

# Factors Affecting Women's Mental Health Lived in the Tent Villages Following the Nepal Earthquake

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**ABSTRACT: Background:** We examined the factors affecting posttraumatic stress disorder and somatic symptoms of Nepalese women who survived the Nepal earthquake in 2015. Participants were 165 Nepalese women aged 18-59 years living in two temporary tent villages in Kathmandu and Bhaktapur. A questionnaire was used to examine demographic characteristics, life changes resulting from the earthquake, social support, and living conditions. We also administered the Impact of Events Scale-Revised (IES-R) and Patient Health Questionnaire-15 (PHQ-15) to measure posttraumatic stress disorder and somatic symptoms, respectively. IES-R scores were significantly higher in women who reported that a spouse, friend, neighbor, or family member was injured or killed in the earthquake; developed illnesses because of the earthquake; did not worship a divine statue at home following the earthquake; were less satisfied with life; lacked awareness of the availability of emergency relief services; and considered religion very important. PHQ-9 scores were also significantly higher in women who were uneducated, perceived themselves unhealthy, developed illnesses because of the earthquake, were less satisfied with life, and lacked awareness of the availability of emergency relief services. Recovery from trauma associated with natural disasters was extremely difficult in countries in which longstanding poverty results in a lack of social care services and prolonged mental health problems such as PTSD. The findings concerning the factors related to PTSD support the notion that Nepalese women tend to somatize their emotional difficulties. Further research should address the relationship between religious and cultural issues and mental health in more detail.

**KEYWORDS:** Earthquake, Nepalese women, PTSD, Somatic symptoms

## INTRODUCTION

In April 2015, the Nepal earthquake killed almost 8,000 people, injured around 22,000, and destroyed over half a million homes. (Thapa & Jang, 2016; United Nation Development Program, 2015). The mental health problems resulting from natural disasters often manifest as somatic symptoms, such as headaches and irritable bowel syndrome (Escalona, Achilles, Waitzkin, & Yager, 2004), with fatigue, low energy, sleep disorders, and pain (back pain, headaches, abdominal pain, and chest pain) reported most (Hanel, Henningsen, & Herzog, 2009; Hiller, Rief, & Brahler, 2006). Individuals in developing countries, such as Nepal, might experience PTSD resulting from both the disaster itself and issues that occur subsequent to the disaster such as

inadequate environments and an inability to afford social support (Cairo et al., 2010; Kumar, 2015; Risler, Kintzle, & Nackerud, 2015). Moreover, the lack of community networks and social support, including housing, healthcare, employment, medicine, mental health services, and religion, is known to exacerbate the adverse effects of natural disasters (Furukawa, Takeuchi, & Muto, 2015). In particular, people who are forced to leave their homes and live in temporary tent villages lose their sources of emotional support (e.g., care providers and people who would listen to their accounts of their experiences). In this context, people who live in developing countries are particularly vulnerable to development of psychological distress and are more likely to be adversely affected by natural disasters relative to those who live in developed countries (Risler, Kintzle, & Nackerud, 2015; Cairo et al., 2010).

According to a recent study performed in Haiti, which is one of the poorest countries in the world, people who lived in areas

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with insufficient infrastructure and public services were twice as likely to die because of the effects of natural disasters, relative to those from affluent nations (Cairo et al., 2010). In addition, they are vulnerable to PTSD, as demonstrated by a study conducted in Sichuan, China, which showed that more than 40% of residents in a region in which an earthquake led to deaths and the destruction of buildings developed PTSD (Wang et al., 2009). Furthermore, a similar study reported that between 23% and 60% of earthquake survivors developed PTSD (Cairo et al., 2010), and the incidence of earthquake-related PTSD in ethnic minority groups and people with lower levels of educational attainment was greater relative to that observed in other populations (Chou et al., 2007; Kilic et al., 2006). Another study showed that recovery from the psychological stress and trauma associated with natural disasters was extremely difficult in countries in which longstanding poverty resulted in social issues, such as inadequate mental care (Risler, Kintzle, & Nackerud, 2015) due to the lack of a social support system, and mental health problems such as PTSD which tended to be protracted. These can increase the risk of further mental health issues.

In many developing countries, including Nepal, women are marginalized with respect to social, economic, and sexual matters; have access to fewer health and food resources; are less mobile; possess less decision-making capacity; experience inequality in legal and political institutions; and are entitled to fewer human rights relative to men (Kumar, 2015). In addition, women are more likely, relative to their male counterparts, to develop psychological and physical health issues following natural disasters, because they face social and sexual discrimination as well as difficulty in accessing resources. In Nepal, women's right to make decisions is limited, and thus they have more restricted access to economic activity and resources. Furthermore, because cultural norms restricting self-expression related to the religious culture often dictate that current behavior determines the afterlife (Marahatta et al., 2017; Juran & Trivedi, 2015), somatic symptoms or conversion disorder are highly prevalent among Nepalese women (Marahatta et al., 2017; Sharma, Jha, Joshi, & Lamsal, 2010; Shakya, 2005).

According to White (1982), the concept of somatization, which involves indirect and metaphorical expression of one's emotional hardship using physical terms, is the opposite of psychologization, which involves the expression of one's emotional difficulties in a direct and straightforward manner using psychological vocabulary. In addition, Asia's explanatory model of illness, which includes authoritarian values (involving a pecking order within groups), collectivist values (involving mutual dependence among group members), and mind-body monism, suggests that direct expression of individuals' negative emotion or emotional difficulties using psychological terminology would contradict cultural norms and values. This causes some individuals to express emotional difficulties in an immature and pathological manner (Kirmayer, Robbins, & Paris, 1994; Kirmayer, Young, & Robbins, 1994). Consequently, mind-body monism has evolved. Moreover, this explanatory model of illness stresses negative self-regulation and repression, so indirect and metaphorical methods of expressing psychological experiences, or somatization, are a more acculturated and effective means of expression and communication relative to direct methods (Kim, 2002).

Few studies have performed an in-depth analysis of factors affecting PTSD and somatization following natural disasters in women in developing countries such as Nepal. Therefore, the purpose of this study was to examine the factors affecting PTSD and somatic symptoms in women who survived the Nepal earthquake in April 2015 and had lived in temporary tent villages in Kathmandu and Bhaktapur for 24 months. These women have been reported to have poor access to governmental resources and receive little assistance (Comez, 2006; Neumayer & Plumper, 2007); however, these types of emotional and material support could save their lives (Neria, Nandi, & Galea, 2008), as earthquakes cause life-threatening conditions, loss, and destruction (Thapa & Jang, 2016).

## METHODS

### Interviews

Interviewers visited participants' individual tents in Kathmandu and Bhaktapur and conducted questionnaire-based interviews between July and August 2016, 16 months after the Nepal earthquake.

### Participants

The participants were 169 women aged 18–59 years, who lived in tent villages for earthquake survivors in Kathmandu and Bhaktapur, two of the regions hit hardest by the Nepal earthquake. They had moved to the temporary settlements immediately after the earthquake, as their homes had been destroyed, and they had been injured or their relatives or close neighbors had been injured or killed by the earthquake in April 2015.

### Measures

#### *Factors Affecting PTSD and Somatic Symptoms*

Factors affecting PTSD and somatic symptoms were measured using a questionnaire consisting of items that reflected a social model of health (including demographic characteristics; community networks; living and working conditions; and socioeconomic, cultural, and environmental conditions), which was developed by Dahlgren and Whitehead (2007) and considered the earthquake as well as Nepal's specific religious and cultural background. In addition, the factors were categorized into four groups; 1) demographic characteristics (sex, age, and religion), 2) life changes caused by the earthquake (health status, illness prior to the earthquake, and illness resulting from the earthquake), 3) social support (intimate friends, close neighbors, the presence of a divine statue at home, and the importance of religion), and 4) living status (meeting places and awareness of the availability of emergency relief services).

#### *Impact of Events Scale-Revised*

PTSD symptoms were measured using the Impact of Events Scale-Revised (IES-R) developed by Weiss and Marmar (1997), which is a self-report scale *via* which respondents describe stress related to a specific event and experienced during the preceding week. The IES-R can be used with people aged between 18 and 79 years and consists of 22 items pertaining to the 3 diagnostic clusters for PTSD: intrusion, avoidance, and hyperarousal.

Responses are provided using a 5-point scale ranging from 0 (not at all) to 4 (extremely). Scores of 24–32 indicate clinically significant PTSD symptoms and those of 33 or higher indicate severe PTSD symptoms. Cronbach’s  $\alpha$  for the scale was 90.

### Patient Health Questionnaire-15

The Patient Health Questionnaire-15 (PHQ-15), which is a 10-item self-report scale, was used to evaluate somatic symptoms (Kocalevent et al., 2013). In addition, research outcomes have demonstrated the reliability and validity of the PHQ-15 as a measure of somatization symptoms in the general population (Kocalevent et al., 2013). Scores of 10 or higher indicate moderate-to-severe somatic symptoms. Cronbach’s  $\alpha$  for the scale was .80.

### Ethical Considerations

The project was approved by the Kathmandu Metropolitan City Office and Namseoul University’s Institutional Ethics and Life Committee (Code: 1041478-HR-201711-001). The researchers provided participants with written material containing clear and simple explanations regarding the purpose of the study, method used to analyze the data, and confidentiality of their information. All participants provided written informed consent.

## RESULTS

Participants’ mean score for earthquake-related shock was 27.62 ( $SD = 14.09$ ). Of the 169 participants, 44 (26.0%) showed clinically significant PTSD symptoms (i.e., scores of 24–32), while 50 (29.6%) showed severe PTSD symptoms (scores of  $\geq 33$ ). With respect to somatic symptoms, 104 (80.4%) participants showed moderate-to-severe symptoms, (scores of  $\geq 10$ ). In addition, 37 (21.9%) participants had scores of 33 or higher in the IES-R and 10 or higher in the PHQ-15. Of the factors considered to have affected PTSD in women who survived the Nepal earthquake, being married

or living with others,  $t = -2.30, p < .05$ , having a relative who was injured or killed by the earthquake,  $t = -2.77, p < .01$ , development of an illness resulting from the earthquake,  $t = -2.10, p < .05$ , the absence of a divine statue at home following the earthquake,  $t = -2.16, p < .05$ , dissatisfaction with life,  $t = -2.55, p < .05$ , lack of awareness of the availability of emergency relief services,  $t = -2.06, p < .05$ , and strong dependence on religion,  $t = -2.46, p < .05$ , were associated with higher PTSD scores (Table 1). Of the factors affecting somatic symptoms, lack of education,  $t = 2.18, p < .05$ , perceived unhealthiness,  $t = 2.90, p < .01$ , development of illness resulting from the earthquake,  $t = 2.22, p < .05$ , dissatisfaction with life,  $t = 4.74, p < .001$ , and lack of awareness of the availability of emergency relief services,  $t = 1.96, p < .05$ , were significantly associated with higher somatic symptom scores (Table 2).

## DISCUSSION

The present study examined factors affecting mental health problems such as PTSD and somatic symptoms in women who survived the Nepal earthquake and lived in earthquake survivor camps in Kathmandu and Bhaktapur, which were two of the regions that were hit hardest by the 2015 Nepal earthquake. The results showed that, of the 169 women living in the temporary settlements, 50 (29.6%) exhibited severe PTSD symptoms, 44 (26.0%) showed clinically significant but relatively moderate PTSD symptoms, 104 (80.4%) participants showed moderate-severe to severe somatic symptoms, and 37 (21.9%) participants displayed both conditions simultaneously. The high proportion of affected women could be attributed to the high, protracted incidence of PTSD and somatic symptoms resulting from changes in residence, family, and occupation; financial hardship; illness; poor living conditions in the temporary settlements; stress; and a lack of social services to provide compensation for loss.

**Table 1.**  
Factors affecting PTSD in women who survived the Nepal earthquake

| Factors   | Description         | N   | %    | M (SD)        | t      |
|---|---------------------|-----|------|---------------|--------|
| <b>Age</b><br>(N = 169)                                   | <40 years           | 86  | 50.9 | 26.28 (14.10) | -1.26  |
|   | $\geq 40$ years     | 83  | 49.1 | 29.01 (14.02) |        |
| <b>Education</b><br>(N = 168)                             | Uneducated          | 117 | 69.6 | 27.49 (1.31)  | -0.29  |
|   | Educated            | 51  | 30.4 | 28.18 (14.02) |        |
| <b>Monthly family income</b><br>(N = 56)                  | <5,500 rupees       | 35  | 62.5 | 26.31 (14.43) | -0.53  |
|   | $\geq 5,500$ rupees | 21  | 37.5 | 28.33 (19.94) |        |
| <b>Employed</b><br>(N = 167)                              | Yes                 | 32  | 19.2 | 27.16 (12.15) | -0.27  |
|   | No                  | 135 | 80.8 | 27.90 (14.49) |        |
| <b>Married</b><br>(N = 166)                               | No                  | 7   | 4.2  | 15.71 (7.54)  | -2.30* |
|   | Yes or other        | 159 | 95.8 | 28.13 (14.16) |        |
| <b>Religion</b><br>(N = 162)                              | Major religion      | 44  | 27.2 | 29.43 (14.61) | 0.73   |
|   | Minor religion      | 118 | 72.8 | 27.61 (13.94) |        |
| <b>Health status</b><br>(N = 169)                         | Healthy             | 78  | 46.2 | 25.58 (14.35) | -1.76  |
|   | Unhealthy           | 91  | 53.8 | 29.37 (13.70) |        |
| <b>Period in tent village</b><br>(N = 169)                | <1 year             | 13  | 7.7  | 22.23 (10.79) | -1.44  |
|   | $\geq 1$ year       | 156 | 92.3 | 28.07 (14.26) |        |
| <b>Illness prior to the earthquake</b><br>(N = 169)       | Yes                 | 50  | 29.6 | 28.74 (12.32) | 0.67   |
|   | No                  | 119 | 70.4 | 27.15 (14.79) |        |
| <b>Illness resulting from the earthquake</b><br>(N = 119) | No>Yes              | 29  | 24.4 | 32.28 (16.20) | 2.18*  |
|   | Yes>No              | 90  | 75.6 | 25.50 (14.00) |        |

|   |              |     |      |               |                    |
|---|--------------|-----|------|---------------|--------------------|
| <b>Family member injured or killed by earthquake</b>          | Yes          | 23  | 13.6 | 22.00 (9.71)  | -2.77**            |
| (N = 169)   | No           | 146 | 86.4 | 28.51 (14.49) |                    |
| <b>Family changes following earthquake</b>                    | Yes          | 36  | 21.4 | 27.50 (11.32) | -0.1               |
| (N = 168)   | No           | 132 | 78.6 | 27.73 (14.82) |                    |
| <b>Occupational changes following earthquake</b>              | Yes          | 24  | 14.5 | 26.08 (9.01)  | -0.91              |
| (N = 166)   | No           | 142 | 85.5 | 28.11 (14.89) |                    |
| <b>Divine statue in home following earthquake</b>             | Yes>No       | 50  | 58.1 | 30.72 (14.00) | 2.16 <sup>+</sup>  |
| (N = 86)  | Yes>Yes      | 36  | 41.9 | 24.14 (13.81) |                    |
| <b>Daily prayer following earthquake</b>                      | Increased    | 43  | 72.9 | 31.02 (13.07) | -0.57              |
| (N = 59)  | Decreased    | 16  | 27.1 | 33.31 (15.42) |                    |
| <b>Life satisfaction</b>                                      | Satisfied    | 101 | 59.8 | 25.39 (13.22) |                    |
| (N = 169)   | Dissatisfied | 68  | 40.2 | 12.97 (5.00)  | -2.55 <sup>+</sup> |
| <b>Intimate friend</b>  | Yes          | 124 | 73.8 | 27.20 (14.19) | -0.69              |
| (N = 168)   | No           | 44  | 26.2 | 28.91 (14.03) |                    |
| <b>Close neighbor</b>   | Yes          | 146 | 86.4 | 27.70 (14.09) | 0.18               |
| (N = 169)   | No           | 23  | 13.6 | 27.13 (14.35) |                    |
| <b>Awareness of availability of emergency relief services</b> | Yes          | 56  | 33.3 | 24.55 (14.16) | -2.06 <sup>+</sup> |
| (N = 168)   | No           | 112 | 66.7 | 29.27 (13.86) |                    |
| <b>Meeting places</b>   | Yes          | 105 | 62.5 | 28.67 (13.79) | 1.18               |
| (N = 168)   | No           | 63  | 37.5 | 26.02 (14.59) |                    |
| <b>Dependence on religion</b>                                 | High         | 18  | 10.8 | 34.94 (17.49) | 2.46 <sup>+</sup>  |
| (N = 167)   | Low          | 149 | 89.2 | 26.49 (13.29) |                    |

Note. \*p<.05; \*\*p<.01

**Table 2.**  
Factors affecting somatic symptoms in women who survived the Nepal earthquake

| Factors  | Description    | n   | %    | M (SD)       | t                 |
|--|----------------|-----|------|--------------|-------------------|
| <b>Age</b>   | <40 years      | 86  | 50.9 | 10.12 (5.15) | -1.81             |
| (N = 169)  | ≥ 40 years     | 83  | 49.1 | 11.54 (5.07) |                   |
| <b>Education</b>                                     | Uneducated     | 117 | 69.6 | 11.39 (5.06) | 2.18 <sup>+</sup> |
| (N = 168)  | Educated       | 51  | 30.4 | 9.53 (5.20)  |                   |
| <b>Monthly family income</b>                         | <5,500 rupees  | 35  | 62.5 | 10.09 (5.96) | -0.66             |
| (N = 56)   | ≥ 5,500 rupees | 21  | 37.5 | 11.10 (4.74) |                   |
| <b>Occupation</b>                                    | Yes            | 32  | 19.2 | 10.94 (5.11) | 0.14              |
| (N = 167)  | No             | 135 | 80.8 | 10.79 (5.20) |                   |
| <b>Married</b>                                       | No             | 7   | 4.2  | 8.86 (4.34)  | -1.05             |
| (N = 166)  | Yes or other   | 159 | 95.8 | 10.94 (5.20) |                   |
| <b>Religion</b>                                      | Major religion | 44  | 27.2 | 11.08 (5.01) | 1.36              |
| (N = 162)  | Minor religion | 118 | 72.8 | 10.57 (5.13) |                   |
| <b>Health status</b>                                 | Healthy        | 78  | 46.2 | 9.60 (5.40)  | -2.90***          |
| (N = 169)  | Unhealthy      | 91  | 53.8 | 11.86 (4.70) |                   |
| <b>Period in tent village</b>                        | <1 year        | 13  | 7.7  | 11.15 (6.22) | 0.25              |
| (N = 169)  | ≥ 1 year       | 156 | 92.3 | 10.79 (5.07) |                   |
| <b>Illness prior to the earthquake</b>               | Yes            | 50  | 29.6 | 11.98 (4.51) | 1.92              |
| (N = 169)  | No             | 119 | 70.4 | 10.33 (5.33) |                   |
| <b>Illness resulting from the earthquake</b>         | No>Yes         | 29  | 24.4 | 12.21 (5.45) | 2.22 <sup>+</sup> |
| (N = 119)  | No>No          | 90  | 75.6 | 9.72 (5.18)  |                   |
| <b>Family member injured or killed by earthquake</b> | Yes            | 23  | 13.6 | 10.65 (5.43) | -0.16             |
| (N = 169)  | No             | 146 | 86.4 | 10.84 (5.12) |                   |
| <b>Family changes following the earthquake</b>       | Yes            | 36  | 21.4 | 11.53 (5.12) | 0.9               |
| (N = 168)  | No             | 132 | 78.6 | 10.65 (5.16) |                   |
| <b>Occupational changes following the earthquake</b> | Yes            | 24  | 14.5 | 11.13 (4.35) | 0.38              |
| (N = 166)  | No             | 142 | 85.5 | 10.70 (5.29) |                   |
| <b>Divine statue in home following earthquake</b>    | Yes>No         | 50  | 58.1 | 11.24 (5.30) | 0.02              |
| (N = 86)   | Yes>Yes        | 36  | 41.9 | 11.22 (4.94) |                   |
| <b>Daily prayer following earthquake</b>             | Increased      | 43  | 72.9 | 11.19 (5.35) | -0.31             |
| (N = 59)   | Decreased      | 16  | 27.1 | 11.69 (5.79) |                   |

|   |              |     |      |              |          |
|---|--------------|-----|------|--------------|----------|
| <b>Life satisfaction</b>                                      | Satisfied    | 101 | 59.8 | 9.37 (4.74)  | -4.74*** |
| (N = 169)   | Dissatisfied | 68  | 40.2 | 12.97 (5.00) |          |
| <b>Intimate friend</b>  | Yes          | 124 | 73.8 | 10.45 (5.17) | -1.65    |
| (N = 168)   | No           | 44  | 26.2 | 11.93 (5.01) |          |
| <b>Close neighbor</b>   | Yes          | 146 | 86.4 | 10.84 (5.25) | 0.16     |
| (N = 169)   | No           | 23  | 13.6 | 10.65 (4.53) |          |
| <b>Awareness of availability of emergency relief services</b> | Yes          | 56  | 33.3 | 9.73 (5.13)  | -1.96*   |
| (N = 168)   | No           | 112 | 66.7 | 11.38 (5.11) |          |
| <b>Meeting places</b>   | Yes          | 105 | 62.5 | 10.88 (5.36) | 0.18     |
| (N = 168)   | No           | 63  | 37.5 | 10.73 (4.85) |          |
| <b>Dependence on religion</b>                                 | High         | 18  | 10.8 | 12.83 (5.39) | 1.83     |
| (N = 167)   | Low          | 149 | 89.2 | 10.50 (5.08) |          |

Note. \*p<.05; \*\*p<.01; \*\*\*p<.001

These results correspond with findings that the incidence of earthquake-related PTSD in ethnic minority groups and people with lower levels of educational attainment was greater relative to that observed in other populations (Chou et al., 2007; Kilic et al., 2006). Furthermore, it corresponds with research showing that recovery from trauma associated with natural disasters was extremely difficult in countries in which longstanding poverty results in a lack of social care services (Risler, Kintzle, & Nackerud, 2015) and prolonged mental health problems such as PTSD.

The findings concerning the factors related to PTSD support the notion that Nepalese women tend to somatize their emotional difficulties (Marahatta et al., 2017; Sharma, Jha, Joshi, & Lamsal, 2010; Shakya, 2005). Women who were married or lived with others, had a family member injured or killed during the earthquake, developed illness resulting from the earthquake, did worship a divine statue at home (Nepalese people have a household religious tradition, with each family having a shrine at home where they worship their deities, were dissatisfied with life, were unaware of the availability of emergency relief services, and considered religion very important exhibited significantly higher PTSD scores relative to other participants. Only seven participants were unmarried; however, interestingly, their PTSD scores were lower relative to those observed in married women and women who lived with a partner. This finding could have occurred because married women were older and had received less education and therefore experienced limited employment opportunities and greater burden in childrearing and supporting their families amid financial difficulties, relative to younger single women, who had been educated to a high level and tended to delay marriage. In addition, those who considered religion very important exhibited higher PTSD scores, relative to those who did not consider religion important, as the importance of religion could have been associated with uncertainty and negative emotions.

With regard to somatic symptoms, women who were uneducated, perceived themselves as unhealthy, developed illness resulting from the earthquake, were dissatisfied with life, and were unaware of the availability of emergency relief services showed significantly higher somatic symptom scores relative to other participants. In addition, 117 (69.6%) participants reported that they were uneducated, and their somatic symptom scores were higher relative to those observed in educated participants. Moreover, given that approximately 45% of Nepalese women are illiterate (Nepal Population Report, 2016), those who were

uneducated were likely to experience limited opportunities for employment and engagement in social activities, which could have led to a tendency to somatize the resultant stress.

Interestingly, religious factors, such as the presence of a divine statue at home following the earthquake and the importance of religion, did not exert significant effects on somatic symptoms, unlike the findings regarding PTSD. Usually people who are caught up in a disaster are assumed to become more dependent on religion in order to cope with their psychological stress due to the disaster, which in turn should theoretically lead to lower PTSD scores. However, the results were different in this study. This finding could be attributed to the fact that PTSD was an acute reaction to stress resulting from the earthquake and caused visible, direct damage, such as destruction of homes or the injury or death of family members for whom participants could mourn officially. In contrast, somatization served as a chronic coping mechanism for stress experienced prior to the earthquake.

## CONCLUSION

The results of the study indicated that psychological services and social infrastructure, including housing and medical services, should be provided to reduce PTSD and somatic symptoms in women who survived the Nepal earthquake. However, further research should be conducted to address more of the relationship between religious and cultural issues, PTSD, and somatic symptoms. Considering that mental health problems due to natural disaster tend to be protracted, increasing the risk of developing further mental health issues, more studies should be performed to better understand the mental health problems of women in Nepal and thereby provide appropriate intervention.

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