Critical Care Nursing

Iran J Crit Care Nurs. 2015;8(1):35-42

Journal home page: www.inhc.ir

The relationship between personality traits and post-traumatic stress disorder among EMS personnel and hospital emergency staffs

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ARTICLE INFO

Article type:
Original article

Article history:
Received: 18 Feb 2014
Revised: 10 Nov 2014
Accepted: 14 Dec 2014

Key words:
Post-traumatic stress disorder
Personality traits
EMS personnel
Hospital emergency staffs

ABSTRACT

Aims: EMS personnel and hospital emergency staffs experience many stressful situations which predispose them to post-traumatic stress disorder (PTSD). The aim of this study was to evaluate the relationship between personality traits and PTSD among EMS personnel and hospital emergency staffs in Kerman, Iran.

Methods: This cross-sectional study was conducted in 2013. All 180 EMS personnel and 321 hospital emergency staffs affiliated to Afzalipour, Shafa, Bahonar, and Shahid Beheshti hospitals and the National EMS System, Kerman, Iran, were recruited by using the census method. The NEO Five-Factor Inventory and the Mississippi combat-related PTSD scale were used for data collection. The SPSS v. 19 was employed for conducting the Chi-square, the Pearson's correlation, the independent-samples t, and the one-way analysis of variance tests.

Results: EMS personnel's PTSD was significantly correlated with personality traits of conscientiousness and neuroticism (P-value<0.01). In the hospital emergency staffs group, PTSD was correlated with personality traits of conscientiousness, neuroticism, and openness (P-value<0.05). The means of hospital emergency staffs and EMS personnel's PTSD scores were 97.02±21.51 and 89.30±19.17, respectively.

Conclusions: EMS personnel and hospital emergency staffs experience great levels of occupational stress and hence, are at great risk for PTSD. Both EMS personnel and hospital emergency staffs have personality traits which predispose them to PTSD. Consequently, health authorities need to implement in-service stress management programs for them and use personality traits as a condition for employing new EMS personnel and hospital emergency staffs.

Please cite this paper as:
Sheikhbardsiri H, Sarhadi M, Abdollahyar A, Dastres M, Sheikh Rabari A, Aminizadeh M. The relationship between personality traits and post-traumatic stress disorder among EMS personnel and hospital emergency staffs. Iran J Crit Care Nurs. 2015;8(1):35-42.

1. Introduction

Post-traumatic stress disorder (PTSD) is a disorder which happens after facing, getting involved, or hearing about a severe traumatic stressor [1]. It is characterized by frequently remembering the traumatic stressor, re-experiencing it either during wakefulness or sleep, avoiding remembering it, and feeling great apprehension and arousal [2]. According

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to the National Institute of Mental Health, 60.7% of American adults experience at least one traumatic event during their lifetime which can finally lead to PTSD [3].

Stress-related disorders are also common among individuals who help severely-injured victims and trauma patients [4]. narimani reported that beside victims, healthcare professionals may also develop PTSD .Repeated exposure to workplace violence, patients' ailment, injuries, open wounds, massive bleedings, and death, as well as working in unstable environments causes great stress to healthcare professionals, particularly emergency staffs, and predisposes them to stress-related disorders such as depression, anxiety, and PTSD [3–8]. The National Institute of Mental Health reported that compared with the public, emergency medical service personnel (EMS personnel) experience higher levels of stress during their daily practice [3]. Laposa et al. (2003) and Regher et al. (2010) conducted studies in Colombia and Germany and found that healthcare professionals are particularly prone to PTSD [7 and 8]. Sorenson et al. (2002) and Bennette et al. (2004) also found that the prevalence of PTSD among healthcare professionals and EMS personnel in the United States and England was as high as 20–22% [10 and 11].

There are several risk factors which are associated with greater risk for developing PTSD. Most of these factors are personal [12]. For instance, healthcare professionals with previous personal and familial history of mood disorders and anxiety are more prone to PTSD compared with those without such history [13]. Cox et al. (2004) also reported that physical or sexual abuses during childhood are associated with greater risk for developing PTSD among individuals who experience traumatic events [14].

One of the risk factors for PTSD is personality traits [25]. Costa et al. [2004] determined five main personality traits including:

1. Neuroticism: having tendency for experiencing anxiety, tension, hostility, impulsivity, depression, and low self-esteem;
2. Extraversion: having tendency for being positive, courageous, energetic, and intimate;
3. Openness: characterized by curiosity, flexibility, reasoning, and a love for art;
4. Agreeableness: having tendency for generosity, kindness, benevolence, empathy, humanism, and confidence in others; and
5. Conscientiousness: having tendency for self-discipline, dutifulness, efficacy, peace, logic, and progress [16].

Neuroticism is associated with greater predisposition to negative emotions and PTSD [12]. Korotkov (2008) reported that healthcare professionals with openness, extraversion, and neuroticism are more prone to PTSD [17]. Cox et al. (2004) compared individuals with and without previous experiences of traumatic events and found that PTSD was more common among self-critical and neurotic men and neurotic women [14]. Lavoie et al. (2011] also found a significant relationship between the risk for PTSD and personality traits of extraversion and openness [18]. However, few studies in Iran and no studies in Kerman, Iran, have dealt with the relationship between personality traits and risk for PTSD.

This study aimed to evaluate the relationship between personality traits and PTSD among EMS personnel and hospital emergency staffs in Kerman, Iran.

2. Methods

In this cross-sectional study, the census method was used to recruit all EMS personnel and hospital emergency staffs who were affiliated to Afzalipour, Shafa, Bahonar, and Shahid Beheshti hospitals and the National EMS System, Kerman, Iran. Study participants included of 321 hospital emergency staffs (physicians, nurses, nurse assistants, and administrative staffs) and 180 EMS personnel

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(nurses, technicians, and associate nurses). The staffs who had a work experience of less than one month, did not give consent for participating in the study, or filled out the study questionnaires incompletely were excluded. In total, 101 participants withdrew or were excluded from the study while 400 ones completed it. After obtaining ethical approval from the Ethics Committee of Kerman University of Medical Sciences, Kerman, Iran, (approval code: 800-617), we referred to the study setting in different work shifts and invited study participants to complete the study questionnaires. All participants provided informed consent for participating in the study. They were informed about the aim of the study both verbally and in written from. Both EMS personnel and hospital emergency staffs completed the same questionnaire.

Three questionnaires were used for data collection, including a demographic questionnaire, the NEO Five-Factor Inventory (NEO-FFI), and the Mississippi combat-related PTSD scale (M-PTSD). The short-form of NEO-FFI was developed by Costa et al. (2004) [16]. This inventory consists of five main factors including extraversion, openness, neuroticism, agreeableness, and conscientiousness. Each factor is measured by 12 items. Accordingly, the NEO-FFI consists of 60 items. The items are scored on a Likert-type scale from 1 (Completely agree) to 5 (Completely disagree). The score of each factor is calculated separately and finally, five total scores are reported [16]. For reliability assessment, 30 staffs were drawn from the study setting and were invited to complete the inventory.

The Cronbach's alpha was 0.94. Moreover, ten faculties affiliated to Kerman Faculty of Nursing and Midwifery, Kerman, Iran, assessed and confirmed the validity of the NEO-FFI. The 39-item M-PTSD is a standardized questionnaire which was developed by Keane et al. (2008) for assessing PTSD [19]. The 39 items of the questionnaire fall into four main domains including, penetrating memories (10 items), problem in personal relationships (9 items), inability in controlling emotional feelings (10 items), and lack of depression (10 items). Items are responded by using a five-point Likert scale ranging from 1 (Never) to 5 (Always).

Accordingly, the total score of the M-PTSD would be 39–195. Scores 39–65, 65–130, and 130–195 are interpreted as mild, moderate, and severe PTSD, respectively [19]. Keane et al. (2008) applied M-PTSD to a sample of 362 American Vietnam veterans and reported a Cronbach's alpha and a test-retest correlation coefficient of 0.94 and 0.90, respectively [19]. The Cronbach's alpha and the test-retest correlation coefficient of the Persian version of M-PTSD were reported to be 0.92 and 0.82, respectively [20]. Narimani et al. (2010) also reported a Cronbach's alpha of 0.97 for the questionnaire [5]. We invited ten faculties affiliated to Kerman Faculty of Nursing and Midwifery, Kerman, Iran, to assess the validity of the M-PTSD.

Data analysis was performed by using the $SPSS_{19}$ Measures of descriptive statistics such as frequency, mean, and standard deviation were used for summarizing and reporting the study data. The Kolmogrov-Smirnov test showed that study variables had a normal distribution.

The relationship between personality traits and PTSD as well as the differences between the study groups regarding categorical demographic variables (such as age, gender, and education) were assessed by performing the Chi-square test. Moreover, the independent-samples t and the one-way analysis of variance (ANOVA) tests were conducted for evaluating the relationships between participants' M-PTSD scores and their demographic characteristics. In addition, the study groups were compared with each other regarding M-PTSD score by using the independent-samples t test. On the other hand, the relationship of M-PTSD scores with participants' age and work experience was evaluated by doing the

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Pearson's correlation test. P values lower than 0.05 were considered as significant.

3. Results

In total, 250 hospital emergency staffs and 150 EMS personnel participated in the study. Table 1 shows study participants' demographic characteristics. Ten hospital emergency staffs (4%) and three EMS personnel (2%) had severe PTSD. The means of hospital emergency staffs and EMS personnel's M-PTSD scores were 97.02±21.51 and 89.0±19.17, respectively (Table 2). Study findings revealed a significant difference between the groups regarding M-PTSD score ($p<0.001$; Table 2). Moreover, in the hospital staffs group, nurses and physicians acquired significantly higher M-PTSD scores than other staffs ($p<0.04$). In addition, there was a significant correlation between EMS personnel's fields of study and their M-PTSD scores. Subsequently, study findings revealed that EMS personnel with nursing degree had significantly higher M-PTSD scores compared

Table 1: Hospital emergency and EMS staffs' demographic characteristics

Variables		Hospital staffs N (%)	EMS personnel N (%)	Chi-square value	P-value
Gender	Male	79 (31.6)	150 (100)	12.17	0.001
	Female	171 (68.4)	0 (0)		
Educations	Diploma	96 (38.4)	28 (18.7)	24.33	0.001
	Associate degree	22 (8.8)	31 (20.7)		
	Bachelor or higher	132 (52.8)	91 (60.6)		
Marital status	Single	193 (77.2)	58 (38.7)	1.79	0.001
	Married	57 (22.8)	92 (61.3)		
Monthly working hours	< 100 hours	19 (7.6)	10 (6.7)	41.94	0.001
	100–150 hours	89 (35.6)	30 (20)		
	150–200 hours	112 (44.8)	51 (34)		
	> 200 hours	30 (12)	59 (39.3)		
Direct contact with patients	Yes	221 (88.4)	122 (81.3)	3.83	0.36
	No	29 (11.6)	28 (18.7)		
Traumatic experiences	Low	29 (11.6)	12 (8)	24.62	0.001
	Moderate	85 (34)	23 (15.3)		
	High	77 (30.8)	53 (35.3)		
	Very high	59 (23.6)	62 (41.3)		
Job interest	Little	44 (17.6)	25 (16.7)	2.69	0.44
	Moderate	125 (50)	65 (43.3)		
	Great	81 (32.4)	60 (40)		

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with other EMS personnel (p<0.01). Moreover, compared with basic and first-responder EMS personnel, intermediate personnel suffered from more severe levels of PTSD (p<0.01).

Table 3 shows the study participants' personality traits scores. There were significant differences between the two groups regarding the personality traits of neuroticism, openness, and conscientiousness (p<0.01). Study findings also indicated that hospital emergency staffs' M-PTSD scores were significantly correlated with the personality traits of conscientiousness, openness, and neuroticism (p<0.05). On the other hand, the M-PTSD scores of EMS personnel were significantly correlated with the personality traits of conscientiousness and neuroticism (p < 0.01). Other personality traits were not correlated with M-PTSD scores.

4. Discussion

This study was carried out to evaluate the relationship between personality traits and PTSD among hospital emergency staffs and EMS personnel in Kerman, Iran. Hospital emergency staffs and EMS personnel who had neuroticism, openness, and conscientiousness personality traits were more at risk for PTSD. Generally, study participants suffered from moderate levels of PSTD. Narmiani et al. (2010) also reported the same finding [21].

Study findings revealed that hospital emergency staffs' M-PTSD scores were significantly higher than EMS personnel. This is consistent with the findings reported by Regehr et al. (2010) and Sorenson et al. (2002) [8 and 10]. These findings can be attributed to

Table 2: Hospital emergency and EMS staffs' M-PTSD scores

M-PTSD domains	Hospital staffs Mean (SD)	EMS personnel Mean (SD)	T test	P-value
Penetrating memories	23.35±6.53	20.66±6.06	4.17	0.001
Problem in personal relationships	24.29±4.47	23.13±3.81	2.82	0.005
Inability in controlling emotional feelings	23.72±4.72	22.23±4.45	3.16	0.002
Lack of depression	23.66±5.79	23.01±4.85	4.18	0.001
Total M-PTSD score	97.02±21.51	89.3±19.17	4.38	0.001

Table 3: Hospital emergency and EMS staffs' personality traits

M-PTSD domains	Hospital staffs Mean (SD)	EMS personnel Mean (SD)	P-value
Neuroticism	37.26±7.02	40.24±4.94	0.005
Openness	37.53±3.56	40.76±4.75	0.001
Agreeableness	40.80±4.61	43.64±5.13	0.08
Extraversion	38.73±3.41	44.95±4.90	0.06
Conscientiousness	40.76±4.57	38.73±3.41	0.001

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hospital staffs' greater workload and greater involvement with care provision to severely-injured patients. Moreover, compared with hospital staffs, EMS personnel have limited number of work shifts per week. The work schedule of EMS personnel who work in urban areas is 24 hours on-duty and 48 hours off-duty and in suburban areas, they are 48 hours on-duty and 96 hours off-duty. Consequently, EMS personnel have more time for restoring morale and vitality.

Study findings also revealed that EMS personnel with nursing degree acquired higher PTSD scores than EMS personnel with other degrees. Plagi et al. (2009) and Narimani et al. (2010) also reported the same finding [5 and 15]. However, Bennett et al. (2004) and Priebe et al. (2013) reported that PTSD was not significantly correlated with job [11 and 24]. This conflicting finding can be ascribed to the fact that in Kerman EMS system, each work shift is done by an in-charge nurse and a first responder and hence, the nurse has a heavier workload and experiences greater levels of stress.

We also found that the participants who were directly involved with patients acquired higher M-PTSD scores than others. Ben-Ezra et al. (2007) and Drewitz-Chesney (2012) also found that PTSD is more prevalent among paramedics and hospital staffs who are in direct contact with patients [22 and 23]. Moreover, PTSD was also significantly correlated with job among the participating hospital emergency staffs. In other words, nurses and physicians acquired higher M-PTSD scores. The reason is probably the greater involvement of nurses and physicians with severely-injured patients. Accordingly, they experience greater levels of stress and are more prone to PTSD.

We also found that among EMS personnel, PTSD was significantly correlated with personality traits of neuroticism and conscientiousness ($p < 0.01$). This finding is in line with the findings reported by Korotkov (2008) and Cox et al. (2004). They reported that the risk of PTSD is smaller among individuals with lower conscientiousness [14 and 17]. However, our finding is in line with the findings of Priebe et al. (2013) which reported that individuals with personality traits of neuroticism, conscientiousness, and openness are more prone to PTSD [22]. The reason behind this finding is probably the fact that conscientious individuals earnestly strive to fulfill their responsibilities properly. Accordingly, if they fail to undertak their responsibilities—for example fail to arrive at an emergency location timely or fail to save all victims of an accident—they would experience pangs of conscience, feel being incompetent, and remember their unfulfilled responsibilities, which collectively put them at risk for PTSD. On the other hand, staffs with neuroticism personality trait are also prone to PTSD because they may be unable to effectively cope with psychological damage, emotional avoidance, and intense guilt experienced after an unsuccessful emergency mission. We found no significant correlation between PTSD and other personality traits including agreeableness, extraversion, and openness.

The findings of the study also showed that in the hospital emergency staffs group, PTSD was significantly correlated with personality traits of neuroticism, conscientiousness, and openness (P value < 0.01). Priebe et al. (2013) also reported the same finding [24]. Individuals with neurotic personality have negative neurotic emotions such as fear, grief, embarrassment, anger, hate, and pangs of guilt which predispose them to PTSD. However, in this group, personality traits of agreeableness and extraversion were not significantly correlated with M-PTSD score.

We also found a significant difference between hospital emergency staffs and EMS personnel regarding three personality traits of neuroticism, openness, and conscientiousness. However, the two groups did not differ significantly regarding the personality traits of extraversion and agreeableness. These findings

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are consistent with findings reported by Korotkov (2008) and Cox et al. (2004) [14 and 17]. In addition, both EMS personnel and hospital emergency staffs with personality trait of openness acquired the lowest M-PTSD score.

The study limitation was our inability to control confounding variables such as childhood events and psychological damages, familial susceptibility to PTSD, recent stressful life events, as well as borderline, antisocial, paranoid, and dependent personality disorders.

5. Conclusions

Hospital emergency staffs have a heavy workload, provide care to severely-injured patients, and work in an unstable and stressful environment. On the other hand, EMS personnel also face stressful situations and witness suffering and death of patients. Accordingly, both of these groups are at great risk for PTSD. Moreover, study findings indicate that both hospital emergency staffs and EMS personnel have personality traits which predispose them to PTSD.

Consequently, health authorities need to implement screening programs for recruiting EMS staffs who have necessary personality traits for working in extreme work environments. Besides, conducting in-service continuing education programs for hospital emergency staffs and EMS personnel (such as stress management and principles of working in stressful situations) is recommended.

6. Acknowledgments

We would like to express our gratitude to the Research Committee of Iranian Nursing Organization as well as the EMS personnel and the hospital emergency staffs who participated in the study. This article was extracted from a research project approved by the Research Committee of Iranian Nursing Organization affiliated to Kerman University of Medical Sciences, Tehran, Iran.

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