Mental Health Problems in Wake of Disaster: A Gendered Perspective

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Abstract:
The present study attempts to analyze mental health problems in terms of anxiety, depression and probable post-traumatic stress disorder among women in Kosi flood affected areas of Bihar, India.

STUDY DESIGN: Cross- Sectional Survey.
METHOD: A cross- sectional survey was conducted with total sample size of 250. 125 from high flood affected areas where populations were displaced for longer period of time from their original homeland and the same from the unaffected areas without displacement. Purposive sampling was used with those respondents who were willing to be part of the study. Ever-married women aged 17-49 were eligible for the study that were recruited after informed consent. Mental health was assessed by using the Hopkins Symptom Checklist-25 (HSCL-25) and Post Traumatic Stress Disorder Civilian Checklist.

RESULTS: Between the two groups there was significant difference found in terms of anxiety ($t=10.64$, $df=248$, $p=.000$) and depression ($t=10.32$, $df=248$, $p=.000$). Further the affected group scored low in two domains of PTSD i.e. avoidance and arousal, whereas intrusion score was found to be average. Moreover, an inverse association of anxiety ($r=-0.189$ & $p=.03$), depression ($r=-0.185$ & $p=.03$) and PTSD ($r=-0.245$& $p=.006$) with age was found among the affected population.

CONCLUSIONS: Anxiety and depression was found to be at an elevated level among affected groups, although respondents in the affected areas scored low in most of the domain of PTSD. Thus following a major disaster, there is a need to specifically address the mental health problems among women and provide adequate psycho-social support.

INTRODUCTION:

Disasters (e.g. flood, transportation accidents) are traumatic events that are experienced by many people and may result in a wide range of mental and physical health consequences (Norris et al., 2002). Especially the awareness regarding the mental health consequences of disasters is growing all over the world (Murthy, 2000; Kar, 2000). India, due to its unique geo-climatic conditions, has been traditionally vulnerable to natural disaster (Kar, 2010). This particularly has its impact on mental health of the survivors. Findings from the scientific literature clearly demonstrate the prevalence of PTSD, depression and anxiety in the aftermath of disaster (Sharon et al., 2009; Murthy 1997, Kar 2010, Kar et al., 2004). Many resources and efforts have focused on the physical

effects of a disaster, both on individual and communities (Corrarino, 2008). But during the recent past, attention shifted on the psychological effects of disaster too. Although the appearance of post-disaster psychological symptoms in adults varies, the incidence of psychopathology in women and children is high after disasters (Corrarino, 2008). Women are disproportionately affected by disasters and their special needs have recently begun to be understood and considered in disaster related planning.

ABOUT KOSI FLOOD, 2008:

On the fateful day of 18th august, 2008, state of Bihar in India, faced a major disaster which according to some is worst in last hundred years and many others claim it to be worst in the history (Roy, 2008). River kosi, known as "Sorrow of Bihar" was diverged from its regular path as it eroded its embankment in Nepal about 12 kms upstream of the barrage. As a result of breakage near Kushaha in Supaul district, river started flowing in an entirely new course (BGVS, 2008). Supaul which shares a boundary with Nepal was the first district to be flooded. According to International Federation's Disaster Relief Emergency Fund, 4.7 million people have been affected in 18 districts spread across 2,528 villages (Lambay and Singh, 2008). Flood in Bihar is not a new phenomenon. The following statistics support the fact as 16.5% of the total flood area of the country is from Bihar and 56.5% of the total flood affected people in the country is from Bihar. Out of this 76% belong to N. Bihar (N. Bihar District models childlines, 2008). But this time, when river Kosi changed its course, it started flowing through areas that have not experienced major flooding in the last five decades, resulting into devastation of unthinkable magnitude.

AIMS AND OBJECTIVES:

With the above backdrop, the aim of the study is to investigate i) the impact of flood on mental health outcomes (depression and anxiety) among women of affected and non affected groups, ii) the possible case ness of PTSD among the affected group, iii) the correlation of age with mental health outcomes (anxiety, depression, PTSD). The present study attempts to analyze mental health problems in terms of anxiety, depression and probable post traumatic stress disorder among women in kosi flood affected areas of Bihar, India.

Procedure:

Total of 250 participants was recruited in the study, 125 each from affected and unaffected/least affected group. List of affected and unaffected areas were collected from block development office, based on which high flood affected areas and unaffected/ least affected areas were selected for the study. Suggestions from local NGOs working in those areas was also considered before selecting the study area. The English version of HSCL-25 and PCL-C questionnaire was back translated and used by incorporating few cultural specific changes. With informed consent from the respondents, questionnaire was administered on the basis of one to one interview. The ethical clearance for the study was obtained from the ethical committee of the Department of Anthropology, University of Delhi. The ethical guidelines of the Declaration of Helsinki 1997 were taken into consideration before undertaking the study.

Subject:

In both affected and least affected group total sample size was 125 each. It is all women study. The mean age was 30.04 years (SD=7.17) in the affected group and 28.39 years (SD=7.00) in the

least/unaffected group. Of the affected group 28% was literate and 72% illiterate. In the unaffected/least affected group 12% was literate and 88% was illiterate. In the affected group, 72% has no education, 8.8% was functionally literate, 6.4% had primary education, 7.2% was middle pass and 5.6% had higher secondary education, whereas in unaffected/least affected group 88% has no education, 6.4% was functionally literate, 1.6% was primary pass, 2.4% had middle and 1.6% had higher secondary degree. In both affected and unaffected areas people were found to be affiliated with two major religious groups i.e. Hindu and Muslim. In affected group 97.6% were Hindu and 2.4% were Muslim, whereas in unaffected/least affected group 100% were Hindu. Majority of respondent in affected group were affiliated to Badhai (39.2%), Yadav (28%) and Bania (21.6%) caste. Among unaffected/least affected group, mallah (46.4%) and badhai (45.6%) were major caste group (See Table 1)

Mental Health Assessment

INSTRUMENT: Mental health was assessed by using the Hopkins Symptom Checklist-25 (HSCL-25) and Post Traumatic Stress Disorder Civilian Checklist (PCL-C). Hopkins symptom checklist - 25 developed by Derogatis and his co-workers (Derogatis et al., 1974), was used to measure psychological symptoms of anxiety and depression. The items in this scale are scored on a 4-point scale ranging from not at all, little bit, quite a bit and extremely (Matthiesen et al., 2004). The statements were divided into two major sets: anxiety symptom comprising of ten reaction statements and depression symptoms made up of 15 statements. In the present study, the scale had a good internal stability. The cronbach's alpha of anxiety and depression in the affected sample were .79 and .81, respectively. Whereas in unaffected group the cronbach's alpha of anxiety and depression were .78 and .84, respectively. The time of reference was last month. Although the questionnaire has been found to be valid and reliable in English and Swedish, it has never been validated as a screening instrument for depression and anxiety in India (Khattri et al., 2009). In context of Bahraich flood, 2008, Khattri et al. has used this instrument by calculating mean scores of anxiety and depression rather than prevalence rate. Following same pattern, this study also reports on mean scores of anxiety and depression. The HSCL-25 has been used previously in disaster research by Souza et al., 2007 in context of tsunami, Indonesia; Khattri et al., 2009 in context of Bahraich flood, India; Zhang Z et al., 2011 in context of Wenchuan earthquake, China.

PTSD was assessed by using PTSD Checklist- Civilian Version (PCL-C). The questionnaire encompasses a screener on PTSD, which allows for establishing possible 'caseness' and not for 'caseness'. In PCL-C, 17 PTSD symptoms have been identified which is further divided into three categories: Intrusion, Avoidance and Arousal. PCL-C was developed by Frank Weathers and his colleagues at the National Centre for PTSD (Weathers et al., 1993). Respondents are asked how often they have been bothered by each symptom on a five point severity scale, namely 1- not at all; 2- a little, 3- moderately; 4- quite a bit; 5- extremely. The symptom of Intrusion includes, disturbing memories, dreams, reliving the disaster and being upset when reminded of the disaster (Sharon et al., 2009), and also being physically responsive such as experiencing rapid heartbeat, sweating when reminded of traumatic event (Tull, 2009). Avoidance symptom is manifested by avoiding activities and failing to remember the important events during disaster, loss of interest in important activities and feeling distant from others, difficulties having positive feeling as well as feeling of life being cut short (Tull, 2009). The arousal symptoms consists of 5 items which includes difficulty in falling or staying asleep, feeling irritable or having outbursts of anger, difficulty in concentrating, being super alert and being jumpy or easily startled. The cronbach's alpha for intrusion, avoidance, arousal and overall PTSD is .56, .68, .78 and .82 respectively.

Data Analysis

Socio demographic details of the respondents are given in Table 1. Mean differences for anxiety and depression between the group (affected and unaffected) were calculated with student-t test for independent samples. A significance level of less than .05 was selected. Pearson's correlation coefficient (r) was used to measure relationships between the selected variables with anxiety and depression indexes. Further mean score, standard deviation, minimum and maximum score for intrusion, avoidance, arousal and overall PTSD was calculated through descriptive statistic, based on which the scores of three items were divided into three groups- low, average and high. Internal consistency of each items for depression, anxiety and PTSD were calculated by means of cronbach's alpha test. The data were analyzed with the statistical software SPSS 16 for windows.

RESULTS

No significant differences were found on socio-demographic variables between the affected and least affected group except for literacy X^2 =**10,** df= 1, p= .002 and caste X^2 =1.292 df= 11, p=.000 (Table-1).

Table1. Demographics

	Flood affected group (n=125)	Unaffected Group (n=125)
Mean age (SD)	30.04 years (7.17)	28.39 years (7.00)
Literacy (%)	28% Literate 72% Illiterate	12 % Literate 88% Illiterate
Education (%)	72% No education 8.8% Functionally Literate 6.4% Primary education 7.2% Secondary education 5.6% Higher secondary educ.	88% No education 6.4% Functionally Literate 1.6% Primary education 2.4% Secondary education 1.6% Higher secondary educ.
Caste (%)	39.2% Badhai 28% Yadav 21.6% Bania 11.2% Others	46.4% Mallah 45.6% Badhai 8% Others
Religion (%)	97.6% Hindu 2.4% Muslim	100% Hindu

Note: SD = Standard Deviation

Differences in Mental Health Outcomes between the Affected and Unaffected Group

Affected group scores significantly higher than the unaffected group in terms of anxiety (M=2.15, SD=.42 and M=1.63, SD=.34 respectively) and depression (M=1.87, SD=.33 and M=1.45, SD=.30). Between the two groups there was significant difference found in terms of anxiety (t=10.64, df=248, p=.000) and depression (t=10.27, df= 248, p=.000) (see table 2).

Table 2: Mean Difference in Anxiety and Depression among Affected and Unaffected group

S.No.	Variables	Affected			Unaffected			t	'P' value
		N	Mean	SD	N	Mean	SD		
1.	Anxiety	125	2.156	0.42	125	1.635	0.34	10.64	.000***
2.	Depression	125	1.872	0.33	125	1.456	0.30	10.27	.000***

*** *'p'* significant at <.001

The relation of selected variables with anxiety and depression score from the affected group was calculated by means of correlation coefficients and student t-test.

The age of the respondents being continuous variable was correlated with anxiety and depression scores. A significant association exists between anxiety score with that of age (r= -.189, p= .03) and depression score with age (r= -.209, p= .01). The variable was found to be inversely associated with anxiety and depression index that is higher the age of the respondent, lesser the anxiety and depression level. (Table3)

Table: 3 Showing Correlations between Anxiety & Age and Depression & Age

Variable	*r* value	*p* value
Anxiety ×Age	-.189	.03*
Depression ×Age	-.209	.01*

**p* is significant at < .05 level

Further, employment status, educational status, husband consuming alcohol and support from neighbor being categorical variables were put to student t-test, with anxiety and depression index.

In the affected group those who were earning, has higher mean score (M=2.33) for anxiety than those who were not earning (M=2.10). Similarly, those respondents who were earning has higher mean score (M=2.04) for depression, than those who were not (M=1.81). A significant difference (p=.01) was found among the anxiety score in terms of people earning and not earning. Similarly, highly significant difference (p=.001) was found with depression score and employment status of the respondents. (Table4)

Table 4: Showing relationship between Anxiety & Employment Status and Depression & Employment Status using Student t-test.

Variable	Anxiety			Depression		
	Mean (±SD)	*t* value	*p* value	Mean (±SD)	*t* value	*p* value
Employment Status						
Earning money Not earning money	2.33 ± .39 2.10 ± .42	2.59	.01*	2.04±.35 1.81±.31	3.33	.001**

p is significant at < .05 level, **p** is highly significant at < .01 level.

Rest of the variables mentioned above has non-significant association with that of anxiety and depression score.

Post Traumatic Stress Disorder (PTSD)

In order to examine the extent of psychological disorder a series of 17 symptoms was presented to respondents. They have to indicate whether or not they suffered from those symptoms in the last month. The descriptive statistics for the three domain of PTSD i.e. intrusion, avoidance, arousal and overall PTSD is given in table 5 below

Table 5: Mean, Standard Deviation of PTSD and its Three Domains

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Intrusion	125	7	20	13.66	2.518
Avoidance	125	8	25	15.26	3.489
Arousal	125	7	18	11.63	2.601
PTSD	125	24	56	40.55	7.043

The mean (SD) for intrusion, avoidance and arousal is 13.66 (2.51), 15.26 (3.48), and 11.63 (2.60) respectively. Whereas mean (SD) for overall PTSD is 40.55 (7.04). Based on the descriptive statistics indices for each of the group of symptoms were calculated per individual and distributed according to the following:

Intrusion Score	Description
7-11	Low
12-16	Average
17-20	High

Avoidance Score	Description
8-13	Low
14-19	Average
20-25	High
Arousal Score	**Description**
7-10	Low
11-14	Average
15-18	High
PTSD Score	**Description**
24-34	Low
35-45	Average
46-56	High

Thus, the mean value of intrusion (13.66), avoidance (15.26), arousal (11.63) and overall PTSD (40.55) falls in the average range of the scoring classification shown above.

In the domain of intrusion, 80% of the respondents report to have repeated disturbing memories and thoughts of the disaster which falls in the category of moderately or quite a bit. More than 50% of the respondents have moderately or quite a bit, repeated disturbing dreams of disaster. Around 45% (44.8%) of the respondents shows physical reaction such as heart pounding, sweating etc. In avoidance category around 50% of the respondents avoid thinking or talking about disaster and 59% avoid activities which reminded of the traumatic event. 55% of the respondents show loss of interest in activities that previously they used to enjoy. Only small percentage (18%) felt distant or cut off from other people and 16% of the respondent felt as if their future somehow is cut short. Emotional numbness was felt by only 12% of the respondents. Further, in arousal group of symptoms, 26% of the respondents had trouble falling or staying asleep, 48% felt irritable and had angry outbursts as a consequence of disaster. More than 50% (51.2) of the respondents claimed having difficulty in concentrating as "moderate". Quite a substantial percentage (39%) averred to be super alert or watchful, whereas 30% of the respondent felt jumpy or easily startled.

A significant and strong correlation exists between age and the two domain of PTSD i.e. avoidance (r= -.332, p=.000) and arousal (r= -.174, p=.05). Overall PTSD has value of r = -.223, p= .01, which is also significant. Although, both the domains have negative association with that of age, that is higher the age, lesser the PTSD level among the respondents (Table 6)

Table: 6: Showing Correlations between Avoidance & Age, Arousal & Age and PTSD & Age

Variable	*r* value	*p* value
Avoidance ×Age	-.332	.000[***]

Arousal ×Age	-.174	.05
PTSD ×Age	-.223	.01[*]

[***] '*p*' significant at <.001, *p* is significant at < .05 level

Discussions

Present study with an aim to examine the mental health problems among women in Kosi flood affected areas of Bihar, analyzed the impact of flood on mental health outcomes- depression, anxiety and PTSD. The study measured an increase in mental distress among affected population. There were large differences between the affected group and least affected/ unaffected group in terms of anxiety and depression. The above findings are consistent with previous research which documented high rate of psychological distress among women exposed to disasters. Increased mental distress (or disorders) among women has been reported in many studies (Corrarino, 2008; Miller et al., 2007; North et al., 1999; Green et al., 1990; Norris et al., 2002; Khattri et al., 2009.) Women's mental health is at risk during the time of disaster (Corrarino, 2008). As one of the respondent said:

In last one year, my actual dose of food has decreased. I have started eating less due to loss of appetite. As a result slowly and slowly I am getting weak and cannot concentrate on my work. Even I am running sort of energy and can't even focus on necessary household work like cooking and looking after my children. I really find it hard to stand up again and cope up with the situation. Even doctor refused to give medicine as according to him there is no medication which makes one eats properly. I know I have to help myself, but how? I really don't know? Why this happened with us only....

Women tend to face severe mental stress in post disaster situation, especially while carrying out gendered social roles of biological and physical reproductive responsibilities of the households (Pradhan, 2008). WHO report on gender and health in natural disasters acquiesce that women is at greater risk of depression and anxiety disorders after disaster (2005).

To answer the second research question, the possible case ness of PTSD among the affected group, it was found that scores of intrusion, avoidance, arousal and overall PTSD falls in the average range in scoring scheme shown in the result. But PTSD could not be established, as according to the criteria for PTSD (APM & DSM-IV-TR) the symptoms should be present for at least one month. (Van kamp, 2005) and as the study was cross-sectional in nature, continued evaluation or follow-up research was not possible. Overall, it may be summarized that symptoms of PTSD in one way or the other pose as a disturbance among the affected population.

As one female (aged 35) interviewee puts it:

...I am still scared of water. During the flood I went to my brother's place. Even there if anyone talks about flood or even water I get disturbed. I do not want to talk about the incident and the moment people start talking of the flood I use to leave that place. I really found hard how to deal with this! Most often I go to terrace or any isolated place to cry aloud. That time situation was so grim that I had no hope of returning back to my home. Still, even if heavy rain occurs I am afraid, that again flood will come and we will be in the similar situation.

On the other hand another female respondent aged 22, felt that disaster situation had made them more alert and cautious than before. As a result they are now prepared especially the male members or the head of the household who hold the responsibility of the family.

I had never seen that much water in my life, Kosi flood was the first experience for me. Even now my hands and feet get numb while recalling the incidence. This is obvious, as except life everything has been lost in flood. Nothing could be saved, not even a single utensil or a chair to sit upon [cries]. The chair I am sitting now reminds me of my old furniture which get washed away in flood and my legs start trembling. Simply do not want to evoke the incidence. People in the village gossip that again flood will come. So we are prepared for any situation now as we have little belongings and also machan (high roof) is there in our house now. We have to be prepared...god has left no option for us.

Although, individual degree of trauma and type of experience varies but avoiding to recall the incidence, being alert, fear of water and recurrence of the same event was the common problem among the respondents in the flood affected areas.

Switching to third research question, the correlation of age with mental health outcomes (anxiety, depression, PTSD), a negative association between mental health outcomes with age of the respondents was established. In the aftermath of disaster, it is often assumed that the elderly are at particularly higher risk following disaster (Myers and Wee, 2005). In Norris and others' review of 20 years of Disaster research, they examined the reactions of 17 samples of adults' disaster victims. In 88% of the samples, the psychological impact of disaster declined with age (Myers and Wee, 2005:49). Myers and Wee further correlated cultural factors with age, from the findings of the cross- cultural post disaster study of Mexican, American and Polish adults by Norris, Kaniasty et al. (Norris et al., 2002). Based on the anthropological findings, which showed differences in the family life cycles among these cultures, Myers and Wee summarized that worldwide, there is no one consistent effect of age; rather it is dependent upon the social, economic, cultural, historical and other factors in the impacted community (Myers and Wee, 2005: 50). Here, in the present study, the flood hit the areas which were not affected from serious flooding since 4-5 decades. As a result younger generation may not have witnessed the catastrophic event before, leaving them more vulnerable to mental health distress. Similar conclusion regarding the negative association between mental health with that of age was drawn by Abrahamson. In his research on mental health distress in post- Katrina situation, he found that men and older respondents were more likely to report better mental health than were women or younger respondents (Abrahamson et al., 2008).

Additionally, in the affected areas, high level of anxiety and depression was found among those respondents who were working as compared to non working. Contrary to the result, in more than one study (Van Griensven et al., 2006, Lomen et al., 2009, Frankenberg et al., 2008, Kumar et al., 2007) researchers found that loss of work and income were related with mental health symptoms, and symptoms were higher among females. According to WHO findings, women are at particular mental health risk due to many factors such as poverty, sexual abuse and also the family responsibilities (WHO, 2002). The disruption of normal life in the aftermath of a disaster in no way alters the nature of women's domestic work; water and fuel wood must be found, meals need to be prepared, and infants, small children and elderly require care (Mehta, 2007). The traditional role of care-giver is burdened further by economic responsibilities on women. They steps out of the family to earn money, this supplementary and magnified responsibility in the aftermath of disaster leads to negative mental health among women.

Limitations:

No data were available regarding the health status and particularly the mental health status of women in the affected area. Previous database was destroyed during the flood. Response rate was low, as the issues were personal and trivial for them to discuss with the outsider. In the affected group, only those populations were selected who was displaced for longer period of time from

their original home, so findings are localized in nature and cannot be generalized to other affected population too.

Conclusions:

Anxiety and depression was found to be at an elevated level among affected groups, also the respondents in the affected areas scored average in all of the three domains of PTSD. Thus following a major disaster, there is a need to specifically address the mental health problems among women and provide adequate psycho-social support. Gender related responses to trauma have not been included in disaster studies or in interventions (Hegadoren et al., 2006). Better interventions prepared for women and institutional help are needed in order to improve mental health after a disaster, which will help them in preparing and mitigating the affect of disaster. Also we should promote women to share their voices and experiences, and provide them with multiple opportunities to disclose their sufferings and pains. Finally enhanced assessment, with a follow up study is requisite to address the mental health needs of women in post disaster context.

REFERENCES

Abramson, D., Stehling-Ariza, T., Garfield, R. and I. Redlener. 2008. Prevalence and Predictors of Mental Health Distress Post-Katrina: Findings From the Gulf Coast. Child and Family Health Study Disaster medicine and public health preparedness. American Medical Association.

BGVS, 2008. Bihar Flood Report. Bharat Gyaan Vigyaan Samiti.

Corrarino, J. E. 2008. Disaster-Related Mental Health Needs of Women and Children. MCN. Vol. 33. No. 4.

CHILDLINE India Foundation, 2008. 'A Plan for Post Monsoon Floods Relief for Children'. North Bihar District Model.

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H. and L. Covi. 1974. The Hopkins Symptom Checklist (HSCL): a self-report symptom inventory. *Behav Sci.* Vol. 19. pp. 1-15.

Ehrenreich, J. H. 2001. Coping With Disasters. A Guidebook To Psychosocial Intervention. Disaster Manual (Draft). Old Westbury. NY. Available at: http://www.mhwwb.org

Freedy, J. R., Kilpatrick, D. G. and H.S. Resnick. 1993. Natural disasters and mental health: Theory, assessment, and intervention. Journal of Social Behavior and Personality. Vol. 8. pp.49–103.

Frankenberg, E., Friedman, J., Gillespie, T., Ingwersen, N. and R. Pynoos. et al. 2008. Mental health in Sumatra after the tsunami. *American Journal of Public Health.* Vol. 98. pp. 1671-1677.

Freedy, J. R. and W. M. Simpson. 2007. Disaster-Related Physical and Mental Health: A Role for the Family Physician. *Am Fam Physician.* Vol. 75(6). pp. 841-846.

Hegadoren, K. M., Lasiuk, G. C. and N. J. Coupland. 2006. Posttraumatic stress disorder Part III: Health effects of interpersonal violence among women. *Perspectives in Psychiatric Care.* Vol. 42. pp. 163-173.

Kar, G. C. 2000. Disaster and mental health. *Indian J Psychiatry*. Vol.42. pp.3–13.

Kar, N., Jagadisha, Sharma, P.S.V.N., Murali, N. and S. Mehrotra. 2004. Mental Health Consequences of the Trauma of Super-Cyclone 1999 in Orissa. *Indian Journal of Psychiatr.* Vol. 46(3). pp. 228-237.

Kar, N. 2010. Indian research on disaster and mental health. *Indian J Psychiatry*. Vol. 52(Suppl1). pp. 286-290.

11 | Kar, N. 2010. Indian research on disaster and mental health. Indian J Psychiatry. Vol. 52(Suppl1). pp. 286-290.

Khattri, P., Wind, T. R., Komproe, I. H. and P.C. Joshi. 2009. Anxiety, Depression, and Functioning Among a Population Struck By Recurrent Floods in Uttar Pradesh. India. MICRODIS working paper series. Unpublished.

Kumar, M.S., Murthedar, M.V., Hutin, Y., Subramanian, T., Ramachandran, V. and M.D. Gupte. 2007. Prevalence of posttraumatic stress disorder in a coastal village in Tamil Nadu, India, after the December 2004 tsunami. *American Journal of Public Health.* Vol. 97. pp. 99-101.

Lommen, M. J. J., Sanders, A. J. M. L., Buck, N. and A. Arntz. 2009. Psychosocial predictors of chronic post-traumatic stress disorder in Sri Lankan tsunami survivors. *Behavior Research and Therapy.* Vol. 47. pp. 60-65.

Lambay, F and Singh, M. 2008. 'Bihar Flood Affected Areas Visit Report'.

Matthiesen, S. B. and S. Einarsen. 2004. Psychiatric distress and symptoms of PTSD among victims of bullying at work. *British Journal of Guidance & Counselling.* Vol. 32, No. 3. Taylor & Francis. pp. 145-168.

Mehta, M. 2007. Gender Matters; Lessons for disaster risk reduction in South Asia. ICIMOD.

Murthy, R. S. 1997. Psychological consequences of Bhopal disaster. In Proceedings of National workshop on psychosocial consequences of disasters. Bangalore: NIMHANS.

Murthy, R. S. 2000. Disaster and mental health: Responses of mental health professionals. *Indian Journal of Social Work.* Vol.61(4). pp. 675-692.

Myers, D. G. and D. F. Wee. 2005. Disaster Mental Health Services: A Primer for Practitioners. Psychology Press.

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E. and K. Kaniasty. 2002. 60,000 disaster victims speak: Part I. An empirical review of the empirical literature. 1981-2001. *Psychiatry.* Vol. 65. pp. 207-239.

Norris, F. H., Murphy, A. D., Baker, C. K. and J. L. Perilla. 2004. Post-disaster PTSD over four waves of a panel study of Mexico's 1999 flood. *J Trauma Stress.* Vol. 17. pp. 283-292.

Norris, F. H. 2005. Psychosocial Consequences of Natural Disasters in Developing Countries: What Does Past Research Tell Us About the Potential Effects of the 2004 Tsunami? National Center for PTSD.

North, C. S., Nixon, S. J. and S. Shariat. et al. 1999. Psychiatric disorders among survivors of the Oklahoma City bombing. JAMA. Vol. 282. pp. 755–62.

Pradhan, R. 2008. Women's mental health: post disaster. Paper presented in, 7th The Rocky Mountain Region, Disaster Mental Health Conference. Nov. 6-8.

Roy, S. 2008. Bihar's Curse of Embankments.

Sharon C. Linog., Cabaraban, M.C. and R. S. Gervacio. 2009. A paper on the Social Consequences of Natural Disaster – The Case of the Philippines. MICRODIS. Working Paper Series.

Souza, R., Bernatsky, S. and R. de J. K. Reyes. 2007. Mental health status of vulnerable tsunami-affected communities: a survey in Aceh Province. Indonesia. *J Trauma Stress.* Vol. 20. pp. 263-269.

Tull, M. 2009. An Overview of PTSD Symptoms. Available at: www.about.com. Health's Disease and Condition.

Van Griensven, F., Chakkraband, M.L.S., Thienkrua, W., Pengjuntr, W., Cardozo, B.L., Tantipiwatanaskul, P. and J.W. Tappero. 2006. Mental health problems among adults in tsunami-affected areas in southern Thailand. *JAMA.* Vol. 296. pp. 537-548.

Van Kamp, I., Van der Velden P.G., Stellato, R. K., Van Loon, J., Gersons B.B.R., Lebret, E., Kleber, R. J. and J. Roorda. 2006. Physical and mental health shortly after a disaster: First results from the Enschede firework disaster study. European Journal of Public Health. Vol. 16. pp. 252-258

Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., and T. M. Keane.1993. The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Paper presented at the annual convention of the International Society for Traumatic Stress Studies. San Antonio. TX.

WHO, 2002. Gender and Health in Disasters. *WHO Report.* Geneva. Switzerland.

Press Trust of India, 2011. India ranks second in world for natural disaster: UN. January 24.

WHO, 2005. WHO multi-country study on women's health and domestic violence against women: Summary report of initial results on prevalence, health outcomes and women's responses. Geneva. World Health Organization.

Zhang, Z., Shi, Z., Wang, L. and M. Liu. 2011. One year later: Mental health problems among survivors in hard-hit areas of the Wenchuan earthquake. *Public Health.* Vol. 125(5). pp. 293-300.