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Descriptive Study

POST-TRAUMATIC STRESS DISORDER (PTSD) AMONG LANDSLIDE SURVIVORS: A DESCRIPTIVE STUDY

Hanif Eka Cahyani [1], Sri Warsini [2*], Carla Raymondalexas Machira[3]
[1] School of Nursing, Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada, Indonesia
[2] Mental Health and Community Nursing Department, Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada, Indonesia
[3]Psychiatric Department, Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada, Indonesia

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CORRESPONDING AUTHOR
Sri Warsini
sri.warsini@ugm.ac.id
Mental Health and Community Nursing Department, Faculty of Medicine, Nursing and Public Health Universitas Gadjah Mada, Indonesia

ABSTRACT

Introduction: Natural disasters present numerous challenges for survivors. One significant outcome is trauma, which can lead to the development of post traumatic stress disorder (PTSD). This study aimed to assess the prevalence of PTSD and identify its predictor factors among survivors of a landslide disaster in the Donorati Village community, Purworejo, Indonesia.
Method: This study used a descriptive cross-sectional design with a quantitative approach, focusing on landslide survivors in the Purworejo district. A sample of 100 individuals from Donorati village was selected through cluster and consecutive sampling. Key variables included PTSD, gender, age, education, socio-economic status, marital status, disaster severity, prior exposure, impact of the landslide (house damage, injuries, and fatalities), and evacuation records. Data were collected using a demographic form and The Impact of Event Scale-Revised (IES-R). Bivariate analysis utilized Chi-squared and Fisher's tests, while multivariate analysis used logistic regression.
Results: The prevalence of PTSD among participants was 27%. Bivariate analysis showed significant differences in PTSD levels related to sex (p = 0.02), age (p = 0.009), occupation (p = 0.02), disaster severity (p = 0.008), injured family members (p = 0.018), and evacuation history (p = 0.001). Multivariate analysis highlighted gender and disaster severity as key factors linked to PTSD after the landslide.
Conclusions: PTSD levels varied significantly by gender, age, occupation, disaster severity, presence of injured family members, and evacuation history. This finding highlights the urgent need for mental health and psychosocial support services to help disaster survivors cope effectively.
Keyword: determinants; factors; mental health disorders; COVID-19

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1. INTRODUCTION

The rate of disasters globally continues to rise. Natural disasters are defined as a situation or event that seizes local capacity, requires national or international level assistance from external parties, and occur due to unforeseeable and sudden events that cause severe damage, devastation, and suffering (Guha-Sapir, Hoyois, & Below, 2014). In addition to the loss of lives, assets, and livelihood, natural disasters also have an adverse impact on the physical and psychological health of survivors, family, and relatives (Warsini, Buettner, Mills, West, & Usher, 2015a).

One psychological impact of disaster is Post-Traumatic Stress Disorder (PTSD) (Warsini et al., 2014). The National Institute of Mental Health stated that PTSD is a disorder that develops in some people who have experienced shocking, scary and dangerous events. PTSD may immediately occur after a person experiences an event which affects them or may occur after some weeks, months or years later (National Health Service (NHS), 2015). A systematic review found that the proportion of delayed-onset of PTSD

was on average 24,5% of all cases PTSD (Utzon-Frank et al., 2014). Post-Traumatic Stress Disorder may also occur or recur within a delayed onset namely from 6 months up to 40 years or more (Mitchell, 2013).

PTSD may occur to anyone in any part of the world after various natural disasters (Warsini et al., 2014) such as earthquake (Chan et al, 2011), flood (Paranjothy et al, 2011), tsunamies (Irmansyah et al, 2010) or other traumatic situations such as sexual abuse, accident, terrorist attack and war (National Center for PTSD, 2016). Researchers have reported that the prevalence of PTSD caused by natural disaster in the first 1-2 years after the occurrence of a natural disaster is around 20% (North, 2014) and of the 6-year prevalence is 11,3% (Arnberg, Johannesson, & Michel, 2013).

According to American Psychiatric Association (2013), Friedman (2015), and Sareen (2014), there are several factors that can increasing the risk of PTSD which are classified into pre traumatic factors, peri traumatic factors and posttraumatic factors. Pre traumatic factors included the mental disturbances history, personality factor, low social economy status, low education background, history of traumatic exposure, marital status (Kun et al, 2013; Zhou et al, 2013), female gender (Friedman, 2015), and age under 25 years old (Friedman, 2015). Peri traumatic factors included dosage/ severity of traumatic stressor exposure (Dyb et al, 2014), number of traumatic events exposures (Ponnamperuma & Nicholson, 2016), and exposure to threatening events (Gil et al, 2015). While posttraumatic factors included negative appraisal toward traumatic events, ineffective coping strategy, additional stress after traumatic events (Xue et al, 2015), negative impact or loss after traumatic events (Warsini et al, 2014), evacuation history (Cheng et al, 2014; Warsini et al, 2014) and low social support (Cheng et al, 2013; Gil et al, 2014).

Survivors of landslides however tend to be more severely impacted than survivors of other natural disasters (Kennedy, Petley, & Murray, 2016; Kennedy, Petley, Williams, & Murray, 2015). This outcome is related to the characteristics of landslides which include rapid onset, often with little or no warning (Batu District Board of Disaster Management (BPBD Kota Batu), 2017), resulting in shock to survivors.

Natural disasters may cause a very high traumatic stress level because as well as the psychological impacts, survivors lose important resources commonly used as a source of coping (Luber, 2013). Those at high risk of developing PTSD in the aftermath of a disaster include females, wounded people or those who witnessed the injury or death of others, survivors who lose their family members, old or middle age people, those on low-income, unemployed as a result of the disaster, poorly educated, and those whose homes and assets are devastated (Chan et al., 2012; SAMHSA Disaster Technical Assistance Center, 2015; Warsini et al., 2014).

Natural disasters that occur in Indonesia are varied including many types of events. Based on the spectrum of natural disasters, landslides in Indonesia rank as the 2nd most highly reported after floods (Asian Disaster Reduction Centre (ASDR), 2021). Donorati village in Purworejo sub-district is a village in Purworejo Regency that experienced a land slide on Saturday, 18 June, 2016 that caused 15 deaths, two injuries, damaged 20 houses and land (Donorati Village Office, 2016). The Head of the Badan Penanggulangan Bencana Daerah (BPBD) Purworejo or Purworejo District Board of Disaster Management, Budi Harjono, had previously expressed concern that Donorati village was highly vulnerable to landslides (Iqbal & Arrazy, 2016).

The research about mental health impact due to landslide disaster is limited (Kennedy et al., 2015). However, several studies about psychological impacts felt by landslide disaster survivors in Indonesia have been conducted. Endiyono (2018) and Anam (2018) investigated landslide survivors in Banjarnegara and the studies showed that the survivors' prevalence rate of PTSD was around 60-80%. In the study of Rahmanishati & Dewi (2021) among landslide survivors in Sukabumi, the prevalence rate of PTSD was around 68,4%. While Mamesah et al (2018) investigated landslide survivors in Manado and got the result as many as 51,1% of all survivors experienced anxiety. Those researches only found out the PTSD prevalence but not the predictor factors of PTSD. Therefore, there is an urgency to do this research. The purpose of this research was to identify the prevalence of post-traumatic stress disorder (PTSD) in the landslide survivors in Indonesia and its predictor factors.

2. MATERIALS AND METHODS

2.1 Design

This research was a descriptive cross-sectional design research using a quantitative approach.

2.2 Population and sampling

The population were the survivors of the landslide which took place on 18 June, 2016, in Donorati village, Purworejo Sub-District, Purworejo Regency which around 728 people. The sampling approach adopted was cluster sampling and consecutive technique. At first, the researchers chose the hamlets from the village by using lottery. The cluster included was the Donorati Hamlet and the Panggulan Kidul Hamlet. Then, the research team applied a consecutive sampling technique by visiting respondents' houses (door to door) where each subject who fulfilled the inclusion criteria and did not meet any of the exclusion criteria, was included in the research until the number of the required sample was reached. By adjusting the proportion of the size of the population in each hamlet, 56 respondents were chosen from Donorati Hamlet and 44 respondents from Panggulan Kidul Hamlet, which fulfilled the required sample size of 100 respondents.

The inclusion criteria were: (i) experienced or witnessed directly or felt the impact of the landslide which took place on the 18 June, 2016; (ii) adult (at minimum of 18 years old); and, (iii) agreed to participate in the research by signing the informed consent form. Respondents were excluded if they were not present when data sampling was performed, had a history of mental illness, or experienced difficulty in hearing or speaking.

2.3 Variable

The dependent variable in this study was Post-traumatic Stress Disorder. Meanwhile gender, age, education level, socioeconomic status, occupation, marital status, severity of disaster, exposure to previous traumatic events, type of traumatic event impact and evacuation record as independent variables.

2.4 Instrument

The first section of the instrument collected demographic information including gender, age, education level, socio-economic status based on occupation, marriage status, severity of natural disaster, exposure to previous disasterevents, landslide disaster impact (house damage, injured family members, and death of family members) and evacuation record. The second section of the instrument included the Indonesian version of Impact of Event Scale Revised (I-IES-R). The instrument consists of 22 items of questions. In this research cut off point ≥ 33 from Creamer et al (2003) used as indicator survivors have PTSD tendency. Validity and reliability testing of the IES-R instrument for Indonesian language was previously conducted by Warsini et al (2015b) who reported high internal consistency with a total Cronbach alpha score of 0,92. Higher scores of I-IES-R indicate higher number of symptoms (Christianson & Marren, 2012). This research used the cut-off point as used by Creamer et al. (2003) who state that an individual with a score of 33 or more has a high potential for being diagnosed with PTSD.

2.5 Data Collection

Data collection was performed one year after the landslide event from September to October, 2017. Three research assistants fluent in the local language assisted with the data collection. Data collection occurred in the homes of the respondents. The researcher team visiting the survivors in their house, explained them about the research that conducted Demographic characteristics and respondents' disaster experience was displayed in Table 1. Table 1 shows that the age range was dominated by people aged between 26-65 years. Most respondents were married, had a low level of education level and were employed. The location or village of residence represented the severity of the land slide with Donorati Hamlet residents more affected compared to residents of the Panggulan Kidul Hamlet.

and asked their willingness to join as respondents. They were asked to fill out the forms that provided. For the respondents who could not read then the researcher read it for them and asked the answer from them. Average time for respondents completing the instrument was about 15 minutes. All respondents approached was agree to join the study and fill out the instruments.

The data collection was performed by researcher and help by two research assistants who fluent in Javanese language. Before data collection, all research assistants were informed about how to conduct the data collection.

2.6 Analysis

In data inputting and analysis, the Statistical Package for the Social Science (version 20)(IBM SPSS, Chicago, IL, USA) software was used. Univariate analysis was performed to describe the characteristics of each research variable, including the characteristics of respondents (such as age, gender, education level, socio-economic status based on occupation, marriage status, severity of disaster, exposure to previous disaster, evacuation record, type of traumatic event impact like house damage, injured family members, and death of family members, as well as description of PTSD in the communities of Donorati village. Bivariate analysis was also conducted to compare PTSD level based on demography variables of respondents. In the bivariate analysis, Chi-squared and Fisher's test was used. Multivariate analysis was also conducted using logistic regression analysis to identify the meaning of relationships of some of the independent variables (predictor variables) and dependent variables (outcome variable).

2.7 *Ethical Clearance*

Ethical clearance with number KE/FK/0931/EC/2017 was obtained from the Commission of Ethics in Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada (FK-KMK UGM) prior to data collection. At the time of data collection, the researcher explained the reason for the research, outlined the respondent's rights and only involved respondents willing to complete the informed consent. All information on respondents was kept confidential and only used for the purpose of the research.

3. RESULTS

Table 1. Demographic characteristics and disaster exeprience of the study sample (n=100)

Variable	Frequency	Percentage (%)	
Gender			
Female	56	56%	
Male	44	44%	
Age			
<26 year	5	5%	
26-35 year	20	20%	Mean ± SD:
36-45 year	22	22%	46,36 ± 12,90
46-55 year	23	23%	Min-Max:
56-65 year	25	25%	18 - 80
> 65 year	5	5%	
Education level			
Elementary	43	43%	
Junior high	39	39%	
Senior high	15	15%	
College	3	3%	
Occupation			
Unemployed (household, student)	42	42%	
Farmer	14	14%	
Merchant	19	19%	
Labor	20	20%	
Employee	5	5%	
Marital status			
Married	91	91%	
Unmarried	5	5%	
Widowed	4	4%	
Village (severity of disaster)			
Donorati (severe impact)	56	56%	
Panggulan Kidul (mild impact)	44	44%	
Disaster experience before			
Yes	29	29%	
No	71	71%	
House damage			
Yes	12	12%	
No	88	88%	
Family injured			
Yes	3	3%	
No	97	97%	
Family death			
Yes	3	3%	
No	97	97%	
Evacuation experience during disaster			
Yes	51	51%	
No	49	49%	

Most respondents reported that land slide on 18 June, 2016 was the first natural disaster they had experienced. The respondents who had family members die or be injured as a result of the disaster only represented 3%. Of the sample, the ratio of evacuated and non-evacuated respondents was almost similar. From 100 respondents of the research, respondents who could potentially be diagnosed with PTSD represented 27% of the sample (Table 2). The total median of IES-R was 23, indicating that the majority of the respondents did not experience PTSD. It is concluded that subscale avoidance has the highest score, which means respondents in this research felt more disturbed with the symptoms in the avoidance subscaleTo identify the difference of PTSD level based on characteristics of respondents, Chi-square and Fisher‘s tests were conducted. The results show a significant difference in the level of PTSD based on sex, age, occupation, severity of natural disaster, injured family members, and evacuation experience (Table 3).

Table 2. *Post-Traumatic Stress Disorder* (PTSD) description (n=100)

Sub-scale	Median	Inter Quartile Range	Frequency	Percentage
Intrusion	6	2,25-10		
Avoidance	12	7-17		
Hyperarousal	5	3,25-8		
IES-R total	23	18-34		
Probable PTSD (score ≥ 33)			27	27%
Not PTSD (score 0-32)			73	73%

Table 3. PTSD description based on respondents' characteristics (n=100)

Variable	Probable PTSD	No PTSD	OR (95% CI)	X^2	*df*	*p Value*
	f/%	f/%				
Gender[a]						
Female	22	34	5,04	9,75	1	0,02*
Male	5	39	(1,72-14,77)			
Age[b]						
Adult (18-59 year)	27	58	-	-	-	0,009*
Elderly (≥60 year)	0	15				
Education level[b]						
Low (≤ 12 years of education)	23	59	1,36	-	-	0,77
High (> 12 years)	4	14	(0,40-4,58)			
Employment						
Unemployed	18	24	4,08	9,24	1	0,02*
Employed	9	49	(1,59-10,42)			
Marital status[b]						
Married	25	66	1,32	-	-	1,00
Unmarried & widowed	2	7	(0,25-6,81)			
Village (disaster severity)[a]						
Donorati (severe)	21	35	3,80	7,12	1	0,008*
Panggulan Kidul (mild)	6	38	(1,37-10,50)			
Disaster experience before[a]						
Yes	6	23	1,61	0,83	1	0,36
No	21	50	(0,57-4,52)			
House damage[b]						
Yes	6	6	3,19	-	-	0,081
No	21	67	(0,93-10,95)			
Family injured[b]						
Yes	3	0	-	-	-	0,018*
No	24	73				
Family death[b]						
Yes	2	1	5,76	-	-	0,17
No	25	72	(0,50-66,29)			
Evacuation experience[a]						
Yes	21	30	5,01	10,6	1	0,001*
No	6	43	(1,80-13,91)			

*=significant p *value* < 0,05; [a]=*Chi square test,* [b]= *Fisher test*

Table 4. Multivariate analysis results

Variable	Wald	*p Value*	Exp(B)	95% CI
Gender	10,69	0,001*	9,5	0,027-0,406
Village (disaster severity)	4,78	0,029*	3,6	0,088-0,875

The variables included in the logistic regression analysis were sex, age, occupation, severity of natural disaster, damaged house, family members wounded, death of a family member, and evacuation experience. The analysis using backward method generated 5 steps. In the 5th step, the only independent variables affecting PTSD in the logistic regression model were gender and severity of disaster (Table 4).

4. DISCUSSION

Prevalence of PTSD Among Landslide Survivors

Respondents in this study identified with potential PTSD were 27%. Even though the study was undertaken more than a year after the disaster, a large number of people were still experiencing PTSD symptoms, similar to the findings of other researchers (Ali, Farooq, Bhatti, & Kuroiwa, 2012; Jin, Xu, Liu, & Liu, 2014). It was evident however that the majority of respondents were not affected by the symptoms of PTSD, which could be a result of the trauma healing intervention implemented in the aftermath of the landslide to assist the community members to reduce their post event trauma.

This research also revealed that the avoidance subscale of the IES-R was the most prominent for the respondents. This result is consistent with the research conducted by Malinauskienė and Bernotaitė (2016), and Warsini et al. (2015a), who also found that the avoidance subscale had the highest score. Other researchers have however reported different results; for example, research by Othman et al. (2016) reported that the intrusion sub-scale had the highest score, while Zhang el al. (2012) found that the hyperarousal sub-scale had the highest p value.

Factors Related ToSurvivors' PTSD

This research found a significant difference in the level of PTSD based on age, where adult (aged between 18 to 59) respondents had higher probability of reporting post event PTSD than old-aged respondents. The high prevalence of PTSD in adult aged respondents may be caused by more exposure to traumatic situations which trigger PTSD (Javidi & Yadollahie, 2012), as adult people also have greater burden responsibility and are usually breadwinners in the family (Zhang & Ho, 2011). Old respondents may have lower likelihood of developing PTSD because of previous life experiences that have them to develop coping skills for managing stressors (Thomas, Phillips, Fothergill, & Blinn-Pike, 2013).

However, from multivariate analysis the age variable was not proven affected the respondents' PTSD. The result is not consistent with some previous researches (Othman et al., 2016; Warsini et al., 2015a; Xue et al., 2015). There is an indication that age when experiencing traumatic event is an important predictor for severity or prevalence of PTSD (McCutcheon et al., 2010). The difference result of this research in age variable may be due to imbalance proportion among adult and elderly respondents. The percentage of elderly respondent in this research was only less than 25%.

The result of this study shows that PTSD level vary significantly based on employment status. Unemployed respondents have more probability to suffer PTSD of 4,08 times than those employed. The cause was the fact that unemployed people have very limited sources (Pandit, 2009) when facing stressful life. With limited resources, a person will face difficulty to fulfill additional need and impact due to natural disaster. In addition unemployment has mostly caused a person suffered desperation, reduced self-esteem and self-confidence and anxiety or depression (Liem & Liem, 2013; Lopus, 2013). However, in multivariate analysis it was not proven that PTSD is affected by employment status. It means that the employment status was not the strongest predictor of survivors PTSD.

This study results revealed that PTSD level significantly vary based on whether injured family members exist or not. It is found that all respondents with injured family falls within the category of probability of PTSD. Zhang et al. (2012) also found similar result with significant difference of PTSD based on injury of the family members. In the book written by Ursano et al (2017) stated that wound or injury suffered by the beloved person has become the risk factor which may develop mental disorder after the traumatic event. But in this research, the injured family was not the predictor factor of PTSD.

This research result showed significant difference of PTSD level based on evacuation experience. The evacuated respondents were 5,01 times more probability to suffer PTSD than those not evacuated. Living in the evacuation place or temporary house is a factor significantly attributable to the increased probability of PTSD (Ali et al., 2012). Unplanned evacuation in the natural disaster will pose high pressure to the communities or individuals, cause feeling of being isolated at the new location and abandoned by communities or government (Agency for Toxic Substances and Disease Registry (ATSDR), 2017). Living in the evacuation point will cause problems such as limited healthcare, scarcity of basic needs and disorder in carrying out daily routines and sometime separate a person with family or friend so that they feel losing support systems (Tuason, Teresa, Güss, & Carroll, 2012).

The female landslide survivors in this research has opportunity 5,04 more with PTSD compared with male. This finding is supported by research by Othman et al (2016) also stating significant difference in PTSD based on sex. Some sources stated that female is more vulnerable to risk of PTSD than male (Hu et al., 2017; Olff, 2017). In addition, from result of multivariate test, it is found that sex the factor mostly affects PTSD of respondents this research. This may be attributable to difference of gender in the initial physiological and psychological response on trauma (Irish et al., 2011). Female is more sensitive to threat, tending not to use effective handling strategy and more negative in interpreting traumatic event of natural disaster than male (Navarro-Mateu et al., 2017; Zhang et al., 2012), female also tend to blame on themselves and see the world as dangerous, this is an important predictor to symptom PTSD (Hu et al., 2017).

The result research shows significant difference of PTSD level in severity of place of residence. The respondents living in Donorati have more probability

to PTSD of 3,8 times than those living in Panggulan Kidul. In addition, based on the result of multivariate test, it is found that severity natural disaster is the factor which affects the PTSD from respondents this research. The above result is consistent with the research by (Wang et al., 2005) who stating that the probability of PTSD was affected by severity of exposure, and PTSD risk will increase significantly based on severity of disaster (Xue et al., 2015).

5. CONCLUSSION

Based on the result of research it is concluded that prevalence of probability of Post-Traumatic Stress Disorder (PTSD) in the respondents is 27%. There is significant difference of PTSD level based on sex, age, occupation, severity of natural disaster, wounded family members, and evacuation record. However independent variable affecting the PTSD in the multivariate analysis is sex and severity natural disaster based on address.

Based on the research conclusion, the researcher recommended some suggestions. First, Purworejo Regency Health Office or local Community Health Center needs to improve the extension program to the communities to maintain mental health and to implement the program in the effort to reduce post traumatic stress disorder such as regular trauma healing program and focus on the most severe symptom. Second, Community Health Center may deliver extension on mental health through psychological approach on female since most communities suffering PTSD are females. Extension may be delivered through integrated service post, recitation, family welfare program (PKK), and gathering group as a regular program was conducted in the area affected by the land slide. Third, local Community Health Center should perform re-screening on mental health issues in the communities victims land slide in Donorati village mostly within the category probability of PTSD diagnosed. The result of screening may be used as the basis to ensure PTSD diagnosis and to make follow-up action intervention planning in an effective and efficient manner.

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