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Prevalence of post-traumatic stress disorder and associated factors among Koshe landslide survivors, Addis Ababa, Ethiopia: a community-based, cross-sectional study

Sintayehu Asnakew,[1] Shegaye Shumet,[2] Worknesh Ginbare,[3] Getasew Legas,[1] Kalkidan Haile[4]

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[1]Psychiatry, Debretabor University, Debretabor, Ethiopia
[2]Psychiatry, University of Gondar, Gondar, Ethiopia
[3]Psychiatry, Amanuel Mental Specialized Hospital, Addis Ababa, Ethiopia
[4]Psychiatry, Debremarkos hospital, Debremarkos, Ethiopia

Correspondence to
Mr. Shegaye Shumet;
shumetshegaye@yahoo.com

ABSTRACT

Objectives To assess the prevalence of post-traumatic stress disorder (PTSD) and associated factors among the survivors of Koshe landslide, Addis Ababa, Ethiopia, 2018.

Design Community-based cross-sectional design.

Setting Koshe landslide, Addis Ababa, Ethiopia.

Participants We recruited 830 participants for interviews using the simple random sampling technique.

Measurement We collected data by face-to-face interviews. The civilian version of the PTSD checklist was used to measure the symptoms of the disorder. The Perceived Stress Scale and the Oslo-3 social support instruments were used to assess the factors. Coded variables were entered into Epi data V.4.2 and exported to SPSS V.24 for analysis. Bivariate and multivariate logistic regressions with OR and 95% CI were employed.

Result A total of 830 participants were interviewed, with a response rate of 98.2%. The prevalence of PTSD was 37.3% with 95% CI 34.1 to 40.8. In the multivariate logistic regression, female sex (adjusted odds ratio (AOR)=1.74, 95% CI 1.21 to 2.50), divorce (AOR=2.08, 95% CI 1.26 to 3.43), sustained physical injury (AOR=8.28, 95% CI 5.04 to 13.61), history of mental illness (AOR=5.55, 95% CI 2.30 to 13.36), family history of mental illness (AOR=2.82, 95% CI 1.48 to 5.37), poor social support (AOR=3.64, 95% CI 1.99 to 6.69) and high perceived stress (AOR=3.08, 95% CI 1.43 to 6.64) were associated with PTSD.

Conclusion and recommendations The prevalence of PTSD among the survivors of Koshe landslide was high. We recommend that an early PTSD-focused regular screening be carried out by trained health professionals; linkage with mental health service providers also needs to be considered.

Strengths and limitations of this study

- The nature of cross-sectional design, which might have only partially accounted for durable temporal relationships.
- Social and recall biases might have interfered with decisions respondents made when completing the questionnaire.
- The post-traumatic stress disorder checklist-civilian version scale used in the current study can serve as a reference in subsequent studies since it has good internal consistency.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a mental health problem that occurs following a traumatic event in which the individual experience, witnesses, is confronted with either actual or imagined loss of life or serious injury which results in a response of fear, helplessness or horror.[1] In order to be diagnosed with PTSD, a person must re-experience the trauma, avoidance of trauma-related stimuli, excessive arousal and negative alterations in cognition and mood which occur within a month after the event.[2] A disaster is a traumatic event that might have been experienced by many people and causes different mental and physical health consequences.[3] A survey study conducted on US residents, 13% of the participants reported a lifetime exposure to natural or human-generated disasters.[4] Several studies conducted among adults showed that there was an increasing psychological distress after natural disasters.[5] Although the consequences of a disaster included a wide range of psychopathology, a review study indicated that PTSD is the most commonly investigated and frequently occurring psychopathology following disaster.[6]

About 8 million adults had PTSD during a given year worldwide.[7] Over 51 million people are being forcibly displaced worldwide, of whom 16.7 million were displaced outside their home countries, and this may lead to a stress-related disorders.[8] The global disease

burden report attributed about 14% of the burden to neuropsychiatric disorders, mostly because of the long-term disabling nature of depression and other common mental disorders like PTSD.[9] According to World Health Report 2001, ~0.4% of the total years lived with disability (YTD) followed PTSD, and the estimated burden increased to 0.6% YLD globally.[10] Data in USA showed the lifetime prevalence of PTSD was 8% in the general population. The lifetime prevalence rate was 10% in women and 4% in men.[11] A study on Israelis aged 18 years and above and exposed to terrorism showed that the average prevalence of PTSD was 9.4%, 16.2% for women and 2.4% for men.[12] The global economic burden of stress-related mental illness is expected to rise in the coming decade. The global disease burden study of WHO estimates that mental illness, including stress-related disorders, will be the second leading cause of disability by the year 2020.[13]

The prevalence rate of PTSD in developing countries is higher compared with the developed ones. A study conducted among a geographically diverse sample of Mexican adults estimated the prevalence of PTSD at 19%.[14] Different studies in Africa showed that PTSD could still be a public health concern for several years after the civil conflict and natural disaster. Reviews of community-based studies in South Africa showed that trauma exposure was higher in low-income countries than in their counterparts.[15] Another study in Uganda during an active conflict showed that PTSD prevalence varied between 18% and 54% in the general population.[16]

PTSD is a public health issue that contributes to poverty, lack of employment, insecure living circumstances, change in the social network and is highly associated with low quality of life.[17 18] Factors that contribute to the development of PTSD have been classified into pre-existing factors like family history of mental illness, substance history as well as the traumatic event itself, and post-trauma factors, such as lack of social support.[19]

There was a devastating garbage landslide in Addis Ababa, Ethiopia, in the area of Koshe garbage land fill on 11 March 2017. The catastrophic slope collapse killed >113 people who were living around the landfill and injured several others. The debris stood from a height of 20 m beyond the actual toe line of the landfill, destroying a minimum of 50 houses.[20 21] The phenomenon occurred in the early morning hours of 11 March and buried a number of makeshift homes under tons of refuse as reported by Eddie Haywood (March 2017). Koshe landfill is a large man-made mount formed from vast rubbish dump on the outskirts of Addis Ababa, the capital of Ethiopia. Hundreds of people used to attempt to make a living by collecting refuse at the landfill site and selling it. Some people even lived around the rubbish dump permanently. Even though landslides sometimes happened in Ethiopia, a man-made garbage hill slide like this was quite. The landslide left a negative sequel on the victims' socioeconomic and psychological conditions, for example, in terms of housing, job and loss of family members.

Disasters including man-made mishaps have negative impacts on the mental health of affected individuals.[22] PTSD is the most common psychopathology and notable public health matter that follows trauma/disaster. Although PTSD is highly prevalent among postdisaster settings, no studies have been done on the prevalence of PTSD among Koshe landslide survivors, Addis Ababa, Ethiopia. So, determining the prevalence of PTSD and associated factors among the survivors is important for early intervention and the reduction of the burden of PTSD and to improve the victims' quality of life.

Objective

This study set out to assess the prevalence of PTSD and associated factors among the survivors of Koshe landslide, Addis Ababa, Ethiopia, 2018.

METHODS AND MATERIALS

Study settings and period

A community-based, cross-sectional study was conducted in May and June 2018. The study was conducted at Koshe (dirt), a large open landfill with a surface area of 25 hectares which used to receive 300 000 tons of solid waste from Addis Ababa, the capital of Ethiopia, annually as reported by Clague 2017. It was the only dumping site available for the entire capital city with more than three million inhabitants. It has been located in the south-western part of Addis Ababa bounded by Nefas Silk-Lafto and Kolfie subcities. The area was a dumping ground for Addis Ababa's rubbish for more than five decades, hosting hundreds of rubbish pickers who sell materials recovered from the waste. Some people even live around the site permanently.

Study participants and sampling

We used the multistage sampling technique to select 830 participants. To reach households, the simple random sampling technique (computer-generated random number) was employed. In each of the areas, household lists were obtained from the kebeles/wards/offices and health extension workers. We proportionally allocated the sample size to Kilinto, Asko, Addis Hiwot and Koshe garbage dumping area, where victims temporarily settled. Members of the selected households were further sorted for interviews. In case of more than one eligible participant in a household, the lottery method was used to choose one.

The study included participants aged 15 years and above during data collection in the area. There were a total of 5316 people in ~1035 households. Individuals seriously ill and unable to communicate were excluded.

Sample size determination

We determined the sample size by using the single population proportion formula with the assumptions of 48% prevalence of PTSD from studies conducted in South Sudan,[23] 0.48 P, 1.96 Z (standard normal distribution),

95% CI, α=0.05 and a 10% non-response rate. Accordingly, a representative/probabilistic sample was calculated to be 423. After considering design effect, the total sample was 846.

Study variables

The dependent variable was PTSD measured by the 17 items of the PTSD checklist-civilian version (PCL-C). We measured PTSD as a dichotomous variable (yes/no). Independent variables included sociodemographic factors (age, sex, marital status, ethnicity, religion, educational and occupational status), clinical variables (family history of mental illness, previous history of mental illness and childhood trauma), trauma-related factors (trauma exposure, perceived life threat), substance-related factors (alcohol consumption, cigarette smoking, khat chewing), awhile psychosocial factors embraced social support and stressful life events.

Data sources and measurement

Data were collected by face-to-face interviews using a semistructured questionnaire by four trained data psychiatry nurses by means of the Amharic version of the tool for a month. The questionnaire was designed in English and translated to Amharic and back to English to maintain consistency. Data collectors were trained on how to interview participants and explain unclear questions and the purpose of the study. Furthermore, they were made aware about ethical principles, such as confidentiality/anonymity/data management, and securing respondents' informed consent for participation.

PTSD was measured using the PCL-C. The PCL is a standardised self-report rating scale for PTSD comprising 17 items that correspond to the key Diagnostic and Statistical Manual of Mental Disorders-IV symptoms of PTSD. A total symptom severity score (range=17–85) was obtained by summing the scores from each of the 17 items. It had a Likert response options ranging from[1] 'not at all' to[5] 'extremely' and a cut-off ≥50, that is, garbage landslide victims had PTSD symptoms.[24] We adapted this instrument from a study conducted on Somali and Oromo Ethiopians in Minnesota.[25] It showed a high internal consistency, reliability and a strong correlation with PTSD diagnosis. We conducted a reliability analysis for the PCL-C questionnaire (Amharic version) and that it a had high score (Cronbach's α=0.94).

Social support

Social support was measured using the Oslo 3-items social support scale with scores ranging from 3 to 14: 3–8=poor social support; 9–11=intermediate social support; and 12–14=strong social support.[26]

Individual stress levels

Individual stress levels were measured using the Perceived Stress Scale (PSS). The questions in this scale asked about feelings and thoughts last month. PSS was measured with likert type scale ranging from (0) 'never' to[4] 'very often' and individuals with higher scores indicating higher perceived stress.[27]

Substance use history

To examine substance use history, respondents were asked: 'Have you ever used any substance in the last 3 months or in your lifetime?' and the responses were yes/no.[28]

History of mental illness

To examine history of mental illness, respondents were asked: 'Have you ever been diagnosed with mental illness and treated' and responses were yes/no.

Family history of mental illness

To examine family history of mental illness, respondents were asked: 'Do you know a family member who had experienced a mental illness?'

Experiencing childhood trauma

To examine childhood trauma, respondents were asked: 'Have you experienced childhood physical and sexual abuse and neglect' and responses were yes/no.

Items on sociodemographic factors

Items on sociodemographic factors (age, sex, ethnicity, religion, marital status, educational status and occupational status) were adopted from a variety literature.

Data processing and analysis

All collected data were checked for completeness and consistency and entered into Epi-data V.4.2 and then exported to SPSS for windows V.24 for analysis.

We computed descriptive, bivariate and multivariate logistic regression analyses to see the frequency distribution and to test the association between independent and dependent variables, respectively. Factors associated with PTSD were selected during the bivariate analysis with a $p<0.05$ for further analysis in the multivariable logistic regression analysis. In the multivariable logistic regression analysis, variables with $p<0.05$ at 95% CI with adjusted OR were considered as statistically significant.

Ethical consideration

Permission was obtained from the Addis Ababa Administration Health Bureau Ethical Committee. We received written informed consent from study participants and assent from officially authorised foster parents after explaining the purpose of the study. Confidentiality was maintained by omitting personal identifiers.

Patient and public involvement

In the current study, participants were people who survived the Koshe landfill, Addis, Ababa, Ethiopia; patients were excluded; participants were not involved in the study design and recruitment. The results of this study will be disseminated to the Federal Ministry of Health, Addis Ababa Health Bureau and Kolfe subcity Health Department for timely management of survivors.

Table 1 Sociodemographic characteristics of study participants among residents of Koshe area, Addis Ababa, Ethiopia, 2018 (n=830)

Characteristics	Frequency	Percentage
Age (years)		
15–40	675	81.3
>40	155	18.7
Sex		
Female	491	59.2
Male	339	40.8
Marital status		
Married	428	51.6
Single	249	30
Divorced	131	15.8
Others*	22	2.7
Ethnicity		
Amhara	404	48.7
Tigray	138	16.6
Gurage	135	16.3
Oromo	123	14.8
Others†	30	3.6
Religion		
Orthodox	502	60.5
Muslim	195	23.5
Protestant	94	11.3
Catholic	39	4.7
Educational status		
Cannot read and write	153	18.4
Primary school	366	44.1
Secondary school	185	22.3
Diploma and above	126	15.2
Occupational status		
House wife	131	15.8
Employed	472	56.9
Student	110	13.3
Jobless	117	14

*Separated, widowed.
†Silte, Hadya.

RESULT

A total of 830 respondents took part with a response rate of 98.2%. The majority of the respondents, 491 (59.2%), were female. The mean age of the respondents was 33 (SD ±12) years; 675 (81.3%) were in the age range of 15–40 years; 428 (51.6%) were married; 502 (60.5%) were Orthodox Christian and 404 (48.7%) Amhara by ethnicity. Regarding occupation, more than half (56.6%) were employed (table 1).

A small number, 55 (6.6%) of the participants had history of mental illness, 202 (24.3%) childhood physical abuse and neglect experience and 79 (9.5%) family history of mental illness.

Table 2 Distribution of trauma-related factors of the respondents in Koshe, Addis Ababa, Ethiopia, 2018 (n=830)

Characteristics	Frequency	Percentage
Sustaining physical injury	166	20
Witnessing the death of families or friends	526	63.4
Witnessing physical injury of families or friends	569	68.6
Property destruction	240	28.9
Thinking, they may die	546	65.8
Perceived life threat		
Low perceived stress	185	22.3
Moderate perceived stress	581	70
High perceived stress	64	7.7

Of the respondents, 569 (68.6%) witnessed physical injury of families or friends, and about 166 (20%) sustained physical injury and 581 (70 %) moderate perceived life threat (table 2).

Out of the total 830 participants, nearly half (48%) had poor social support and the majority, 659 (79.4%), experienced at least one stressful life event (table 3).

Regarding substance-related factors, nearly three-fourths, 602 (72.5%) consumed alcohol, and 516 (62.20%) were doing that at the moment; 164 (19.80%) smoked, and 102 (12.30%) were smoking; 129 (15.5%) used khat (leaves) and 102 (12.30%) were using it during the study.

Prevalence of PTSD

The prevalence of PTSD among participants was 37.3% (95% CI 34.1 to 40.8).

Factors associated with PTSD

To determine the association of independent variables with PTSD, bivariate and multivariate binary logistic regression analyses were carried out. In the bivariate analysis, factors including female sex, >60 years of age, divorce, history of mental illness, family history of mental illness, childhood physical trauma and neglect, physical injury, witnessing the death and physical injury of families or friends, property destruction, fear of death, poor social

Table 3 Distribution of psychosocial factors of the study participants among residents of Koshe, Addis Ababa, Ethiopia, 2018 (n=83)

Characteristics	Category	Frequency	Percentage
Social support	Poor	398	48
	Moderate	324	39
	Strong	108	13
Stressful life events	Yes	659	79.4
	No	171	20.6

support and high perceived life threat were significantly associated with PTSD at a p<0.05. These factors were entered into the multivariable logistic regression model to control confounding effects.

The result of the multivariate analysis showed that female sex, divorce, history of mental illness, family history of mental illness, physical injury, poor social support and high perceived life threat were significantly associated with PTSD at a p<0.05. Female sex was 1.7 times more likely to develop PTSD compared with male sex (AOR=1.7, 95% CI 1.2 to 2.5). The odds of developing PTSD were 2.1 times higher among divorcees compared with the married ones (AOR=2.1, 95% CI 1.3 to 3.4). The odds of developing PTSD were 5.6 times higher among participants who had history of mental illness compared with those who had no such history (AOR=5.6, 95% CI 2.3 to 13.4). The likelihood of developing PTSD was 2.8 times higher among respondents who had family history of mental illness compared with those who had no family history of mental illness (AOR=2.8, 95% CI 1.5 to 5.4). The odds of developing PTSD were 8.3 times higher among respondents who sustained physical injury than those who had not (AOR=8.3, 95% CI 5.0 to 13.6). Respondents who had poor social support were 3.6 times more likely to develop PTSD compared with those who had strong social support (AOR=3.6, 95% CI 2.0 to 6.7). The odds of developing PTSD were 3.1 times higher among respondents who had high perceived stress than those who had low perceived stress (AOR=3.1, 95% CI 1.4 to 6.6) (table 4).

DISCUSSION

PTSD is the most common psychopathology and important public health matter after experiencing trauma/disaster. We found that, for the entire sample, the garbage landslide had a negative impact on exposed individuals' mental health in terms of housing, income, jobs and family problems resulting from the event. This study found that a number of people met the criteria for post-trauma stress symptomatology. Some 37.3% of people who experienced the incident presented with PTSD symptoms according to the PCL-C. Our finding was consistent with reports of studies on people exposed to natural disasters, such as 36.3% among earth quack victims in Kerman, 35.4% Syrian refugees in Lebanon, 34.9% in Turkey and 34.3% among the bombing victims of Oklahoma city, USA.[8 29–31] Conversely, this finding was lower than the 48% noted in South Sudan, 75.6% among the Rana Plaza building collapse victims in Bangladesh, 57% in Saudi Arabia, 83.7% in Croatia and Serbia former Yugoslavia, Germany and UK, 59.4% in Fukushima nuclear disaster, Japan.[18 23 32–34] The possible reason for this difference might be the use of different instruments and cut-off points to measure PTSD, exposure to multiple trauma, study design and the nature and magnitude of the accidents covered in the study.

On the other hand, our estimations are higher than findings in other countries, for example, 11.8% in northern Uganda, 18.8% in Serbia, 29.3% in Southern Lebanon and 9.1% in sothern Brazil.[35–38] The possible reason for this variation might be difference in instruments. That is, the other study used general health questionnaire (GHQ)-12, structured clinical interview, mini-international neuropsychiatric interview (MINI), the modified version of the composite international diagnostic interview, while we utilised the PCL-C. The other variation might be due to the methods they used for data collection (structured telephone interview) and conducting of studies late after the trauma.

Female sex, being divorce, history of mental illness, family history of mental illness, sustained physical injury, poor social support and high perceived life threat were significantly associated with PTSD. The greater likelihood of PTSD among women than men in our work was similar to the reports of other studies,[29 31 32 39–41] possibly because females experience sexual assaults and child sexual abuse more than males. Hence, being exposed to such trauma involves more risk than other trauma in causing PTSD.[42]

Divorcees were more likely to develop PTSD than married respondents. Participants who lost their partners and needed to support families, especially small children, single handed were more stressed. Our finding was supported by that of a study in Serbia.[36]

History of mental illness was also significantly associated with PTSD. Participants with history of mental illness might have more neurochemical imbalance and neuronal damage compared with those who had no history of mental illness. As a result, they might be prone to develop PTSD after the event. This finding was supported by results of studies conducted in various countries.[31 34 39 43 44]

The odds of developing PTSD was 2.8 times higher among respondents who had family history of mental illness than those who had no such illness. The possible explanation might be the inheritance of the serotonin transporter gene as well as genes associated with the hypothalamic–pituitary–adrenal axis and psychological factors which make participants more highly predisposed to PTSD.[42 45] This finding was consistent with the results of studies conducted in South Korea.[43 44]

Moreover, experiencing physical injury was a stronger predictor of PTSD compared with those who experienced no such injuries during the catastrophe. The finding was similar to the results of other studies.[29 32 41] The possible explanation for the similarity could be the presence of scars, the impaired part may remind the trauma and cause reliving it and victims may believe that the traumatic event has left its marks behind, and the body could keep clinging to unresolved issues. The odds of developing PTSD was 3.6 times higher among individuals who had poor social support than strong social support. The finding is similar to results of studies conducted in Southern Brazil and Mexico.[38 46] Lack of help to compensate for physical incapacity, emotional support and someone to talk with about the traumatic experience or to turn to for advice could increase the risk of PTSD.[47]

Participants who had high perceived stress were more likely to develop PTSD compared with respondents who

Table 4 Factors associated with PTSD among residents of Koshe, Addis Ababa, Ethiopia, 2018 (n=830)

Variables	Category	PTSD		COR (95% CI)	AOR (95% CI)
		Yes	No		
Sex	Male	106 (31.3%)	233 (68.7%)	1	1
	Female	204 (41.5%)	287 (58.5 %)	1.6 (1.2 to 2.1)*	1.7 (1.2 to 2.5)*
Age (years)	15–40	241 (35.7%)	434 (64.3%)	1	1
	>40	69 (44.5%)	86 (55.5%)	1.5 (1.0 to 2.1)	1.4 (0.9 to 2.1)
Marital status	Married	138 (32.2%)	290 (67.7%)	1	1
	Single	87 (34.9%)	162 (65.1%)	1.1 (0.8 to 1.6)	1.2 (0.8 to 1.8)
	Divorced	77 (58.8%)	54 (41.2%)	3.0 (2.0 to 4.5)*	2.1 (1.3 to 3.4)*
	Others	8 (36.4%)	14 (63.6%)	1.2 (0.5 to 2.9)	1.4 (0.5 to 4.2)
History (Hx) of mental illness	Yes	46 (83.6%)	9 (16.4%)	9.9 (4.8 to 20.5)*	5.6 (2.3 to 13.4)*
	No	264 (34.1%)	511 (65.9%)	1	1
Family Hx of mental illness	Yes	55 (69.6%)	24 (30.4%)	4.5 (2.7 to 7.4)*	2.8 (1.5 to 5.4)*
	No	255 (34.0%)	496 (66.0%)	1	1
Experiencing childhood trauma	Yes	109 (54.0%)	93 (46.6%)	2.5 (1.8 to 3.4)	1.2 (0.7 to 1.9)
	No	201 (32.0%)	427 (68.0%)	1	1
Sustaining physical trauma	Yes	135 (81.3%)	31 (18.7%)	12.2 (7.9 to 18.7)*	8.3 (5.0 to 13.6)*
	No	175 (26.4%)	489 (73.6%)	1	1
Witnessing the death of family or friend	yes	223 (42.4%)	303 (57.6%)	1.9 (1.4 to 2.5)	0.8 (0.5 to 1.4)
	No	87 (28.6%)	217 (71.4%)	1	1
Witnessing injury of family or friend	Yes	238 (41.8%)	331 (58.2%)	1.9 (1.4 to 2.6)	0.8 (0.5 to 1.4)
	No	2 (1.1%)	189 (98.9%)	1	1
Property destruction	Yes	117 (48.8%)	123 (51.2%)	2.0 (1.4 to 2.7)	1.0 (0.7 to 1.5)
	No	193 (32.7%)	397 (67.3%)	1	1
Thought of death	Yes	242 (44.3%)	304 (55.7%)	2.5 (1.8 to 3.5)	1.3 (0.7 to 2.0)
	No	68 (23.9%)	216 (76.1%)	1	1
Social support	poor	209 (52.5%)	189 (47.5%)	4.9 (2.9 to 8.2)*	3.6 (2.0 to 6.7)*
	Moderate	81 (25.0%)	243 (75.0%)	1.5 (0.9 to 2.5)	1.4 (0.8 to 2.6)
	Strong	20 (18.5%)	88 (81.5%)	1	1
Perceived threat	Low	56 (30.3%)	129 (69.7%)	1	1
	Moderate	209 (36.0%)	372 (64.0%)	2.9 (1.9 to 4.6)	1.0 (0.7 to 1.6)
	High	45 (70.3%)	19 (29.7%)	10.9 (5.6 to 21.4)*	3.1 (1.4 to 6.6)*

*P<0.05, modelfitness=0.114 (Hosmer and Lemshow), 0.000 (Omnibus test), no multicolinearity (tolerance >0.1 and variance inflation factor (VIF) <2).
COR, crude odd ratio; PTSD, post-traumatic stress disorder.

had low perceived stress. The result is similar with findings from Southern Israel and South Korea.[43 48] Negative beliefs about the consequence of the ongoing threat as damaging implications will precipitate the onset and persistence of PTSD.[49]

Limitation of the study

The cross-sectional design of the study prevented us from concluding the casual relationships of the associations we found.

In addition, participants might not tell whether or not they had other PTSD symptoms before the onset of the landslide. The presence of earlier catastrophic experience might have influenced the disorder due to the landslide.

Furthermore, social desirability and recall bias might also be the other limitations. Since the data collection method was a face-to-face interview which might led individuals to respond in socially acceptable ways during the process, especially in cases of substance-related questions.

Individuals without PTSD symptoms may have less motivation to recall earlier exposure than individuals with the symptoms.

In addition, we did not consider other mental health problems that can confound outcomes. For instance, the

presence and effects of anxiety and depression symptoms, which are commonly associated with PTSD symptoms and the severity of PTSD, duration of mental illness or exposure to other diseases were not covered.

The strength of the study was it used a relatively large sample and sampling methods.

Since we have employed face-to-face interviews, we addressed individuals who had PTSD symptoms for further investigation and intervention.

CONCLUSION

The prevalence of PTSD was found to be high. This study confirmed that the garbage landslide had a negative impact on the mental health of affected individuals. Female sex, divorce, history of mental illness, family history of mental illness, sustained physical injury, poor social support and high perceived life threat were significantly associated with PTSD. Therefore, we recommend a PTSD-focused early regular screening by trained health professionals and linkage with mental health service providers. It is necessary to give emphasis to individuals with family history of mental illness, women and history of mental illness of those who experienced physical trauma during the disaster.

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