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Research Article

Post-traumatic stress Disorder among Iranian pre-hospital emergency medical services personnel

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ABSTRACT:

Introduction: Post-traumatic stress disorder (PTSD) is a psychiatric disorder in which a person experiences trauma-related symptoms or impairments in everyday functioning. The most important and reliable method for diagnosis of mental disorders, especially PTSD, is clinical interview as a golden standard tool. It seems that majority of previous studies have used only screening scales, and because of this weakness they have committed to an over or under estimation. The aim of present study is to evaluate PTSD prevalence in EMS personnel working in Emergency medical services located in between cities roads, using olden standard tool, in addition to assess some related risk factors.

Method: The sample comprised all pre-hospital Emergency medical services personnel (PEMS) working for Red Crescent Society and medical university in Kohgiloyeh and Boyearahmad province, measuring instruments were: TheImpact of Event Scale –Revised (IES-R), Structured Clinical Interview for DSM-5(SCID), The Satisfaction with Life Scale (SWLS), The Satisfaction with Life Scale (SWLS), and The Generic job satisfaction scale.

Using Census sampling, all personnel of EMS completed scales. The score of 22 was selected as cut- off point. SCID administered by a clinician or trained mental health professional that was familiar with the DSM-5 classification and diagnostic criteria for all personnel who scored over 22 (70%). Finally, the prevalence rate of PTSD was calculated as the percentage of participants meeting criteria for this disorder according to the SCID. Data were analyzed using SPSS 22 version. Descriptive analysis was made to determine the characteristics of the sample correlation coefficients were used to assess multi collinearity and the strength of bivariate relationships. Linear regression models were used to determine the predictive values of demographic characteristics, job satisfaction and life satisfaction on PTSD status. Z-test for two proportions was used to compare the present study prevalence rate with previous studies.

Results: One hundred percent of participants had experienced at least two traumatic events. The mean of total scores in IES was 33.81. Postulating the 22 as cut-off point, prevalence rates for PTSD were 70 percent and SCID interview showed 47% prevalence of this disorder... The result showed significant correlation between total scores of IES and life satisfactory, job satisfactory, age, marriage status and precedence. There was no significant correlation between IES total and subscales scores and work precedence. In this model age, marriage status and marriage precedency did not demonstrate significant relationship with IES total scores. Finally, the job satisfactory and then life satisfactory

were entered to model. The result showed both variables significantly predicted probable PTSD (IES) severity; these two variables together explain about 49% of the variance.

Discussion: Results show:there is a significant discrepancy between estimation of incidents of PTSD according to screening and assessment tools. In attention to golden standard role of Clinical interview and its deep and professional assessment of patients, it seems that the 47% prevalence be more reliable. In other hand, it sees that EMS personnel may exaggerate their scores on PTSD scale and report symptoms much higher than actual, therefore this discrepancy could, to some extent, be related to this tendency. The prevalence of PTSD is much higher than prevalence of PTSD in general population. Age, marriage precedency, work precedency, number of experienced traumas, job satisfaction and life satisfaction had a significant correlation together. Only job and life satisfaction had a significant prediction of severity of symptoms. These results are in line with previous studies.

Conclusion: The present study makes a significant contribution to research on PTSD, especially in EMS personnel; by investigate the prevalence rate of PTSD and its related risk factors. The results showed a high rate of PTSD among these personnel and also manifested job and life satisfaction as strong predictors for this rate.

Keywords: PTSD, pre-hospital emergency medical services, personnel, ambulance workers.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is apsychiatric disorder in which a person experiences trauma-related symptoms or impairments in everyday functioning (Friedman, 2015). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013)) included PTSD in a new chapter on Trauma- and Stressor-Related Disorders. According to DSM 5 diagnostic criteria for PTSD include a history of direct and indirect exposure to a traumatic event that meets specific stipulations and symptoms from each of four symptom clusters: intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity. While the life time prevalence of this disorder in American adults was reported 7.8% (Friedman et al., 2014), data analyzed from 26 population surveys in the World Health Organization World Mental HealthSurveys showed that lifetime prevalence of PTSD was 3.9% in the total sample (Koenen, 2017). In attention to this worldwide prevalence and the psychological and physical consequences of traumatic exposure, it is clear that PTSD is a significant publichealth problem (Schnurr and Green, 2004; Friedman, 2005; and Atwoli et al., 2015).

In other hand, it seems that Traumatic exposure is higher for individuals with specific jobs (includes military personnel, police, fire fighters, emergency medical technicians, and others) where their work places them in traumatic situations on a regular basis(Friedman, 2015; andDrewitz-Chesney, 2012).This could be related to experiencing repeated or extreme exposure to aversive details of the traumatic events (as A4 criteria of DSM5 for PTSD).Hereupon, it seems that Emergency Medical Services (EMS) personnel are at the top of this exposing and its psychological and physical consequences (McFarlane et al., 2009; and Johnson et al, 2005).

Studieshave shown that EMS personnel are frequently exposed to traumatic events therefore have the higher prevalence of PTSD than other emergency services personnel (Maguen et al, 2009). It seems that this job is inherently stressful (Young and, Cooper, 1997). They are often confronted with a repeated exposure to circumstances of serious accident, death, life-threating injury, patients with specific intensive care, or a crisis situation. Moreover, they often have to involve in unpredictable and dangerous interventional activities that could act for them as a trauma (Cydulka et al., 1989; and James, 1988). In other words, they are enduring a high daily stress resulted from direct and indirect traumas that could induce PTSD symptoms in them.

Several studies have addressed the prevalence of post-traumatic stress disorder (PTSD) symptoms in the EMS personnel. For example, in a study

Clohessy and Ehlers (199) assessed Fifty-six ambulance service workers and found that 21%met DSM-III-R criteria for PTSD. This rate was22% (sample size= 617) in UK (Bennett et al., 2005), 15.2% in Swedish population (Jonsson et al., 2003), 5.6% in Brazil (Berger et al., 2007), and 6.4% in Canada (Donnelly, 2012). The prevalence PTSDparamedic trainee was evaluated by Fjeldheim and colleagues (2014). They found that 16% (sample size = 131) met criteria for PTSD. In Asia, the prevalence rate has been reported by several studies. This rate was estimated 64.5% for Iraqi population (Jacoub et al., 2010), 94% in Iranian population (Iranmanesh et al., 2013), 28% and 22% for Chinese (Shi et al., 2017) and Pakistanis (Keraiet al., 2017) population respectively.

There is a consistent body of research showing thatthe prevalence rate of PTSD is associated with a variety of risk factors (Friedman, 2015). Several studies have evaluated the risk factors that could play a significant precipitating or protecting role in incidence of PTSD, especially in EMS personnel (de Boer et al., 2011). These studies have found that the risk of PTSD was strongly associated with positive coping (Shi et al, 2017; and Mishra et al., 2010), personality (Lawrence and Fauerbach, 2003; and ; Lawrence and Fauerbach, 2003), resiliency (Alexander and Klein, 2001;Fjeldheim et al., 2014;Davydov et al, 2010; and LawrenceandFauerbach, 2003), job satisfaction experience (Jonsson et al., 2002; andDonnelly , 2011)social support (Kerasiotis and Motta, 2004; Mishra et al., 2010; Alexander and Klein, 2001; Fjeldheim et al., 2014;and Van der PloegandKleber, 2003) and demographic variables (Jonsson et al., 2002; Kerai et al., 2017, and Jacoub et al., 2010).

Despite a lot of researches on PTSD in the EMS personnel, there is a lack of depth assessment tools inmajority of them andrelying on just screening scales. In these studies, estimation of PTSD prevalence has been done according to screening tools. Screening determines the need for acomprehensive assessment; it does not present definitive information about diagnosis andpossible treatment needs (Substance Abuse andMental Health Services Administration, 2012). The most important and reliable method for diagnosis of mental disorders, especially PTSD, is clinical interview (Spoon et al., 2013, and Griffin et al., 2004) as a golden standard tool (Marques et al., 2009). It seems that because of this weakness they have committed to an over or under estimation.

The aim of present study is to evaluate PTSD prevalence in EMS personnel working in Emergency medical services located in between cities roads (using olden standard tool), in additionto assess some related frisk factors.

METHOD:

Participants

The sample comprised all pre-hospital Emergency medical services personnel (PEMS) working for Red Crescent Society and medical university in Kohgiloyeh and Boyearahmad province (south of Iran); Serving a population of approximately one million.Using Census sampling, 110persons (all male) were selected. All of participants were working in emergency medical services centers located in the between cities roads. The mean age of the group was 30.06(SD=4.97; range 22–45 years).

Measures:

The Impact of Event Scale –Revised (IES-R)

The IES-R is a 22-item self-report measure which aims to assess subjective distress caused by traumatic events. The original version (Horowitz et al., 1979) consists of 15 items. It was revised by Weiss and Marmar (1997) to better match diagnostic criteria for PTSD as specified in the DSM-IV (APA, 2000). Accordingly, in addition to intrusion and avoidance items, the IES-R includes items capturing hyper arousal as the third main Symptom cluster of PTSD. The responses of the 22 items range from 0 (‘‘not at all’’) to 4 (‘‘extremely’’). Its good psychometric properties, validity and reliability have been evaluated in a wide array of researches (Beck et al., 2008; Creamer et al., 2003; Bryant et al., 2003; Morina

et al, 2013; Weiss and So-kum Tang, 2007), and therefor make it a promising brief self-reported measure for assessing PTSD

Structured Clinical Interview for DSM-5(SCID)

The Structured Clinical Interview for DSM-5 (SCID-5) is a semi-structured interview guide formaking DSM-5 diagnoses(first et al., 2015). The SCID is widely used in published research studies, including in the traumatic stress literature [National Center for PTSD, 2006]. In addition, among traumatic stress professionals the SCID'sPTSD module was found to be the second mostwidely used clinician-administered PTSD instrument (Elhai et al., 2005). Its validity and reliability have been reported in a number of papers (Glasofer, 2015; Elhai et al., 2005; first et al., 2015)

The Satisfaction with Life Scale (SWLS)

The Satisfaction with Life Scale (SWLS, a 5-item scale, was developed to assess satisfactionwith the respondent's life as a whole (Diener et al., 1985). Respondents are asked to answer each item on a 7-point Likert scale (from 1= *strongly disagree* to 7 = *strongly agree*). This scale has reported favorable psychometric properties, including high internal consistency and high temporal reliability (Neto, 1993; Diener et al., 1985; and Athay, 2012).

The Generic job satisfaction scale

This is a 10-item instrument that has been used to measure job satisfaction on a five-point Likert scale with 1 = strongly disagree and 5 = strongly agree (Macdonald and MacIntyre 1997). TheCronbach'salpha as reported by Macdonald and Macintyre is 0, 77.

Procedure

Using Census sampling, all personnel of EMS completed IES – R. The score of 22, as proposed by Rash et al. (2008), was selected as cut- off point. SCIDadministered by a clinician or trained mental health professional that was familiar with the DSM-5 classification and diagnostic criteria for all personnel who scored over 22 (70%). Finally, the prevalence rate of PTSD was calculated as the percentageof participants meeting criteria for this disorder according to theSCID.

Data were analyzed using SPSS 22 version. Descriptive analysis was made to determine the characteristics of the sample. Correlation coefficients were used to assess multicollinearity and the strength of bivariate relationships. Linear regression models were used to determine the predictive values of demographic characteristics, job satisfaction and life satisfaction on PTSD status. Z-test for two proportions was used to compare the present study prevalence rate with previous studies (Woodward, 2005 and Altman et al., 2000).

RESULTS

Sample demographic

The descriptive statistics of the research are presented in Table 1. The sample size was 110 (100% male). The mean age of the group was 30.06 years (SD=4.97; range 22–45 years). The result showed that 60% of participants were married and all of them (100%) were at bachelor degree. The number of experienced traumas ranged 2to 30 (mean = 6.6 (4.6)). Marriage and Work precedency data are presented in tble1.

Data screening and prevalence of PTSD

One hundred percent of participants had experienced at least two traumatic events. As presented in table1, the mean of total scores in IES was 33.81(SD= 16.18; ranged 6-70). The highest and lowest average scoresin subscales were 13.99±6.32 (AV; with items mean 1.75) and 7.74±4.98 (HYA with items mean .97) respectively. the average means of the top and bottom items in present study. Items 17 with 2.41 and 10 with .79 were respectively at top and bottom of all average means of 22 items. All three lowest items were related to HYA subscale.

Postulating the 22 as cut-off point (as reported by Rash et al., 2008), prevalence rates for PTSD were 70 percent (table 1). Using clinical interview, 47 percent met the criterions for PTSD. With compare to previous studies, the most difference

was observed with Donnelly (2011; z= 14.42) and the least was with Clohessy&Ehlers (1999; 3.26).

Predictors of PTSD status

In order to assess the relationship between the variables,bivariate correlations ascertained the strengthof the association and assessed for multicollinearity(table 2). The total and subscales scores, life satisfactory, job satisfactory; age, marriage status, marriage and work precedency were inserted to correlation analysis. The result showed significant correlation between total scores of IES and life satisfactory (.68, p <0.01), job satisfactory (.68, p <0.01), age (.28, p <0.01), marriage status (.23, p <0.05) and precedence (.33, p <0.01).

There was no significant correlation between IES total and subscales scores and work precedence.

Multiple Linear regression was used to assess explanatory variables of PTSD. The followingvariables were entered into the first regression model: age, life satisfactory, job satisfactory, marriage status, and marriage precedency. In this model age, marriage status and marriage precedency did not demonstrate significant relationship with IES total scores. Finally, the job satisfactory (firs model) and then life satisfactory were entered to model (table 3). The result shoed both variables significantly predicted probable PTSD (IES) severity; *F* (2,109) _ 52.6, *p* _ .001; total *R*2_ .49, p _ .01. These two variables together explain about 49% of the variance.

Table 1. comparison of prevalence rates reported in present (according to interview) and previous studies

Study	Number of sample	Percent	Z- Test	P value
Presentstudy.1	110	70		
Present study2	110	47	3.26	0.001
Clohessy&Ehlers(1999)	56	21	6.30	0.00001
Jonsson et al. (2003)	223	15	5.51	0.00001
Bennett et al (2005)	612	22	9.37	0.0001
Berger et al. (2007)	234	5	2.96	0.0001
Jacoub et al. (2010)	189	64.5	14.42	0.0001
Donnelly (2011)	1633	6.4	11.86	0.0001
Iranmanesh et al. (2013)	400	94	5.42	0.0001
Fjeldheim et al (2014)	131	15	7.11	0.0001
Mishra et al. (2010)	105	4	9.64	0.0001
Shi et al.,(2017)	2706	13.6	5.39	0.0001
Kerai et al., (2017)	507	22		0.0001

Table 2. correlations between demographic variables, job and life satisfactory, and IES scores

	Total IES	INT	HYPT	AV	Life Satisfactory	Job satisfactory	Age	Marriage status	Marriage precedency	Work precedency
Total IES	1									
INT	.9**	1								
HYPT	.89**	.82**	1							
AV	.81**	.53**	.57**	1						
Life Satisfactory	-.63**	-.54**	.60**	-.52**	1					
Job satisfactory	-.68**	-.60**	-.62**	-.57**	.75**	1				
Age	-.28**	-.16	-.26**	-.27**	.18	.35**	1			
Marriage status	.-23*	-.12	-.18	-.28**	.20*	.23*	.72*	1		
Marriage precedency	-.33**	-.23*	-.30**	-.30**	.22*	.34**	.86**	.71**	1	
Work precedency	-.18	-.07	-.20*	-.20*	.13	.23*	.84**	.66**	.83**	1

*According to cut- off point of IES, **according to clinical interview

Table3. Hierarchical regression analysis for IES total scores basedon data from sample*

Model		B	Std. Error	Beta	t	Sig.	95% Lower Bound	95%Upper Bound
1	(Constant)	104.224	7.350		14.179	.000	89.655	118.794
	Jobsatisfactory	-1.903	.196	-.682	-9.696	.000	-2.292	-1.514
2	(Constant)	94.542	8.122		11.640	.000	78.440	110.643
	Jobsatisfactory	-1.354	.289	-.486	-4.693	.000	-1.926	-.782
	Life satisfactory	-.638	.251	-.263	-2.539	.013	-1.136	-.140

Final model *F* (2,109) _ 52.6, *p* _ .001; total*R*2_ .49, p _ .01.

DISCUSSION

The current study was designed to assess prevalence of PTSD among ESM personnel and some factors related to such stress symptoms, using screening scale and structured clinical interview.Whereas previous studies of PTSD found rates ranging from 3.9% (Koenen, 2017) to 7/8 (Kessler, 2005) in general population and from 5 %(Berger et al, 2007) to 94% (Iranmanesh et al., 2013) in EMS personnel, we found a current prevalence 70% on IES-R and 47% on SCID. Three points should be considered about these results. Firstly, there is a significant discrepancy between estimation of incidents of PTSD according to screening and assessment tools. In attention to golden standard role of Clinical interview (Spoon et al., 2013, and Griffin et al., 2004) and its deep and professional assessment of patients, it seems that the 47% prevalence be more reliable. In other hand, it sees that EMS personnel may exaggerate their scores on PTSD scale and report symptoms much higher than actual problems (Sterud et al., 2006), therefore this discrepancy couldto some extent, be related to this tendency.

The prevalence of PTSD is much higher than prevalence of PTSD in general population (3.9-7.8). The participants were working in emergency centers located at between cities roads and experiencing daily deathful car accidents, as a traumatic event therefore, they are exposed to a host of traumatic events. Experiencing a repeated exposure (at least two times) to circumstances of serious accident, death, life-menacing injury, patients with specific intensive care, or a crisis situation, could justify this prevalence. Directly experiencing of trauma, especially witnessing a transport accident, is part of the daily routine work performed by these personnel

Finally, there is a significant discrepancy between the rate of prevalence reported by present study (especially 47%) and majority of previous studies, as showed in table.3. For this discrepancy the first possibility could be cultural and regional differences. There is strong evidence that Cultural belief systems could greatly affect individual's reaction to trauma and stress (Mishra et al, 2010; Pole et al., 2001; Perilla et al., 2002; Cohen, 1997; Tseng, 2003; and Herbert and Forman, 2010). Similarity between this study and other Asian studies (Iranmanesh et al., 2013; and Jacoub et al., 2010) in reported prevalence rate could explain these cultural discrepancies. A second possibility could be different type of duties in present participants.

All of the participants were working in emergency medical services centers located in the between cities roads. This job is inherently required a lot of witnessing dangerous and death full road accidents that are substantially higher than other paramedic personnel. The mean number of experienced traumatic events was 6.6(ranged from 2to 30), with compare to majority of previous studies that rarely one hundred of participants experienced traumatic event. For example, 61.6, 71, 94, percent of participants reported exposure to a traumatic event in Jonsson et al. (2003), Mishra et al. (2010), and Fjeldheim et al. (20140 respectively.

The highest average of mean scores in subscales was related to avoidance, then intrusion, and finally the hyper arousal (table.1). This result is not in agreement with previous (Mishra et al, 2010) study that reported intrusion and hyper vigilance as the most common criteria. This discrepancy could be to some extended by different socio-cultural contexts because the cultural systems could justify diversity of symptoms and criteria (Cohen, 1997; Tseng, 2003; and Herbert and Forman, 2010). In addition, the most commonly and sever reported items were "trying to remove it from my memory", "feeling watchful and on-guard" and" reminder bring back feelings about trauma".

The result also showed a significant correlation with, age, marriage precedency, and work precedency, number of experienced traumas, job satisfaction, and life satisfaction. Regression analysis showed that only job and life satisfaction as significant predictors of severity of symptoms. These results are in line with previous studies (Jonsson et al., 2002; andDonnelly, 2011; Kerasiotis and Motta, 2004; Mishra et al., 2010; Alexander and Klein, 2001; Fjeldheim et al., 2014; and Van der PloegandKleber, 2003).

This study contains some limitations that are important to acknowledge. In spite of census sampling and covering all of EMS personnel, the sample size was small that should be considered in interpretation of data.

Secondly, the sample consisted of only EMS personnel who working in emergency centers located in between cities roads, it be recommended to comprise all of personnel (between and inter cities) in future studies.

Conclusion:

The present study makes a significant contribution to research on PTSD, especially in EMS personnel; by investigate the prevalence rate of PTSD and its related risk factors.

The results showed a high rate of PTSD among these personnel and also manifested job and life satisfaction as strong predictors for this rate.

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