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RESEARCH ARTICLE

Prevalence and Correlates of Mental Health Status Among Pre-Hospital Healthcare Staff

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Abstract:

Introduction:

Mental stress amongst pre-hospital Emergency Medical Services (EMS) workers is an iceberg phenomenon; owing to unique occupational stressors faced by them. This study was aimed to examine the mental health status of pre-hospital EMS workers and its correlation with Post-Traumatic Stress Disorder (PTSD) and Work Environment Scale (WES).

Methods:

This cross-sectional study incorporated 224 emergency EMS members from urban and road EMS bases in eastern Iran in 2018. General Health Questionnaire (GHQ-28), Post-Traumatic Stress Disorder Checklist-Civilian version (PTSD-C), and Work Environment Scale (WES) were used as research instruments. Data were analyzed via SPSS Statistics software (version 21); while $p < 0.05$ was considered significant.

Results:

The mean age of participants was 31.91 ± 6.9 years; 36 (16.1%) had PTSD ≥ 50 , which increased with age ($p = 0.01$), number of offspring ($p = 0.022$) and time working at the EMS ($p = 0.002$). Mean WES scores were 73.41 ± 12.27 ; with a significant impact of marital status ($p = 0.007$), the number of offspring ($p = 0.023$), qualification ($p = 0.019$) and less time working at the EMS ($p = 0.008$). Mental distress was recorded in 89 (39.7%) individuals. Multivariate logistic regression revealed that members at higher risk of mental distress were; those with associate's degree (adjusted OR 3.192; 95% CI, 1.456-6.998), individuals with 1 or 2 offspring (adjusted OR 2.03; 95% CI, 0.992-4.156; adjusted OR 3.380; 95% CI, 1.483-7.704, respectively), and those with PTSD equal or higher than 50 (adjusted OR 2.504; 95% CI, 1.063-5.903), with a reverse impact of WES ($p > 0.05$).

Conclusion:

PTSD adversely affected mental health and clinical performance of the subjects; while work-place environment augmented working spirit as well as psychological resilience. Strategies aiming at stress-dilution and improvements in a professional environment cannot be over-emphasized.

Keywords: Mental Health, Pre-hospital EMS workers, Post-traumatic Stress Disorder, Work Environment Scale, Healthcare, Stressors.

Article History

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1. INTRODUCTION

Mental health issues proportionate physical resilience and prophesize healthy, effective, and satisfying life. The sturdy mental health of any society mandates dynamism, growth, and

excellence [1]. World Health Organization (WHO) reported that in 2007 almost 450 million people suffered from mental or behavioral disorders worldwide [2]; while in 2010, mental health issues were proclaimed to account for 12% of global disease burden [3]. Mental stressors are the most vivacious predictors for psychological ailments which represent four out of ten leading causes of disability, misery and financial loss globally; and they may grow by 50% by the year 2020 [3, 4].

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Apropos, individual, professional and social aspects of every human must be monitored to mandate prompt management of psychosomatic challenges [4].

Occupational sciences often probe into psychological challenges characteristic of any department. Working dynamics play a pivotal role in manipulating environmental stressors; once un-questioned, they lead to health deterioration, attenuated work performance, and consequently threatened organizational goals [5, 6]. Cole *et al.* reiterated that 93% of nurses faced psychosomatic issues owing to professional distress [7]. There is a moderate burnout documented among nurses, 53%, 43%, and 21% being victims of reduced personal accomplishment, emotional exhaustion and depersonalization, respectively. Lack of coping skills further aggravates behavioral problems [6, 8].

Mental health relies upon the individual as well as organizational factors [6, 9] including personality traits, social support, working conditions (congenial environment, workload/hours, job description, salary) and work-life balance [6, 10, 11]. Role of optimum hospital policies, positive leadership and apt utilization of resources cannot be overlooked in promoting the well-being of staff [6].

Post-Traumatic Stress Disorder (PTSD) is induced by exposure to trauma; with a prevalence of 6.8% among the general population [12]. It has a significant association with other mental health challenges like Bipolar Spectrum Disorders (BSD), Panic Disorders and Major Depressive Disorder (MDD) [13]. Prehospital care is provided by emergency medical services (EMS) workers. These personnel are the initial healthcare providers and managers at the scene of disaster [14] and are considerably at risk to encounter traumatic situations on daily basis, few being life-threatening events [15, 16]. Laposka and Alden reported that 27% of emergency department nurses had PTSD symptoms; 20% had to think about quitting their job due to traumatic events [15]. Age, gender, length of service, and marital status affect the incidence and intensity of PTSD [15, 17, 18].

Road, urban, and industrial accidents are at a surge in Iran, which deem prompt EMS, and efficient healthcare workers [19]. Considering the importance of mental health status in staff and its impact on improving their performance and efficiency, this study was planned to assess the mental health status of pre-hospital EMS workers, and its association with PTSD and Work Environment. The following research question was posed: "Is there a significant association between traumatic exposure to PTSD, WES and decrease in the mental health status of pre-hospital staff?"

2. METHODOLOGY

2.1. Study Participants And Setting

This cross-sectional study was carried out using a descriptive-analytic approach, census selection and voluntary participation on 260 pre-hospital EMS staff, working in urban and road EMS bases in eastern Iran in 2018. After obtaining permission from Torbat Heydarieh University of Medical Sciences and informed consent (verbal and written), the pre-designed questionnaires were distributed among participants during

work shifts.

Members working in operationally active urban and road pre-hospital EMS bases, with minimum one-year work experience of EMS ambulances were included. Members working overtime in the bases (192 hours defined), individuals having familial problems such as divorce and or death of close relatives, and those working in administrative and central communication departments were excluded.

2.2. Measuring Tools

Data collection was dual-phased: the first phase included demographic characteristics such as age, time working at the EMS (years), education, marital status, number of children, and working hours per month. History of occupational trauma was also obtained; and the second phase comprised of General Health Questionnaire (GHQ-28)-Persian, Post-Traumatic Stress Disorder Checklist-Civilian version, and Work Environment Scale (WES).

2.3. General Health Assessment

GHQ was developed by Goldberg and Hiller in 1978 to find and identify psychiatric disorders in a community and included 28 items; examining four scales of physical symptoms, anxiety, insomnia, social dysfunction, and depression [20]. Its reliability co-efficient is 0.78-0.95 [21, 22]. Researchers from Iran reiterated it as an acceptable, valid and reliable tool [23 - 26]. It is based on a 4-point Likert-type scale with a reverse scoring method with scores 22 and below are considered healthy; and a score above 22 indicates higher mental disorder [20].

Post-Traumatic Stress Disorder Checklist-Civilian version

PTSD-C is a widely used 17-items questionnaire; each item has a score from 1 to 5; 50 and higher scores indicate PTSD [27, 28]. It asks questions about non-combat and / or ordinary stressful events, doesn't focus on a specific traumatic event and focuses more on public events in the past [28]. Standardized PTSD-C was designed by Weathers *et al.* with internal consistency (Cronbach's alpha) of 0.94 [27]. Goodarzi calculated its internal reliability and external validity as 0.92 and 0.82, respectively [29]; while Narimani *et al.* declared 0.97 Cronbach's alpha coefficient [30].

2.4. Work Environment Scale Assessment

The 10-items WES was developed by Moos, scoring amount of contribution to tasks, collaboration with other staff, boss support, authority at the workplace, true perception of assigned responsibilities, job stress, clarity of duties, being under supervision, innovation at workplace, as well as physical comfort at the workplace from zero to 90 [5, 31]. Assadi *et al.* stated its reliability via correlation coefficient of 0.80 [32].

2.5. Statistical Analysis

Data were analyzed via descriptive analysis (version 21, SPSS Inc., Chicago, IL, USA), quantitative data were expressed as mean \pm standard deviation/SD (Minimum-Maximum); quantitative data were summed-up as frequency (percentage). Cross-tabulation was conducted via chi-square

analyses. Univariate logistic regression was done to determine the rates of mental health between different participants' characteristics, PTSD and WES. Significant variables were sifted for multivariable logistic regression analysis to further explore this association, which provided the odds ratio (OR). Inferences were based on OR and *p*-values; the level of significance was considered $p < 0.05$.

3. RESULTS

224 (86%) subjects responded to the study. All participants were male and their mean age was 31.91 ± 6.9 (21-51) years. The demographic characteristics of the subjects are shown in Table 1.

In total, mean PTSD and WES scores for the participants were 34.78 ± 12.67 and 73.41 ± 12.27 , respectively. Qualitative characteristics of the respondents and their relation with levels of PTSD and WES scores are shown in Table 2; 188 (83.9%) and 36 (16.1%) participants had PTSD scores lower and higher than 50, respectively. PTSD significantly increased with age ($P < 0.01$), offspring ($p = 0.022$) and time working at the EMS ($p = 0.002$); with no significant impact of marital status ($P = 0.186$) and qualification ($p = 0.117$).

As shown in Table 2, WES was significantly affected by marital status ($p = 0.007$), offspring (nil compared to people with children, $p = 0.023$), qualification (associate's degree compared to the other two groups, $P = 0.019$) and lesser time working at the EMS ($p = 0.008$).

According to questionnaire criteria, GHQ scores were 23.3 ± 12.49 ; scores < 23 and ≥ 23 were found in 60.3% and 39.7% subjects respectively. Table 3 illustrates the association between mental distress and univariate logistic regression analysis, along with crude OR. Amongst disordered (39.7%), the majority were 30-39 years old (41.1%), married (42.5%), had more than 2 children (53.8%), with associate's degree (46.7%) and with more than 10 years time working at the EMS (43.3%). Similarly; psychological distress was harbored by individuals with PTSD lower than 50 (34%), PTSD ≥ 50 (69.4%) and WES (39.7%), respectively.

Univariate logistic regression showed that respondents of age 30-39 years were more likely to be distressed (crude OR 1.084; 95% CI, 0.604-1.946). Married (crude OR 1.513; 95% CI, 0.823-2.782), with 1 child (crude OR 1.729; 95% CI, 0.920-3.246), more than 2 children (crude OR 2.750; 95% CI, 1.363-5.548), with associate's degree (crude OR 2.042; 95% CI, 1.057-3.944) and bachelors (crude OR 1.207; 95% CI, 0.525-2.775), with ≥ 10 years time working at the EMS (crude OR 1.285; 95% CI, 0.745-2.214), and PTSD ≥ 50 as compared to PTSD < 50 had more distress (crude OR 4.403; 95% CI, 2.038-9.516), with lesser distress in better WES scores (crude OR 0.961; 95% CI, 0.939-0.983).

Multivariate logistic regression analysis elaborating the prevalence of mental distress is explained in Table 4. Individuals with associate's degrees (adjusted OR 3.192; 95% CI, 1.456-6.998), individuals with 1-2 offspring (adjusted OR 2.03; 95% CI, 0.992-4.156; adjusted OR 3.380; 95% CI,

1.483-7.704, respectively), and those with PTSD ≥ 50 were more vulnerable (adjusted OR 2.504; 95% CI, 1.063-5.903); while WES scores had a reverse impact (adjusted OR 0.966; 95% CI, 0.942-0.991).

4. DISCUSSION

Pre-hospital EMS workers are constantly on alert to save human lives and improve their vital signs; they also deal with various incidents and illnesses in their work environment. Therefore, the mental health status of these personnel is of paramount importance, as their psychosomatic health can directly affect the quality of EMS and patient outcomes. Accordingly, the identification of stressors in their work environment can greatly help in recognizing occupational risks and prevent relevant diseases through the improvement of the work environment. Addressing organizational issues positively augments nursing care output as well as the mental health of staff [6].

This survey evaluated PTSD, work environment indices, and the mental health status of pre-hospital EMS workers. Results revealed that 39.7% of the individuals had high levels of mental stress; which were in line with the inferences of Alexander and Klein who examined the effects of accident and emergency activities on mental health and emotional well-being among EMS staff in the UK (32%) [33]. Moreover, 54.5% of the emergency department and intensive care unit nurses showed low scores for mental quality of life [34]. Pyper and Paterson also demonstrated that rural and district EMS staff in Australia experienced varying degrees of low-to-high fatigue and emotional trauma [35].

Considering the presence of occupational stressors in the work environment of pre-hospital EMS workers, researchers had expected only high levels of PTSD, but various degrees of stress, ranging from low to high were documented. PTSD scores were more than 50 among 16.1% participants; roughly consistent with data of Mealer *et al.* from Colorado Hospital [36], and Laposa and Alden from Columbia Hospital [15], US. These high-risk patients validate that EMS staff is more vulnerable to develop psychological trauma due to their nature of job. Research of Li *et al.* encompassing emergency department nurses from China revealed that the tasks of dealing patients with severe physical harm and accepting responsibilities of caring for dying patients are vital triggers to enhance PTSD [37]. Burbeck *et al.* stated that in the UK, emergency department physicians endorsed that dealing with human deaths and injuries, as well as threats of workplace violence increase job stress and dissatisfaction [38]. Shi *et al.* reported that in China, the prevalence of PTSD among healthcare workers who had experienced physical violence was 28% [39]. Souza *et al.* documented that high workload reduced levels of nursing job satisfaction, and deteriorated physical and mental health in Brazil [40]. Freimann and Merisalu revealed that work-related psychological factors such as excessive work demands, emotional demands, as well as work pace and role conflicts were positively associated with mental health problems among nurses in Estonia which could lead to high levels of job stress and burnout [41].

Table 1. The Socio-demographic characteristics of respondents (n = 224).

Variable		Frequency (percent)
Age (years)	<30	97 (43.3)
	30-39	90 (40.2)
	≥40	37 (16.5)
Marital Status	Single	64 (28.6)
	Married	160 (71.4)
Offspring	Nil	94 (42)
	1	78 (34.8)
	≥2	52 (23.2)
Qualification	Diploma	60 (26.8)
	associate's degree	120 (53.6)
	Bachelor	44 (19.6)
Time working at the EMS	<10 years	134 (59.8)
	≥10years	90 (40.2)

Table 2. The relation between socio-demographic characteristics with PTSD and WES scores (n = 224).

Variable		PTSD		p-value [†]	WES t score, Mean ± SD	p-value
		<50, n (%)	≥50, n (%)			
Age (years)	<30	86 (45.75)	11 (30.56)	0.01	74.26 ± 10.92	0.237 ^{††} F=1.451
	30-39	77 (40.95)	13 (36.11)		73.77 ± 13.06	
	≥40	25 (13.30)	12 (33.33)		70.31 ± 13.44	
Marital Status	Single	57 (30.32)	7 (19.44)	0.186	76.88 ± 8.02	0.007 ^{†††} t= 2.719
	Married	131 (69.68)	29 (80.56)		72.02 ± 13.37	
Offspring	Nil	86 (45.75)	8 (22.22)	0.022	76.05 ± 9.3	0.023 ^{††} F=3.86
	1	63 (33.5)	15 (41.67)		71.57 ± 15.73	
	≥2	39 (20.75)	13 (36.11)		71.39 ± 10.14	
Qualification	Diploma	55 (29.25)	5 (13.89)	0.117	73.27 ± 15.76	0.019 ^{††} F=4.024
	Associate's degree	99 (52.67)	21 (58.33)		75.08 ± 9.09	
	Bachelor	34 (18.08)	10 (27.78)		69.03 ± 13.55	
Time working at the EMS	<10 years	121 (64.36)	13 (36.11)	0.002	75.17 ± 10.44	0.008 ^{†††} t= 2.658
	≥10years	67 (35.64)	23 (63.89)		70.78 ± 14.23	

[†]Chi square Test; ^{††}One-way ANOVA, and ^{†††}Independent Samples Test

Table 3. Univariate logistic regression of factors associated with mental health.

Characteristics		Disorder		Crude OR	95% CI	p-value
		No, n (%)	Yes, n (%)			
Age (years)	<30	59 (43.7)	38 (42.7)	1		
	30-39	53 (39.3)	37 (41.6)	1.084	0.604-1.946	0.787
	≥40	23 (17.0)	14 (15.7)	0.945	0.433-2.061	0.887
Marital Status	Single	43 (31.9)	21 (23.6)	1		
	Married	92 (68.1)	68 (76.4)	1.513	0.823-2.782	0.182
Offspring	Nil	66 (48.9)	28 (31.5)	1		
	1	45 (33.3)	33 (37.1)	1.729	0.920-3.246	0.089
	≥2	24 (17.8)	28 (31.5)	2.750	1.363-5.548	0.005
Qualification	Diploma	42 (31.1)	18 (20.2)	1		
	Associate's degree	64 (47.4)	56 (62.9)	2.042	1.057-3.944	0.034
	Bachelor	29 (21.5)	15 (16.9)	1.207	0.525-2.775	0.658
Time working at the EMS	<10 years	84 (62.2)	50 (56.2)	1		
	≥10 years	51 (37.8)	39 (43.8)	1.285	0.745-2.214	0.367

(Table 3) cont.....

PTSD	<50	124 (91.9)	64 (71.9)	1		
	≥50	11 (8.1)	25 (28.1)	4.403	2.038-9.516	0.001
WES	General score	135 (60.3)	89 (39.7)	0.961	0.939-0.983	0.001

Data expressed as Frequency (Percent).

Table 4. Multiple logistic regression analysis of factors associated with mental health.

Characteristics*		B	S.E	Wald	OR	95% CI	p-value
Offspring	Nil	-	-	-	1.0	-	-
	1	0.708	0.365	3.754	2.03	0.992-4.156	0.053
	≥2	1.218	0.420	8.398	3.38	1.483-7.704	0.004
Qualification	Diploma	-	-	-	1.0	-	-
	Associate's degree	1.161	0.401	8.397	3.192	1.456-6.998	0.004
	Bachelor	0.076	0.479	0.025	1.079	0.422-2.761	0.874
PTSD	<50	-	-	-	1.0	-	-
	≥50	0.918	0.437	4.404	2.504	1.063-5.903	0.036
WES	general score	-0.034	0.013	6.890	0.966	0.942-0.991	0.009

*References group; Diploma and PTSD < 50; β represents the logistic regression coefficient; S.E: represents the standard error.

The results of this study revealed that married people, and those with children, were more exposed to PTSD, which is conveniently justifiable owing to more stressful factors in married individuals. Similarly, PTSD was positively correlated with age and time working at the EMS in participants; concurred by Carmassi *et al.* [42] and Mealer *et al.* [36]. Similar effects were shown by high workload, long shifts/working hours, and being away from home and family for a long time [43].

The results of univariate regression analysis showed that mental disorder had increased in people aged 30-39 years, married, those with associate's degrees, professional experts, those with children and over 10 years' time working at the EMS as well as individuals scoring over 50 PTDS. Levels of education [42], types and load of responsibilities and organizational support have been reported to augment mental disorders among EMS staff [36]. Guppy and Gutteridge reported higher stress amongst nurses due to high workload, poor communications with supervisors, and lack of cooperation among co-workers [44].

The results of multivariate regression analysis suggested that PTSD scores above 50, having more children, and being an associate's degree could bring about mental disorder. Zafar *et al.* demonstrated a positive correlation of PTSD with mental disorder and the prevalence of workplace violence [45]. Even one worrying incident in the last 6 months predisposes to post-traumatic symptoms and mental disorder [32]. Bullying at the workplace [46] and lack of social support may cause PTSD [47], along with symptoms of anxiety, depression, and burnout [34, 48]. Considering the negative beta, mental health score dropped whereas WES scores increased. Better WES results validate mental resilience [5, 31].

This study could not evade all limitations. Bigger sample size, and more sociodemographic and job-related variables could add to the results. Interview and recall biases could not be ruled out either. However, it was the first survey of its kind which incorporated GHQ, WES and PTSD inventories simultaneously to assess mental health levels of pre-hospital

EMS staff. It is hoped that healthcare officials will pay special attention to preventive healthcare of these and other paramedical workers, and provide continuous in-service education to them. Relevant authorities can reduce stressors and use a multitude of incentives to augment mental well-being.

CONCLUSION

Evidences suggest that pre-hospital EMS workers are increasingly exposed to varying levels of work-related stress. They daily face physical suffering and death, which can directly affect mental health and even the quality of their social life. As the results of this study showed that the mental health of pre-hospital EMS workers is adversely affected by PTSD, while work environment scales can alleviate workplace stress and mental health disorders. The professional environment should ensure a better working spirit and reduced stressors. Pre-hospital EMS workers are assets of society as they save the life and limb of people. Special strategic measures are deemed to improve their work environment and prevent mental challenges.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

All procedures carried out in studies involving human participants were in accordance with the ethical committee of Torbat Heydariyeh University of Medical Sciences, Iran (No. IR.THUMS.REC.1395.17).

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was taken from all the participants when they were enrolled.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this research are available from the corresponding author [G.T] upon request with permission from the Ethics Committee of THUMS.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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