minds off the snowstorm during the weeks approaching the anniversary. This was much like the so called anniversary reactions.<sup>28</sup> Even children and adolescents, who have rebuilt their homes or found new dwellings to rent, frequently feel a sense of loss at the anniversary. Though the area was provided with adequate relief in terms of better infrastructure, education, employment and financial help in years post disaster to make their life without psychological distress, but, perhaps four such anniversary reactions and the fact that they are still living in the same geographical area and climate conditions have not allowed them to settle down in a routine since the psychological distress. Of the total sample of 100 patients, 41 % (N=41) reported at least one diagnosis. This is almost similar to a study by Kar and Bastia after a natural

**Table 1: Sociodemographic Profile**

Variable	Sample Size (100)		Patients (41)		Chi square	p-value
	N	%	N	% (of category sample)		
<u>Age</u>						
Pre-Adolescence (6-10)	31	31	19	61.29	2.36	0.1245
Early Adolescence (11-13)	30	30	12	40	0.01	0.9203
Middle Adolescence (14-16)	26	26	6	23.07	1.54	0.2146
Late Adolescence (17+)	13	13	4	30.77	0.06	0.8065
<u>Sex</u>						
Males	47	47	16	34.04		
Females	53	53	25	47.17	0.46	0.4976
<u>Educational Status</u>						
Primary School (1 <sup>st</sup> To 5 <sup>th</sup> Standard)	49	49	25	51.02	1.23	0.2674
Middle School (6 <sup>th</sup> To 8 <sup>th</sup> Std.)	43	43	13	30.23	1.11	0.2921
High School (9 <sup>th</sup> & 10 <sup>th</sup> Std.)	8	8	3	37.5	0.04	0.8415
<u>Family Type</u>						
Nuclear	22	22	6	27.27	0.58	0.4463
Extended Nuclear	24	24	9	37.5	0.00	1
Joint	54	54	26	48.15	0.7	0.4028
<u>Socio-Economic Status</u>						
Upper	0	0	0	0	-	-
Upper Middle	0	0	0	0	-	-
Lower Middle	4	4	1	25	0	1
Upper Lower	55	55	27	49.09	1	3.173
Lower	41	41	13	31.71	0.71	0.3994
<u>Social Support</u>						
Good/Fair	31	31	5	16.13		
Poor	69	69	36	52.17	4.46	0.0347
<u>Birth Order</u>						
Eldest	14	14	10	71.43	1.55	0.2131
Middle	51	51	13	25.49	3.62	0.0571
Youngest	26	26	12	46.15	0.04	0.8415
Only Child	9	9	6	66.67	0.47	0.493
<u>Income Source Of Family</u>						
Farming/Cattle	81	81	34	41.97	0	1
Semi-Government Job	15	15	6	40	0.04	0.8415
Government Job	4	4	1	25	0	1

**Table 2: Age Wise Distribution of Diagnosis**

	Diagnosis	Age groups							
		Pre-adolescence (6-10 yrs) (n=31)		Early adolescence (11-13 yrs) (n=30)		Middle adolescence (14-16 yrs) (n=26)		Late adolescence (17+ yrs) (n=13)	
			%		%		%		%
1	Major Depressive Disorder (MDD) (4)	1	3.23	1	3.33	2	7.69	-	-
2	Suicidality (2)	-	-	-	-	2	7.69	-	-
3	Dysthymia (3)	-	-	2	6.66	1	3.84	-	-
4	Mania (1)	-	-	-	-	-	-	1	16.66
5	Panic Disorder (2)	1	3.23	1	3.33	-	-	-	-
6	Agoraphobia (3)	1	3.23	2	6.66	-	-	-	-
7	Separation Anxiety Disorder (SAD) (4)	4	12.9	-	-	-	-	-	-
8	Social Phobia (3)	2	6.45	-	-	1	3.84	-	-
9	Specific Phobia (1)	1	3.23	-	-	-	-	-	-
10	Obsessive Compulsive Disorder (OCD) (2)	1	3.23	1	3.33	-	-	-	-
11	Post Traumatic Stress Disorder (PTSD) (14)	7	22.58	3	10	2	7.69	2	33.33
12	Alcoholism (0)	-	-	-	-	-	-	-	-
13	Substance Abuse (1)	-	-	-	-	-	-	1	16.66
14	Tic Disorder (1)	1	3.23	-	-	-	-	-	-
15	Attention Deficit/Hyperactivity Disorder (ADHD) (2)	2	6.45	-	-	-	-	-	-
16	Conduct Disorder (CD) (2)	1	3.23	1	3.33	-	-	-	-

17	Oppositional Defiant Disorder (ODD) (0)	-	-	-	-	-	-	-	-
18	Psychotic Disorders (0)	-	-	-	-	-	-	-	-
19	Anorexia Nervosa (0)	-	-	-	-	-	-	-	-
20	Bulimia Nervosa (0)	-	-	-	-	-	-	-	-
21	Generalized Anxiety Disorder (GAD) (5)	-	-	2	6.66	2	7.69	1	16.66
22	Adjustment Disorder (3)	2	6.45	1	3.33	-	-	-	-
23	Pervasive Development Disorder (PDD) (1)	1	3.23	-	-	-	-	-	-
	Total (number of diagnosis) (54)	24		14		10		6	
	Total number of patients (41)	19		12		6		4	

Table 3: Sex Wise Distribution of Diagnosis

	Diagnosis	Sex			
		Males (n=47)		Females (n=53)	
			%		%
1	Major Depressive Disorder (4)	1	2.12	3	5.66
2	Suicidality (2)	1	2.12	1	1.89
3	Dysthymia (3)	1	2.12	2	3.77
4	Mania (1)	1	2.12	-	-
5	Panic Disorder (2)	-	-	2	3.77
6	Agoraphobia (3)	1	2.12	2	3.77
7	Separation Anxiety Disorder (4)	1	2.12	3	5.66
8	Social Phobia (3)	1	2.12	2	-
9	Specific Phobia (1)	-	-	1	1.89
10	Obsessive Compulsive Disorder (2)	1	2.12	1	1.89
11	Post Traumatic Stress Disorder (14)	5	10.64	9	16.98
12	Alcoholism (0)	-	-	-	-
13	Substance Abuse (1)	1	2.12	-	-
14	Tic Disorder (1)	1	2.12	-	-
15	Attention Deficit/Hyperactivity Disorder (2)	1	2.12	1	1.89
16	Conduct Disorder (2)	2	4.25	-	-
17	Oppositional Defiant Disorder (0)	-	-	-	-
18	Psychotic Disorders (0)	-	-	-	-
19	Anorexia Nervosa (0)	-	-	-	-
20	Bulimia Nervosa (0)	-	-	-	-
21	Generalized Anxiety Disorder (5)	1	2.12	4	7.55
22	Adjustment Disorder (3)	1	2.12	2	3.77
23	Pervasive Development Disorder (1)	1	2.12	-	-
	Total (Number of Diagnosis) (54)	21		33	
	Total number of patients (41)	16		25	

disaster in Orissa (cyclone) who found 37.9 % of adolescents with any diagnosis.<sup>29</sup> Similarly Margoob et al found that 34.39 % had a psychiatric disorder at the end of one year, after disaster.<sup>17</sup> Other studies yielded results in the range of 12% to 70% in terms of total psychiatric morbidity.<sup>26, 30-33</sup>

PTSD was the commonest individual diagnosis in our study with 14% (N=14) of the total population. Studies have shown PTSD prevalence after disaster from as high as 72 %<sup>34</sup> to as low as 8 %.<sup>35</sup> However, these were done immediately or within a few months after the disaster and the longitudinal pattern was not studied. A study conducted by Margoob et al reported a prevalence of 18.51 % in a sample of survivors one year after the same snowstorm on which this present study is based.<sup>17</sup> Similarly, Bockszczanin et al 2.5 years after a flood in Poland reported 18 % of children to be suffering from PTSD.<sup>36</sup> Thus our results of 14 % patients suffering from PTSD are also similar to the trend as we are studying them after a period of five years following the disaster. Diagnosis of PTSD

in our study was more common among the pre-adolescent age group, 22.58 % (N=7) and adolescents 33.33% (N=2). Similar findings were reported by Hoven et al who found a prevalence of 20.1 % in this age group.<sup>30</sup> Also PTSD was more frequent in females in our study. It was observed in 16.98 % females (N=9) as compared to 10.64 % for males. Hoven et al also found high prevalence in girls (13.3 % vs. 7.4 %).<sup>30</sup>

Anxiety Disorders (excluding PTSD) formed the most common collective diagnostic category in our sample. Anxiety disorders were present in 20 % (N=20) of our sample population which formed about 37.04 % of total diagnosis. These included cases of GAD 5% (N=5), SAD 4% (N=4), Social Phobia 3% (N=3), Agoraphobia 3% (N=3), Panic Disorder 2% (N=2), OCD 2% (N=2) and Specific Phobia 1% (N=1). Similarly Norris et al found anxiety in various forms in 32% of their sample of disaster victims.<sup>25</sup> Similar findings were also reported by Reijneveld et al.<sup>37</sup> Hoven et al in an important study after 9/11 found prevalence of various anxiety disorders to the magnitude

of 28.6%.<sup>30</sup> Our study correlated very closely to the above mentioned study. GAD was the commonest anxiety disorder among the above group. A prevalence of 5% (N=5) was found in the study sample. This prevalence was almost half of the earlier studies in children and adolescents after a disaster by Kar and Bastia<sup>29</sup> where it was 12% and by Hoven et al.<sup>30</sup> where it came out to be 10.3 %. However these studies were conducted within a few months after the disaster and hence came out with a higher prevalence of GAD than ours. It was more common in girls in contrast to boys (7.55 % vs. 2.12%) similar to study by Hoven et al.<sup>30</sup> SAD was also seen to predominate in anxiety disorders with 4 % (N=4) of the sample receiving the diagnosis. Some studies like one by Hoven et al found it to be prevalent in 12.3 % of their sample 6 months after 9/11.<sup>30</sup> However other studies have found SAD to be comparatively less frequent post disaster in children and adolescents.<sup>34</sup> Thus our findings are modest and lie somewhere between the above two studies. Also ours was a long term study hence SAD figures are a bit low. SAD in our study was more prevalent in girls than boys (5.66% vs. 2.12%). Moreover, it was exclusively seen in ages below 10 years. The above findings are in tune with the study by Hoven et al.<sup>30</sup> Panic disorder showed a low prevalence in our study and was found in only 2 % (N=2) patients. In both of these patients it was found to be comorbid, with MDD in one and with Agoraphobia in another. Studies immediately post disaster found the prevalence to be around 10.8 % (Math et al)<sup>32</sup> and 8.7% (Hoven et al).<sup>30</sup> However in the survivors of the same area, in which our study is based, an earlier study one year after the disaster found 3.08 % prevalence of panic disorder which is very similar to our study.<sup>17</sup> It was more prevalent in females and is well correlated to a study by Hoven et al.<sup>30</sup> Agoraphobia was present in 3 % (N=3) patients. It was comorbid in two patients with panic disorder and with PTSD, and an individual diagnosis in one. Hoven et al have found high rates of Agoraphobia post disaster i.e., about 14.8%.<sup>30</sup> But again this study was done only 6 months after 9/11 hence more morbidity. Female preponderance of the diagnosis was established (3.77 % vs. 2.12 %) as with earlier studies.<sup>30</sup> Obsessive traits are known to increase subsequent to disaster in the surviving population.<sup>38</sup> Similarly 2 % of cases satisfying the criteria for OCD were seen in our study. The commonest obsessions were recurrent intrusive and annoying themes related to the disaster and ruminations about whether it could have been prevented, followed by worries related to harm befalling themselves, family members, or fear of harming others due to losing control over aggressive impulses. Other obsessive themes were related to scenes of trauma and commonly blood. Obsessions regarding extreme fears of contamination were also present.

The affective disorders have been studied less often than PTSD after disaster. Depression is known to occur with increased frequency subsequent to disaster.<sup>25</sup> MDD was present in 4 % (N=4) of the total sample population. Studies conducted immediately after disasters have found higher prevalence. Math et al,<sup>32</sup> Kar & Bastia<sup>29</sup> and Catani et al<sup>33</sup> found the prevalence of

13.5 %, 17.6 % and 19.6 % in their studies respectively. A study at three months and at one year after disaster on the adults in the same population as our study found the prevalence of MDD as 29.6 % and 14.28 % respectively.<sup>17</sup> This decreasing trend is substantiated by the findings of our study and is in line with it. MDD was more common in females (5.66 % vs. 2.12%) which is similar to the study of Hoven et al.<sup>30</sup> Our findings of increased prevalence of MDD in middle adolescents (7.69 %) as compared to other age groups is also comparable to Hoven et al.<sup>30</sup> Of the Dysthymia cases, 3 % (N=3) were observed in our studies. Increased prevalence of dysthymia has not been reported post disaster in earlier studies. Our findings could be a part of large affective diaspora with dysthymia resulting from diminished self-esteem and a sense of helplessness subsequent to disaster. In addition to the time period for depression these patients were given the diagnosis of dysthymia because the depressed mood in them was more apparent subjectively than objectively. Finally these patients could have been on a natural course of dysthymia which usually begins in childhood. Combined dysthymia and MDD accounted for 7 % (N=7) of patients which if taken as a collective depression category, the results are slightly more comparable with the above studies. One patient had Mania (past). This patient had a positive family history of Bipolar Affective Disorder. This could be an incidental finding even though psychological stress is known to precipitate mania.<sup>39</sup> Also the prevalence is 1 % in our study which is even less than the prevalence in general population thus it could be an artifact.<sup>40</sup> Studies have consistently found increased prevalence of adjustment disorder after disaster.<sup>41</sup> In our study prevalence of adjustment disorder was 3% (N=3, anxiety 2, depression 1). In a study by Math et al 3 months after tsunami it was 13.5%.<sup>32</sup> A lower prevalence in our study was again due to the long term nature of study. The role of trauma, stress, and negative life events as risk factors for suicidal ideation and behavior has long been recognized.<sup>42</sup> A longitudinal investigation looking at the trends in suicidality and mental illness in the aftermath of Hurricane Katrina found significant increases in suicidal ideation and plans in the year after the disaster as a result of unresolved hurricane related stresses.<sup>43</sup> The suicidality in our population sample was found to be 2% (N=2) of sample. These results were in tune with that of Kessler et al, although it was immediately after hurricane Katrina and hence a higher prevalence of 6.4%.<sup>43</sup>

Many symptoms of PTSD overlap with the symptoms of ADHD and CD.<sup>44</sup> In our study, each of the disorders were present in 2 % of the sample. In one patient, they were comorbid with each other (ADHD with CD). In a study by Hoven et al 6 months after 9/11, the prevalence of CD was found to be as high as 12.8 %.<sup>30</sup> This could be because of immediate post disaster nature of the study. Also because of the symptom overlap more weight was given to the PTSD diagnosis.

Three patients had a diagnosis of Substance Abuse, Tic Disorder and PDD, 1 % each. Though substance abuse is known to increase subsequent to disaster in adolescents,<sup>30</sup> no evidence was found for relation of tic disorder or PDD to the post-disaster psychiatric stress. The cause of a low prevalence of substance abuse in our sample was because of the fact that the area is inhabited by Muslim population and hence alcohol is not religiously sanctioned, and, harder substances are either not available or they can't be afforded. The only substance which is available is marijuana or cannabis. However, most used it only recreationally and the criterion for abuse was not met. Even the sole patient of substance abuse was also taking cannabis. Also, it is a well known phenomenon that drug dependent subjects do not reveal the true information and deny any history of abuse at first contact with the investigating team.<sup>45</sup> Tic disorder and PDD are regarded as biological disorders and their relation to trauma is only incidental.<sup>46, 47</sup>

Studies have consistently shown presence of psychiatric comorbidities post disaster.<sup>48, 49</sup> The same was observed in our study where 29.27 % of total patients had comorbid psychiatric diagnosis. Similar results were found by Kar and Bastia who found comorbidities in 39% of adolescents.<sup>29</sup> PTSD is the most common comorbid disorder observed during the period post disaster<sup>48, 49</sup> and the same was observed in our study with PTSD comorbid in 14.63 % (N=6) of cases. However when all the anxiety disorders were combined except PTSD, they were found to exceed the comorbidity of PTSD and they were comorbid in 21.95 % (N=9) patients. There is expanding literature regarding comorbidity of anxiety and depression in children and adolescents.<sup>50, 51, 52</sup> Similar comorbidity of an anxiety disorder (including PTSD) and depressive disorder (including Dysthymia) were seen in 7.32 % (N=3) of patients in our study. These results show that psychiatric diagnoses are frequently comorbid after the disaster and there is a need to be vigilant about them for a holistic psychiatric assessment, treatment and rehabilitation of the survivors.

**Sociodemographic Profile:** In our sample the prevalence of psychiatric morbidity was at maximum in pre-adolescents (6-10 years age group) and it was 61.29 % of the sample of pre-adolescents. This is consistent with the research that has suggested that younger children possess fewer strategies for coping with both the immediate disaster impact and its aftermath, and thus may suffer more severe emotional and psychological problems.<sup>53</sup> Second commonest group was of 11-13 years with 40 % morbidity in them which was consistent with an earlier study which also found significant morbidity in this age group.<sup>54</sup> The age characteristics of the total population also closely matched the above findings. More females than males were found to exhibit psychiatric morbidity in our study (47.17 % vs. 34.04 %). Though these findings were in tune with those of Hoven et al, their findings were a little lower than ours (34.7 % vs. 21.8 %).<sup>30</sup> Some studies have found that girls express more anxiety-depressive disorders<sup>30</sup> and PTSD symptoms<sup>55, 56</sup> and boys seen to exhibit more behavioral

problems.<sup>57</sup> Similarly in our study rates of anxiety disorders, depressive disorders and PTSD were higher in girls and conduct disorder was exclusively found in boys.

Our study suggested that children up to 5<sup>th</sup> standard were (51.02 %) more susceptible than those in higher classes. This was in accordance with an earlier study by Kar et al.<sup>54</sup> These findings are also in accordance with the findings of a study by Hoven et al. which found maximum morbidity (34.1 %) in preschoolers.<sup>30</sup> Thus it could be said that higher educational status was protective, in addition to increasing age. Psychiatric morbidity was highest in children who were from joint family systems (48.15%). This was followed by children from extended nuclear (37.5%) and nuclear (27.27%) families. This pattern is consistent with an earlier study by Margoob et al.<sup>58</sup> This could be because of the fact that in the sample of joint families there was loss of more family members in the tragedy. There were no cases of upper and upper-middle socio-economic class and lower-middle class was significantly less in our sample. This was because of the demographics per se and was not a sampling error. Consequently, higher morbidity was seen in the upper-lower socio-economic class (49.09%) followed by the lower class (31.71%). All the above findings are in accordance with an earlier study by Margoob et al.<sup>58</sup>

Psychiatric morbidity was not found to be influenced by the source of family income. Same was observed by Kar and Bastia in their study.<sup>29</sup> The majority of the patients had poor social support (52.17%, p=0.03). These findings are substantiated by earlier studies.<sup>59</sup> Loss of a parent was strongly associated with lower social support and high psychiatric morbidity. This was also reported by earlier studies.<sup>31, 60</sup> Our study reported higher psychiatric morbidity in first-born children (71.43%). This could be due to increased burden of family matters on an eldest child subsequent to a disaster especially when head of family or mother has perished in such a catastrophe. This was in accordance with earlier studies on birth order and psychiatric morbidity.<sup>61</sup> However in our study only child also documented significant morbidity which is in contrast to earlier studies.<sup>61</sup> This could be due to the fact that an only child had significantly less social support due to fewer siblings and death in the family due to disaster considerably compounding the problem. Also, often the youngest born is more pampered and hence more likely to feel emotionally insecure when attention is shifted from him in the aftermath of a disaster.

There was an unavoidable limitation in the study; the disaster-affected population was not compared with a normal or control population. The difficulty we faced was finding a control population as the area has a racially, geographically and culturally distinct population of Gujjars and all of them were affected. So no appropriate control group could be found. However if we compare it with most of the studies done in populations from the north India, the prevalence in our study is largely greater than those found in those studies.<sup>62</sup>

## Conclusion

This research portrays and scrutinizes the experience of children and adolescents in the aftermath of a snowstorm disaster and supports the idea that children are susceptible to morbid psychological experiences long after the traumatic event has occurred. With that said, we want to stress the decisive role of support agents for children. These agents include the adults and peers who help children and youth recuperate in the long term. Provision of an outreach psychosocial and clinical service long after the disaster when no one is around to help after the initial knee jerk response of relief agencies is also stressed.

## Competing Interests

None declared

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## References

1. Ray-Bennet NS. Environmental Disasters and disastrous policies: an overview from India. *Social Policy and administration*. 2007; 41: 419-424.
2. Saylor CF: Introduction: Children and Disasters: Clinical and Research Issues. In: Saylor CF (ed.): *Children and Disasters*. New York. NY: Plenum Press, 1993, pp. 1-10.
3. World Federation for Mental Health (WFMH): *The Effect of Trauma and Violence on Children and Adolescents: A Global Mental Health Education Program of the World Federation for Mental Health*. Alexandria, VA: World Federation for Mental Health and World Health Organization, 2002.
4. Kingston W, Rosser R. Disaster: effects on physical and mental state. *J Psychosom Res*. 1974; 18: 437-456.
5. Fredrick CJ. Current thinking about crisis or psychological intervention in United States disasters. *Mass Emergencies*. 1977; 2: 43-50.
6. Quarantelli EL, Dynes RR Response to social crisis and disasters. *Annual Review of Sociology*. 1977; 3: 23-49.
7. Taylor V. Good news about disaster. *Psychology Today*. 1977; 11: 93-96.
8. Tierney KJ, Baisden B. *Crises Intervention Programs for Disaster Victims: A Source Book and Manual for Smaller Communities*. DHEW Publication (ADM)79-675. Washington, DC, US Government printing office, 1979.
9. Fredrick CJ. Effects of natural vs. human induced violence upon victims. In *Evaluation and Change: Services for Survivors*. Minneapolis KL (ed), Minneapolis Medical Research Foundation, 1980.
10. Pynoos RS, Frederick C, Nader K, Arroyo W, Steinberg A, Eth S, et al. Life threat and posttraumatic stress in school-age children. *Arch Gen Psychiatry*. 1987; 44: 1057-1063.
11. Goenjian AK, Molina L, Steinberg AM, Fairbanks LA, Alvarez ML, Goenjian HA, et al. Posttraumatic stress and depressive reactions among Nicaraguan adolescents after hurricane Mitch. *Am J Psychiatry*. 2001; 158: 788-794.
12. Smith P, Perrin S, Yule W, Rabe-Hesketh S. War exposure and maternal reactions in the psychological adjustment of children from Bosnia-Herzegovina. *J Child Psychol Psychiatry*. 2001; 42: 395-404.
13. Rothe EM, Lewis J, Castillo-Matos H, Martinez O, Busquets R, Martinez I. Posttraumatic stress disorder among Cuban children and adolescents after release from a refugee camp. *Psychiatr Serv*. 2002; 53: 970-976.
14. Papageorgiou V, Frangou-Garunovic A, Iordanidou R, Yule W, Smith P, Vostanis P. War trauma and psychopathology in Bosnian refugee children. *Eur Child Adolesc Psychiatry*. 2000; 9: 84-90.
15. Vizek-Vidovic V, Kuterovac-Jagodic G, Arambasic L. Posttraumatic symptomatology in children exposed to war. *Scand J Psychol*. 2000; 41: 297-306.
16. Schwarz E, Perry BD. The post-traumatic response in children and adolescents. *Psychiatric Clinics of North America*. 1994; 17: 311-326.
17. Margoob MA, Khan AY, Firdosi MM, Ahmad SA, Shaukat T. One-Year Longitudinal Study of Snow Storm Disaster Survivors in Kashmir. *JK-Practitioner* 2006; 13(Suppl.1): S29-S38.
18. McFarlane AC. The longitudinal course of post-traumatic morbidity: The range of outcomes and their predictors. *Journal of Nervous and Mental Disease*. 1988a; 176: 30-3.
19. McFarlane AC. The phenomenology of post-traumatic stress disorders following a natural disaster. *Journal of Nervous and Mental Disease*. 1988b; 176: 22-29.
20. Russoniello CV, Skalko TK, O'Brien K. Childhood post-traumatic disorder and its effects to cope after Hurricane Floyd. *Behavioral Medicine*. 2002; 28: 61-71.
21. Sheehan DV, Sheehan KH, Shytle RD. Reliability and validity of the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID). *J Clin Psychiatry*. 2010; 71: 313-26.
22. American Psychiatric Association. *DSM-IV, Diagnostic and Statistical Manual of Mental disorders*, Washington. 4th edition. 1994.
23. Kumar N, Shekhar C, Kumar P, Kundu AS. Kuppupswamy's Socioeconomic Status Scale-Updating for 2007. *Indian J Pediatr*. 2007; 74: 1131-1132.
24. Meltzer H. Development of a common instrument for mental health. In: Nosikov & Gudex (eds). *EUROHIS: Developing Common Instruments for Health Surveys*. Amsterdam: IOS Press. 2003.
25. Norris FH, Friedman MJ, Watson PJ. 60,000 disaster victims speak: part I. An empirical review of the empirical literature, 1981-2001. *Psychiatry: Interpersonal and Biological Processes*. 2002; 65: 207-39.
26. McDermott BMC, Palmer LJ. Post-disaster service provision following proactive identification of children with emotional distress and depression. *Australian and New Zealand Journal of Psychiatry*. 1999; 33: 855-863.
27. Farberow NL, Frederick CJ. *Training Manual for Human Service Workers in Major Disasters*. Rockville, Maryland: National Institute of Mental Health, 1978.
28. Gabriel MA. Anniversary Reactions: Trauma revisited. *Clinical Social Work Journal*. 1992; 20: 179-192.
29. Kar N, Bastia BK. Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. *Clinical Practice and Epidemiology in Mental Health*. 2006; 2: 17.
30. Hoven CW, Duarte CS, Lucas CP, Wu P, Mandell DJ, Goodwin RD. Psychopathology Among New York City Public School Children 6 Months After September 11. *Arch Gen Psychiatry*. 2005; 62: 545-551.

31. Gul M, Kashmiri M, Sabir A. Emotional and behavioural difficulties among children who lost their parents in a natural disaster: A pilot study Short Communication. *JPPS*. 2007; 4: 57.
32. Math SB, Tandon S, Girimaji SC, Benegal V, Kumar U, Hamza A et al. Psychological Impact of the Tsunami on Children and Adolescents from the Andaman and Nicobar Islands. *Prim Care Companion J Clin Psychiatry*. 2008; 10: 31–37.
33. Catani C, Jacob N, Schauer E, Kohila M, Neuner F. Family violence, war, and natural disasters: A study of the effect of extreme stress on children's mental health in Sri Lanka. *BMC Psychiatry*. 2008; 8: 33.
34. Grigorian HM. "The Armenian Earthquake." In Austin LS, (ed.): *Responding to Disaster*. Washington, DC: American Psychiatric Press, 1992, 155-167.
35. Schwarz ED, Kowalski JM. Malignant memories: PTSD in children and adults after a school shooting. *J Am Acad Child Adolesc Psychiatry*. 1991; 30: 936–44.
36. Bokszczanin A. PTSD Symptoms in Children and Adolescents 28 Months after a Flood: Age and Gender Differences. *Journal of Traumatic Stress*. 2007; 20: 347-351.
37. Reijneveld SA, Crone MR, Verhulst FC, Verloove-Vanhorick SP. The effect of a severe disaster on the mental health of adolescents: A controlled study." *Lancet*. 2003; 362: 691-696.
38. Margoob MA, Hussain A, Dar FA, Mustafa T, Wani ZA, Khan AY, et al. Adult life consequence of childhood sexual abuse: Case report study. *JK-Practitioner* 2006; 13(Suppl 1):S79-S81.
39. Malkoff-Schwartz S, Frank E, Anderson B, Sherill JT, Siegel L, Petterson D, et al. Stressful Life Events and Social Rhythm Disruption in the Onset of Manic and Depressive Bipolar Episodes: A Preliminary Investigation *Arch Gen Psychiatry*. 1998; 55: 702–707.
40. Rihmer Z, Angst A: *Mood Disorders: Epidemiology*. In: Sadock BJ, Sadock VA, (eds.): *Comprehensive Textbook of Psychiatry*. 8th ed. Baltimore: Lippincott Williams & Wilkins, 2004.
41. Boscarino JA, Adams RE, Figley CR. Mental health service use 1-year after the World Trade Center disaster: implications for mental health care. *Gen Hosp Psychiatry*. 2004; 26: 346-58.
42. Paykel ES, Prusoff BA, Myers JK. Suicide attempts and recent life events: a controlled comparison. *Arch Gen Psychiatry*. 1975; 32: 327– 333.
43. Kessler RC, Galea S, Gruber MJ, Sampson NA, Ursano RJ, Wessely S. Trends in mental illness and suicidality after Hurricane Katrina. *Mol Psychiatry*. 2008; 13: 374–384.
44. American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of post-traumatic stress disorder in children and adolescents. *J Am Acad Child Adolesc Psychiatry*. 1998; 37: 4S-26S.
45. Margoob MA, Majid A, Dhuha M. Thin layer chromatography (TLC) in detection of current nature of drug abuse in Kashmir. *JK Pract* 2004; 11: 257-260.
46. Swain JE, Scahill L, Lombroso PJ, King RA, Leckman JF. "Tourette syndrome and tic disorders: a decade of progress". *J Am Acad Child Adolesc Psychiatry*. 2007; 46: 947–68.
47. Lord C, Cook EH, Leventhal BL, Amaral DG. "Autism spectrum disorders". *Neuron*. 2000; 28: 355–63.
48. Kar N. Psychosocial issues following a natural disaster in a developing country: a qualitative longitudinal observational study. *Int J Disast Med*. 2006; 4: 169-176.
49. Kilpatrick DG, Ruggiero KJ, Acierno R, Saunders BE, Resnick HS, Best CL. Violence and risk of PTSD, Major Depression, Substance abuse/dependence, and Comorbidity: Results from the national survey of Adolescents. *Journal of Consulting and Clinical Psychology*. 2003; 71: 692-700.
50. Goenjian AK, Pynoos RS, Steinberg AM, Najarian LM, Asarnow JR, Karayan I. Psychiatric comorbidity in children after the 1988 earthquake in Armenia. *J Am Acad Child Adolesc Psychiatry*. 1995; 34: 1174-1184.
51. Angold A, Costello EJ. Depressive comorbidity in children and adolescents: empirical, theoretical and methodological issues. *Am J Psychiatry*. 1993; 150: 1779-1791.
52. Strauss CC, Last CG, Hersen M, Kazdin AE. Association between anxiety and depression in children and adolescents with anxiety disorders. *Abnorm Child Psychol*. 1988, 16: 57-68.
53. Mercuri A, Angelique HL. Children's responses to natural, technological, and na-tech disasters. *Community Mental Health Journal*. 2004; 40: 167–175.
54. Kar N, Mohapatra PK, Nayak KC, Pattanaik P, Swain SP and Kar HC . Post-traumatic stress disorder in children and adolescents one year after a super-cyclone in Orissa, India: exploring cross-cultural validity and vulnerability factors. *BMC Psychiatry*. 2007; 7: 8.
55. Green BL, Korol M, Grace MC, Vary MG, Leonard AC, Gleser GC . Children and disaster: age, gender, and parental effects on PTSD symptoms. *J Am Acad Child Adolesc Psychiatry*. 1991; 30: 945-951.
56. Shannon MP, Lonigan CJ, Finch AJ, Taylor CM. Children Exposed to Disaster: I. Epidemiology of Post-Traumatic Symptoms and Symptom Profiles. *J Am Acad Child Adolesc Psychiatry*. 1994; 33: 80-93.
57. Pfefferbaum B, Nixon SJ, Tucker PM, Tivis RD, Moore VL, Gurwitsch RH. Posttraumatic stress responses in bereaved children after the Oklahoma City bombing. *J Am Acad Child Adolesc Psychiatry*. 1999; 38: 1372–1379.
58. Khan AY, Margoob MA. Pediatric PTSD: Clinical Presentation, traumatic events and sociodemographic variables— experience from a chronic conflict situation. *JK-Practitioner*2006; 13: S40-S44.
59. Väänänen A, Vahtera J, Pentti J, Kivimäki M. Sources of social support as determinants of psychiatric morbidity after severe life events. Prospective cohort study of female employee. *Journal of Psychosomatic Research*. 2005; 58: 459-467.
60. Goenjian AK, Walling D, Steinberg AM, Roussos A, Goenjian HA, and Pynoos RS. Depression and PTSD symptoms among bereaved adolescents 6½ years after the 1988 Spitak earthquake. *Journal of Affective Disorders*. 2009; 112: 81-84.
61. Anita, Gaur DR, Vohra AK, Subhash S, Khurana H. Prevalence of psychiatric morbidity among 6 to 14 year old children. *Indian Journal of Community Medicine*. 2003; 28: 133-37.
62. Malhotra S, Kohli A, Kapoor M, Pradhan B. Incidence of childhood psychiatric disorders in India. *Indian J Psychiatry*. 2009; 51(2): 101–107.



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