INTRODUCTION
Pakistan’s geographical location, inadequate preparedness for floods, and poor structural quality of housing, generally predispose it to a large scale post-flood destruction. In July 2010, heavy monsoon rains resulted in floods in Pakistan, which affected around 20 million people, 78 districts, covered over 100,000 square kilometer area, and led to heavy financial, environmental and human losses. Younger and especially pregnant women were at a greater risk as cultural constraints prevented them from being able to find relief support for themselves. In addition, living in refugee camps with lack of proper food, shelter, clean drinking water as well as death of spouse or parents added extra discomfort. Floods with such an impact can have long lasting effects not only on physical but mental health of people as well.

People witnessing a natural disaster may experience deterioration of psycho-social health as a result of exposure to a high frequency of physical injury, threat to or actual loss of life, serious continuing financial difficulty, or contribution of human carelessness or intent. Flood victims in Pakistan, more or less, experienced these threats making them more vulnerable towards getting psychiatric impairments.

A variety of psychiatric symptoms and disorders can be expected to be present among adolescents of district Muzaffargarh, a heavily affected area, after a major trauma, like July 2010 floods in Pakistan. Adolescents who have suffered significant trauma and loss are quite vulnerable to psychiatric impairment. Initially, they may experience typical symptoms after witnessing the whole trauma. Moreover, their family and close kins face danger such as nightmares, flashbacks, avoidance of reminders of the trauma, emotional numbing, stomachaches, headaches, lack of concentration, apathy, decline in responsible behaviors, and rebellion at home or school. With the help of appropriate pharmacotherapy and psychological interventions, many adolescents recover from these typical symptoms. However, if symptoms persist and are left untreated, these will disrupt their daily life functioning and may develop into full blown disorders such as Post-Traumatic Stress Disorder (PTSD), depression, Generalized Anxiety Disorder (GAD), and substance abuse etc. Moreover, women become more vulnerable and are two times more likely to develop PTSD symptoms then men after a disaster. Women in Pakistan experienced great difficulty in the context of aftermath of 2010 floods due to exposure to the unfamiliar environment of relief camps, inability to maintain privacy from male strangers, and separation from their social network of relations, which

ABSTRACT
Objective: To estimate the incidence of psychopathology, frequency of psychiatric symptoms, and their demographic correlates in flood affected female adolescents.
Study Design: Descriptive study.
Place and Duration of Study: District Muzaffargarh, Pakistan, from July to October 2011.
Methodology: Female adolescent flood victims, aged 13 - 19 years, were recruited. Screening was done and Diagnostic Questionnaire for Psychiatric Disorders was administered to confirm the diagnosis according to DSM-IV-TR. Demographic information was also obtained regarding nature of personal and financial damages to the participants due to flood.
Results: The mean age of 205 participants was 15.78 ±2.13 years. Post-flood diagnoses of Post-Traumatic Stress Disorder (PTSD), Generalized Anxiety Disorder (GAD), and Major Depressive Disorder (MDD) had the highest frequency rates in female adolescents flood victims i.e., 4 (2%), 2 (1%) and 2 (1%), respectively. Psychiatric symptoms of GAD and PTSD were reported most by the screened-out participants; whereas participants who were still living in personal tents and received late arrival of any kind of aid, reported more psychopathology.
Conclusion: Flood and consequent financial damages may pose a risk factor for development of psychiatric symptoms and psychopathology. Results have implications for the need of improved mental health services for female adolescent flood victims.

caused a great deal of anxiety and stress in them.\(^8\) Therefore, it becomes important to ascertain the incidence of psychiatric disorders and common psychiatric symptoms in this high risk population. The objective of the present study was to find out the frequency of incidence of different psychiatric disorders, psychiatric symptoms, and their demographic correlates in flood affected female adolescents living in district Muzaffargarh.

**METHODOLOGY**

Non-probability purposive sampling strategy was used to select 205 flood affected female adolescents from District Muzaffargarh for this study which was conducted from July to October 2011.

Inclusion criteria consisted of selection of only those female participants who were within the age range of 13 - 19 years and were affected by the flood. Moreover, data was collected from ten villages of three highly flood affected tehsils (Muzaffargarh, Kot Addu, and Alipur) of district Muzaffargarh which were conveniently accessible; indicated by the district administrators. Participants with a past history of drug dependence, chronic illness, brain injury, or history of psychiatric illness prior to flood were excluded from the study.

Demographic questionnaire was designed by researchers and included information regarding participants' age, education, number of deaths of the participants' relatives, injury or disability to self, loss of their houses, land, or cattle etc.

Screening was done and diagnostic questionnaire for psychiatric disorders [unpublished observations] was administered on research participants in two steps. First, screening questionnaire for psychiatric disorders, comprising of 16 screening questions, was used to screen out participants with different psychiatric disorders. Participants' responses were rated on 4 point Likert scale ranging from 0 to 3 (0 = not at all; 3 = very much) and few questions were on dichotomous scale (Yes/No). In present study, cronbach alpha of this questionnaire came out to be 0.89.

In the next step, diagnostic interview was conducted on screened out participants to confirm the diagnosis according to DSM-IV-TR criteria.\(^9\) This interview catered 20 psychological disorders with reference to DSM-IV-TR criteria.\(^9\) Responses revolved around onset, duration, as well as severity of symptoms such as very much, moderately, rarely, and not at all.

Departmental Doctoral Committee of Centre for Clinical Psychology, University of the Punjab approved the research project. The data was collected eleven months after flood. Written permission was obtained from concerned authorities of Muzaffargarh district and data was obtained from ten highly flood affected villages (Muhammad Abad = 8; Qazi Basti = 4; Muslim Wala = 8; Mundka = 17; Bara Basti = 7; Jalal Abad = 45; Meer Wala = 26; Paka Ghalwan = 56; Kot Addu = 29; Matli Wala = 5), located in three tehsils of district Muzaffargarh. Data derived from one village depended upon the availability of research participants at that time, whereas individual administration of the questionnaire was done. Researchers ensured ethical considerations. Each and every participant was briefed about the nature and purpose of the research study and they were assured about the confidentiality of their identity. Written consent was obtained from each participant. Five participants were excluded from the study because they had psychiatric symptoms prior to flood. Researchers faced language barrier while dealing with illiterate female participants as their mother tongue was Saraiki. To overcome this limitation, researchers had interpreter with them who had full command over Saraiki and Urdu. Literate female participants were better in Urdu-written and verbal expression. Descriptive statistics such as mean, standard deviation, frequencies and percentages were computed to analyze the results by using software of Statistical Package for Social Sciences (SPSS; version 21).

**RESULTS**

First, demographic characteristics of the sample showed that the overall mean age of the participants was 15.78 ±2.13 years. Most participants in present sample were either illiterate i.e., 91 (44.4%) or had education till middle level, n = 69 (33.7%). Majority of them were unmarried, n = 184 (89.8%) and unemployed, n = 141 (68.8%).

Second, descriptive statistics such as frequencies and percentages were computed to determine the incidence of psychiatric disorders among research participants. Results in Table I revealed that PTSD was the most prevalent disorder among research participants followed by GAD and MDD, respectively. Moreover, one fourth of screened participants were meeting entire diagnostic criteria of different disorders according to DSM-IV-TR except that they did not have any impairment in their daily functioning. Among them, GAD and PTSD were most prevalent.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Classified diagnosis*</th>
<th>Diagnosis with functionality**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>PTSD</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>GAD</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>MDD</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pain disorder</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total diagnosis</td>
<td>9</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Note: * = Participants meeting the entire diagnostic criteria according to DSM IV TR. ** = Participants meeting the entire diagnostic criteria according to DSM IV TR without impairment in daily functioning.
Third, after flood, 67 (32.7%) out of 205 participants reported few psychiatric symptoms when screened out. Among them, PTSD and GAD symptoms were mostly reported. The more common symptoms of PTSD such as feelings of fear and helplessness due to flood were reported by 39 (58.2%) participants. Moreover, research participants reported symptoms of recurrent thoughts about the flood, n = 25 (37.3%), fear of flood coming again, n = 19 (28.4%), threat to life, n = 16 (23.9%), and distressing dreams about the event, n = 15 (22.4%). The more common symptoms of GAD such as persistent worry and inability to control the worry were reported by 34 (51%) participants. Being easily fatigued, n = 16 (24%); difficulty falling asleep, n = 16 (24%); and restlessness symptoms, n = 15 (22.4%) were also reported by research participants. However, half of the participants i.e., 101 (49.8%) did not report any psychiatric symptoms, when screened out post-flood. Lastly, 205 participants were allocated into four groups and their demographic characteristics were observed through descriptive statistics by computing frequencies and percentages (Table II). Results revealed that higher percentage of participants with classified diagnoses, in comparison to participants with rest of groups, had damaged houses and were still living in camps and received aid very late after the flood. On the other hand, higher percentage of participants who were meeting the entire diagnostic criteria of different disorders according to DSM-IV-TR but were functional in their daily activities, experienced relative’s death and damages to their cattle, crops and land.

**DISCUSSION**

The current study intended to explore the incidence of psychiatric disorders among female adolescent flood victims of district Muzaffargarh, Pakistan. Results revealed that out of all the psychiatric disorders, PTSD was reported highest i.e., 4 (2%) among research participants. Several previous researches have supported present findings as PTSD being the most common disorder in adolescents after flood.10-12 However, the estimates of prevalence and incidence rate vary widely depending upon the methodology used, sample selection procedure, severity of disaster, and extent of time elapsed post-disaster when data is being collected.13 For example, researchers have noticed that use of DSM-IV-TR criteria led to lower incidence and prevalence rates than DSM-III R, DSM-V criteria and self-report methodologies.14,15 In the present study, researchers ascertained diagnoses to participants according to DSM-IV-TR criteria as it was in active use at the time of data collection, which might have contributed to lower rates of psychiatric disorders in them i.e. 4.4%.

In the present study, researchers screened out 67 (32.7%) flood victims who had confirmed presence of few psychiatric symptoms of PTSD and GAD in themselves at the time of data intake. Present findings also suggested ongoing potential risk for 27 (13.17%) participants meeting entire diagnostic criteria of GAD and PTSD but were functional in their daily activities so far. Briere, Scott, and Weathers reported in their research findings that some people have the capacity to dissociate themselves from the physical and psychological pain evoked by exposure to traumatic event which can interfere with healthy processing of traumatic memories, subsequently increasing the likelihood of delayed onset of psychiatric disorders.16 Persistent dissociation attempts, soon after the trauma, may provide temporary relief but result in increase in the experience of unwanted thoughts, emotions, and behaviors later for trauma survivors. Several researchers have speculated depending on the findings of their empirical investigations that a significant proportion of the population after the disaster may meet diagnostic criteria at a later point of time and develop delayed onset of PTSD or other psychiatric disorder.17,18 Thus, for this group of participants, immediate intervention is warranted as they may develop full blown PTSD or other psychopathology later, if proper help is not provided.

**Table II:** Comparison of personal and financial damage due to flood among participants with classified diagnoses, diagnosed with functionality, screened with symptoms, and screened with no symptom (N=205).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Classified diagnosis* (9)</th>
<th>Diagnosis with functionality** (27)</th>
<th>Screened with symptoms*** (67)</th>
<th>Screened with no symptoms (102)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Death of participant's relative due to flood</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Damage of crops</td>
<td>4</td>
<td>44.44</td>
<td>21</td>
<td>77.78</td>
</tr>
<tr>
<td>Damage of cattle</td>
<td>2</td>
<td>22.22</td>
<td>9</td>
<td>33.33</td>
</tr>
<tr>
<td>Damage of house</td>
<td>9</td>
<td>100.0</td>
<td>23</td>
<td>85.19</td>
</tr>
<tr>
<td>Damage of land</td>
<td>4</td>
<td>44.44</td>
<td>21</td>
<td>77.78</td>
</tr>
<tr>
<td>Reception of aid after 2 months</td>
<td>7</td>
<td>77.78</td>
<td>5</td>
<td>18.52</td>
</tr>
<tr>
<td>Residence in personal tents</td>
<td>4</td>
<td>44.44</td>
<td>2</td>
<td>7.41</td>
</tr>
</tbody>
</table>

Note: * = participants meeting the entire diagnostic criteria according to DSM-IV-TR; ** = participants meeting the entire diagnostic criteria according to DSM-IV-TR without impairment in daily functioning; *** = participants showing psychiatric symptoms of different disorders without meeting the entire criteria according to DSM-IV-TR.
A careful insight into demographic characteristics of research participants revealed that flood victims, diagnosed with psychiatric disorders, were still living in tents and received aid late i.e., after two months when the flood first hit their area. Moreover, death of relative and damage to crops, cattle, and land were much experienced by research participants who met full diagnostic criteria of PTSD and GAD but had intact daily functioning. Psychological reactions may occur from the stress caused directly by the disaster (e.g., financial difficulties, flood experience, unemployment, and disruption of social relationships). Empirical literature has drawn the conclusion that the more is the severity of exposure, the worse will be the psychological impacts. In most under-developed countries of the world, women are culturally constrained to remain at home, do household chores, and care for children. They are financially dependent upon their parents or husbands. In present study, it was observed that flood had changed the role of some women as now they had to live in tents with little privacy available and lost their financial assets which might have enhanced their perception of traumatic experience. This also suggests that post-disaster traumatic stresses and their perceived intensity and severity may lead to the development of psychopathology.

Post-flood exposure to catastrophic condition, however, does not fully explain the onset of psychopathology as many individuals do not develop pathological symptoms. Indeed, events solely do not have the power to make conditions "traumatic" but appraisals may make them so. Emotional processing theory explains that some victims recover because they process the traumatic event in their memory well and don't make errors in their interpretation of traumatic experiences. Therefore, it can be implied from current study's findings that flood victims, who were screened but reported no psychiatric symptoms, may have interpersonal and psychological characteristics, such as social support, resilience, rational beliefs, and self esteem, which might have worked as buffer against traumatic situations. Further research is needed to establish this reality.

The study had several limitations. Researchers experienced language barrier while collecting data from illiterate participants. The villages were arbitrarily defined in district Muzaffargarh as no street as well as house numbers could be identified, therefore, randomization of the sample was not possible.

Despite several limitations, findings of this study highlighted the people who needed post-flood psychological help. Mental health practitioners can utilize the information generated by this study and help these flood victims by providing them physical and emotional relief and develop support systems for them. Future studies may be needed to focus on risk as well as protective factors for developing psychiatric disorders after being exposed to natural disasters. Longitudinal research can help in assessment of intensity of symptoms over extended period of time after flood.

**CONCLUSION**

PTSD had the highest incidence rate among research participants in present study. More than half of the screened out participants demonstrated the psychiatric symptoms of PTSD and GAD; while one fourth of the research participants met entire diagnostic criteria of GAD and PTSD, but were functional in their daily activities at the time of data intake suggesting that they were at risk to develop full blown disorder in future and were in need of psychological, pharmacological, and material help. The demographic variables, such as late arrival of any kind of aid, damaged house and residence, and living in personal tents were observed more commonly among research participants with classified diagnosis.

**REFERENCES**


