BMJ Open

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-066744
Article Type:	Original research
Date Submitted by the Author:	16-Sep-2022
Complete List of Authors:	Hashemi, Shima; Lorestan University of Medical Sciences, Department of Health; Ilam University of Medical Sciences, Department of Epidemiology Merzah, Mohammed; Al-Furat Al-Awsat Technical University Karbala Technical Institute, Department of Community Health Rezaei, Mehdi; University of Birjand, Department of psychology Astaraki, Peyman; Lorestan University of Medical Sciences, Department of Internal Medicine Birjandi, Mehdi; Lorestan University of Medical Sciences, Nutritional Health Research Centre Ghazanfari, Firoozeh; Lorestan University, Department of Psychology, Faculty of Human Sciences
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Epidemiology < TROPICAL MEDICINE, PUBLIC HEALTH

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Shima Hashemi[1,2], Mohammed Merzah[3], Mehdi Rezaei[4], Peyman Astaraki[5], Mehdi Birjandi[6], Firoozeh Ghazanfari[7] *

[1] Student Research Committee, Lorestan University of Medical Sciences,Khorramabad, Iran
[2]Department of Epidemiology, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran
[3]Department of Community Health, Technical Institute of Karbala, AlFurat AlAwsat Technical University, Karbala, Iraq
[4] Department of psychology, University of Birjand, Birjand, Iran
[5] Department of Internal Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran
[6] Nutritional Health Research Centre, Lorestan University of Medical Sciences, Khorramabad, Iran
[7]Department of Psychology, Faculty of Human Sciences, Lorestan University, Khorramabad, Iran, (corresponding author), E-mail: firoozeh.ghazanfari@yahoo.com

Abstract

Objectives: This study was aimed to determine the relationship between job stress and WRQoL among emergency medical technicians (EMTs) in Lorestan Province, Western Iran.
Methods: This is a cross-sectional study using census method among 430 emergency medical technicians who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-Related Quality of Life (WRQoL). The odd ratio with 95% Confidence Interval (CI) was used to declare the statistical association ($p \leq 0.05$).
Results: All participants were exclusively males, with a mean age of 32±6.87 years. The overall average score of job stress using the HSE scale was 2.69±0.43; while the overall quality of working life score was 2.48±1.01.The type of working shift was found to have a significant impact on the HSE-average score, ($F(3,417) = 5.26$, $P = 0.01$); and on the WRQoL-average score, ($F(3,417) = 6.89$, $P< 0.01$).
Conclusions: Two-thirds of EMTs working in governmental hospitals had job stress and a low quality of work-related life. Work shift was statistically significant associated with EMTs' job stress and WRQoL. To improve the WRQoL among EMTs, we suggest the urgent need for organizational intermissions that aim to diminish work-related stress. Furthermore, rescheduling should be explored as a strategy for reducing stress caused by shift work.

Keywords: Job stress, Work-related quality of life, Emergency medical technician, HSE, WRQoL

Introduction:

Working in emergency medicine can be challenging, and healthcare workers are subjected to a variety of pressures (1). Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among them. Additional environmental stressors in the prehospital context include traffic safety concerns and unexpected accident scenes (2). Several studies have demonstrated the alarming prevalence of burnout syndrome, posttraumatic stress disorder (PTSD), and other related health difficulties among first responders and emergency medical service personnel (3)(4)(5)(6)(7). Furthermore, those stressors might cause hostility, aggression, absenteeism, and turnover among emergency medical technicians (EMTs).

Job stress refers to the psychological stress caused by the imbalance between the needs of the target and the individual's ability to adapt to specific job conditions (8). Job stress is one of the most important workplace health risks among employees worldwide (9). One of the complications of modern life is the presence of stress in the workplace (10). It is a common condition of the 21st century that affects people in a variety of conditions and is responsible for absenteeism among health- care workers (11). 137.3 million working days were lost to due to sickness and injury as it is estimated by the UK national statitsics (12). This is only the material dimension of the issue of stress; in addition, stress has a significant impact on employees, their families, and patients (9).

In 2021, job stress (new or long-standing) was the biggest work-related health issue in the UK, which accounted for 50% of all job-related illnesses with an incidence rate of 2,480 per 100,000(13). The cost of sickness and stress-related absenteeism is estimated at 4 billion pounds a year(12). Numerous studies have shown that the job stress experienced by the pre-hospital emergency staff is significantly higher than that of other healthcare workers because they are the first people to be present in a variety of emergencies, from fatal accidents to minor injuries and illnesses (14)(15). Meanwhile, emergency medical technicians face stressful environments such as congested areas and critically ill patients where it is difficult to work (16).

Neglecting the ongoing stress that is inflicted on employees, particularly healthcare workers, would eventually result in a lack of motivation and morale in the staff (17). There is enormous capital lost annually due to the lack of physical and mental health of employees, impaired performance, quitting, and changing jobs due to job stress. Stress and its complications result in the loss of hundreds of working days each year. About 30% of the workforce in developed countries suffers from job stress. The International Labor Organization also estimates that the costs incurred by countries due to job stress are about 1 to 3.5% of GDP and are currently increasing (18)(19).

Work-related quality of life (WRQoL) is an organizational culture or management style in which employees feel ownership, self-reliance, responsibility, and self-esteem(20). WRQoL is a multidimensional structure that includes several concepts such as welfare measures, health services, incentive plans, job fit, job security, job design, importance to the role and position of the individual in the organization, providing growth and development, participation in decision making, reducing job conflicts and ambiguities and education(21). According to the research, companies that provide a better work quality of life for their employees are more successful in retaining their valuable employees and have higher profitability (22). However, job stress reduces the WRQoL and increases the risk of work-related injuries. The WRQoL is critical for organizations to be able to attract and retain human resources (23).

Job stress in emergency medical technicians is typically higher than in other professionals, and since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job and its contents are in a high level of stress. Research evidence related to job stress among EMTs is limited in the study area. Therefore, this study was conducted to determine the relationship between job stress and quality of work-life among Emergency Medical Technicians (EMT) in Lorestan Province, Western Iran in 2019.

Material and methods:

A census approach was used to conduct a cross-sectional survey among 430 emergency medical technicians who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province. The number of participants was 25, 37, 22, 38, 21, 19, 115, 61, 28, 54, and 10 from Alashtar, Aligoudarz, Azna, Broujerd, Doroud, Dooreh, Khorramabad, Kouhdasht, Nourabad, Poldokhtar, and Sepiddasht, respectively. This study was approved by the institutional review of Lorestan University of medical Sciences Verbal agreement was taken from all participants. The confidentiality principle was maintained so that there was no need to mention the names of the individuals in the questionnaires, and it was assured that the information was just provided to the researcher and used in the study. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-related quality of life (WRQoL).

Job Stress Questionnaire: The management standard was assessed using a 35-item indicator tool created by the Health and Safety Executive (HSE) to measure work-related stress among employees. The tool consists of seven items. These items are: (1) Demands (including such issues as workload, work patterns, and the working environment). (2) Control (how much say the person has in the way they do their work). (3 & 4) Manger and peers' support (including the encouragement, sponsorship, and resources provided by the organization, line management, and colleagues). (5) Relationships at work (including promoting positive working practices to avoid conflict and dealing with unacceptable behaviour). (6) Role (whether people understand their role within the organization and whether the organization ensures that the person does not have conflicting roles). (7) Change (how organizational change (large or small) is managed and communicated in the organization). The validity of the HSE-scale was 83% (α=0.83)(24).

Work-Related Quality of Life Questionnaire (WRQoL): This is a multidimensional concept that includes job and professional satisfaction factors, working conditions, general health status, home-work relationship, work stress, and work control. The questionnaire comprises a five-Likert scale from strongly disagree to strongly agree (25). The validity of the questionnaire was confirmed by experts, and its reliability was determined by the test-retest method. The questions had a 95% correlation value, while the alpha Cronbach coefficient for determining the internal relevance of the questions was 78%. The scale's reliability was 79% (α=0.79)(25).

Patient and Public Involvement

This was a cross-sectional study that meaningfully engaged all emergency medical technicians working in different cities of Lorestan province in identifying priority research questions, research training, all facets of recruitment and data collection, and in interpreting the results and co-authoring this manuscript. Additionally, we trained them in the

informal settlements of the study conducted in their workplaces, who contributed likewise to informing the study focus, and data collection efforts.

Statistical analysis: Descriptive statistics were used to determine the characteristics of participants and the overall scores of job-stress and work-related quality of life. Pearson correlation was used to assess the correlation between the domains of the two questionnaires (HSE and WRQoL). The odd ratio at (95% CI, P-value≤0.05) was used to declare the statistical association. All analyses were done using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp (26).

Results:

All emergency medical technicians (EMTs) who participated in this study were exclusively male, with a mean age of 32±6.87 years. Based on their educational level, 18.1% held a diploma while the rest (81.9%) had an academic education degree. All other socio-demographic characteristics of the participant are provided in Table 1.

Table 1. Demographic characteristics of the Emergency Medical Technicians (ETMs) (N=430)

Variables [N*]	Categories	n (%)
Age (years) [427]	20-30	222 (51.5)
	30-40	146 (33.9)
	40-50	56 (13.0)
	50-60	3 (0.7)
Education level [406]	High school	78 (19.2)
	Diploma	235 (57.9)
	Bachelor	90 (22.2)
	Master	3 (0.7)
Marital Status [406]	Single	167 (38.7)
	Married	239 (55.5)
Length of Service (years) [410]	1-5	162(37.6)
	6-10	190(44.2)
	11-15	13(3.1)
	>15	45(10.5)
Native Status [412]	Native to the city	225 (52.3)
	Native to the province	127 (29.5)
	Non-indigenous	60 (14.0)
Working Shift Status [421]	Constant morning shift	6 (1.4)
	Circulating shift	51 (11.9)
	24-hour shift	228(53.0)
	48-hour shift	136 (31.6)

*Number of responses for each variables.

Emergency Medical Technicians (EMTs) with a master's degree had the highest HSE (3.5±0.01) and WRQoL (4.0±0.01) average scores. Regarding martial status, native status, and length of service, there were no significant differences of them, neither with HSE nor with WRQoL average scores. However, the type of working shift had a significant impact on the HSE-average score, $F\ (3,417) = 5.26$, $P = 0.01$; and on the WRQoL-average score, F (3,417) = 6.89, P< 0.01, as the highest average scores were reported among those who worked on the 48-hour shift (2.79±0.46) of the HSE, and the fixed morning shift (2.87±0.01) of the WRQoL.

The overall average score of job stress using the HSE scale was (2.69±0.43), with peer support as the highest stressor domain among EMTs (2.89±0.63). While the overall quality of working life score was (2.48±1.01), with

control at work as the highest factor that might impact the quality of working life (2.47±0.90). (See Table 2 for more details) Generally, 73.5% of respondents reported having work-related stress, with 46% having a low work-related quality of life (lower than the overall mean). The reposne rate for each specific question of the HES and WRQoL standards was provided in supplementary tables 1 and 2.

Table 2: Stressor domain scores and work related quality of life scores by factors among the EMTs (N=430)

	Domains and Factors	n	Score Mean (SD)	95% CI
Stressor domains	Demand	405	2.11 (0.56)	1.93-2.08
	Control	402	2.54 (0.60)	2.44-2.59
	Manager's support	410	2.58 (0.82)	2.48-2.67
	Peer's support	413	2.89 (0.63)	2.82-2.98
	Relationship	414	1.75 (0.81)	1.58-1.78
	Role	415	3.12(0.64)	3.00-3.16
	Change	411	2.61 (0.80)	2.62-2.71
	Overall HSE (N)	**430**	**2.69 (0.43)**	**2.65-2.73**
WRQoL- factors	Job career satisfaction	410	2.39 (0.77)	2.30-2.48
	Control at work	413	2.47 (0.90)	2.37 -2.58
	General well-being	393	2.45 (0.54)	2.38-2.51
	Home-work interface	422	2.44 (1.01)	2.32-2.55
	Stress at work	420	1.96(1.00)	1.84-2.08
	Working conditions	423	2.12 (0.98)	2.00-2.23
	Overall quality of working life	**424**	**2.48 (1.01)**	**2.35-2.60**

To assess the linear relationship between stresser domains and WRQoL factors, pearson correlation was used (Table 3). There were a strong positive relationship between two domains of HSE, which are peer support and the change ($r = 0.72$, $N= 394$, $p < 0.001$). In other words, increasing the peers' support in work rnvironment the higher the change might apply. Regarding the WRQoL factors, however, job career satisfaction was found to have a significant positive impact on control at work ($r = 0.72$, $N = 395$, $P<0.001$), general well-being ($r = 0.72$, $N = 379$, $P<0.001$), home-work interference ($r = 0.77$, $N = 407$, $P<0.001$), and working conditions ($r = 0.77$, $N = 407$,$P<0.001$).

Table 3: Correlation between HSE-domains and WRQoL factors.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Demand	(0.80)													
2	Control	0.03	(0.74)												
3	Manager support	-0.11*	0.55**	(0.72)											
4	Peer support	-0.20**	0.56**	0.67**	(0.74)										
5	Relationship	0.50**	-0.03	-0.16**	-0.26**	(0.81)									
6	Role	-0.17**	0.34**	0.28**	0.47**	-0.24**	(0.76)								
7	Change	-0.11*	0.54**	**0.72****	0.64**	-0.17**	0.35**	(0.73)							
8	Job career satisfaction	-0.25**	0.31**	0.52**	0.41**	-0.25**	0.25**	0.48**	(0.71)						
9	Control at work	-0.13*	0.40**	0.60**	0.42**	-0.11*	0.22**	0.55**	**0.72****	(0.71)					
10	General well-being	-0.30**	0.45**	0.43**	0.44**	-0.25**	0.34**	0.41**	**0.73****	0.64**	(0.73)				
11	Home-work interface	-0.25**	0.30**	0.50**	0.38**	-0.18**	0.24**	0.41**	**0.77****	0.65**	0.62**	(0.72)			
12	Stress at work	0.38**	-0.02	-0.18**	-0.23**	0.40**	-0.20**	-0.19**	-0.23**	-0.11*	-0.26**	-0.24**	(0.83)		
13	Working conditions	-0.24**	0.24**	0.48**	0.37**	-0.19**	0.30**	0.47**	**0.77****	0.63**	0.64**	**0.72****	-0.28**	(0.72)	
14	Overall quality of working life	-0.30**	0.20**	0.39**	0.30**	-0.18**	0.28**	0.32**	0.66**	0.52**	0.59**	0.52**	-0.29**	0.64**	(0.74)

Note: Pearson's correlation coefficient was used. Alpha reliability coefficients are given in parenthesis.
* P value <0.05, ** P value < 0.01.

Discussion

Considering that the work environment for emergency medical personnel is very stressful since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job and its contents are subject to a high level of stress. Research evidence related to job stress among EMTs is limited in the study area. Hence, this study was conducted to determine the relationship between job stress and the quality of work-life among EMT personnel in Lorestan province.

The results of the present study showed that the overall stress was a little more than the average among all participants (M, 2.69; IC, 2.65-2.73). This finding is in a harmony with the Ashgh et al. study, in which the male employees of emergencies in Golestan province were found to experience moderate work stress(27). Another study shows that emergency physicians experience a subclinical level of anxiety due to repetitive exposure to serious incidents like the death of an adolescent or a child (7). In regards to WRQoL, the overall quality of working life was a little less than the moderate range (M, 2.48; IC, 2.35-2.60). A cross-sectional analysis of 908 health employees from 15 hospitals shows that the majority of employees were dissatisfied with occupational health and safety and also indicated that their work was not interesting and satisfying (21). High WRQoL seems to have a protective factor. All of these, high stress and low WRQoL, not only affect the EMTs themselves, but can also have an adverse impact on patient care (7).

In the present study, a significant association was found between work shift and work-related stress. Rotating shift EMTs were more stressed than fixed-shift EMTs. This finding was consistent with research reported in Ethiopia (28) and Jordan(29), which indicated that employees working on rotating shifts were more stressed than their counterparts who worked on fixed shifts; however, those studies were done on nurses. Therefore, working on a fixed shift might be beneficial in improving the WRQoL, as the current study reported.

Change in the work environment to be suited to the employee, by their choice, was found to be related to the peers' and managers' support. A lack of social support among emergency care personnel is a well-known predictor of occupational stress (7). A study found that facilitating social support from coworkers can help in the rehabilitation process after being confronted with traumatic experiences and occupational dangers among those who work in EM(7).

This study has some limitations, including the fact that the cross-sectional study design utilized in this investigation could not determine a temporal association between stress and WRQoL. Given that stress is mainly subjective and psychological, the qualitative method would give rich and reliable information on the EMTs' experiences with stress and related concepts. Furthermore, since the sampling method in the present study was a census, some of the technicians were reluctant and were not satisfied to participate in the study.

Conclusion: This study determined the level of job stress and its relation to the WRQoL among EMT personnel working in government hospitals in Lorestan, Iran. Two-third of EMTs working in governmental hospitals had work-related stress. Work shift was statistically significantly associated with EMTs' work-related stress and WRQoL. Peer support was found to be the most stressful domain among EMTs; while the control domain at work was the highest factor that might impact the quality of working life. EMT personnel have a tremendous role in the

health care delivery system world-wide, especially in emergency situations. Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among the challenges that EMTs face during their work. In the mean time, EMTs' experienced work-related stress and low WRQoL may affect not only the health care services but also might increase medical errors and resource expenditure. To improve the quality of work among EMTs, we suggest the urgent need for organizational intervisions that aim to diminish work-related stress. Moreover, rescheduling should be explored as a strategy for reducing stress caused by shift work. To demonstrate a true cause-and-effect link, more research employing a mixed-method and analytical design in government and commercial health institutions is recommended.

Declarations:

Ethical Approval and Consent to participate:

Human Participants with the ethical approval ID: IR.LUMS.REC.1397-1-99-1254. This study was approved and funded by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all participants. All experimental protocols were approved by Lorestan University of Medical Sciences and the ethical approval ID is: IR.LUMS.REC.1397-1-99-1254.

Consent for publication:

Not applicable.

Availability of supporting data:

All data generated or analyzed during this study are included in this published article.

Competing interests

Not applicable.

Funding:

This study was funded by Lorestan University of Medical Sciences.

Author's contributions:

H.Sh, Gh.F, A.P, conceptualized and designed the main idea of this study. H.Sh, and R.M. designed the data extraction file, extracted data, and interpreted data. M.M, and B.M. analysed the data. H.Sh, and M.M, wrote the initial draft of the manuscript. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

Acknowledgment:

Researchers express their sincere gratitude to all ETMs that participated in the study.

References

1. Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. Cogn Behav Ther [Internet]. 2017;46(6):522–32. Available from: http://doi.org/10.1080/16506073.2017.1315612
2. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion Satisfaction, Burnout, and Compassion Fatigue Among Emergency Nurses Compared With Nurses in Other Selected Inpatient Specialties. J Emerg

Nurs [Internet]. 2010;36(5):420–7. Available from: http://dx.doi.org/10.1016/j.jen.2009.11.027

3. Haile KK, Asnakew S, Waja T, Kerbih HB. Shift work sleep disorders and associated factors among nurses at federal government hospitals in Ethiopia: A cross-sectional study. BMJ Open. 2019;9(8):1–8.
4. Hegg-Deloye S, Brassard P, Jauvin N, Prairie J, Larouche D, Poirier P, et al. Current state of knowledge of post-traumatic stress, sleeping problems, obesity and cardiovascular disease in paramedics. Emerg Med J. 2014;31(3):242–7.
5. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psychiatry Psychiatr Epidemiol [Internet]. 2018;53(9):897–909. Available from: http://dx.doi.org/10.1007/s00127-018-1539-5
6. Ayyala RS, Ahmed FS, Ruzal-Shapiro C, Taylor GA. Stressors contributing to burnout amongst pediatric radiologists: results from a survey of the Society for Pediatric Radiology. Pediatr Radiol. 2019;49(6):714–22.
7. Somville FJ, De Gucht V, Maes S. The impact of occupational hazards and traumatic events among Belgian emergency physicians. Scand J Trauma Resusc Emerg Med [Internet]. 2016;24(1). Available from: http://dx.doi.org/10.1186/s13049-016-0249-9
8. Xu H, Zhang M, Hudson A. Occupational Health Protection for Health Workers in China With Lessons Learned From the UK: Qualitative Interview and Policy Analysis. Saf Health Work [Internet]. 2021;12(3):304–10. Available from: https://doi.org/10.1016/j.shaw.2021.02.002
9. Konstantinos N, Ouzouni C. Factors influencing stress and job satisfaction of nurses working in psychiatric units: a research review. Heal Sci J [Internet]. 2008;2(4):183–95. Available from: https://www.hsj.gr/medicine/factors-influencing-stress-and-job-satisfaction-of-nurses-working-in-psychiatric-units-a-research-review.php?aid=3653
10. Padma V, Anand NN, Gurukul SMGS, Javid SMASM, Prasad A, Arun S. Health problems and stress in Information Technology and Business Process Outsourcing employees. J Pharm Bioallied Sci. 2015;7(April):S9–13.
11. Belita A, Mbindyo P, English M. Absenteeism amongst health workers - developing a typology to support empiric work in low-income countries and characterizing reported associations. Hum Resour Health. 2013;11(1):1–10.
12. Kinman G. Sickness presenteeism at work: Prevalence, costs and management. Br Med Bull. 2019;129(1):107–16.
13. Work-related stress, anxiety or depression statistics in Great Britain. 2019;(March). Available from: https://www.hse.gov.uk/statistics/causdis/stress.pdf
14. Eshgh ZM, Aghaeinejad A akbar, Peyman A, Amirkhani A, Taghinezhad F, Sheikhi A akbar. The relationship between occupational stresses with job burnout in pre-hospital emergency staff. Hakim Jorjani J. 2015;2(2):33–41.
15. Torshizi L, Ahmadi F. Job Stressors from Clinical Nurses' Perspective. Iran J Nurs. 2011;24(70):49–60.
16. Ghorbanian A, Bahadori M, Nejati M. The relationship between managers' leadership styles and emergency medical technicians' job satisfaction. Australas Med J. 2012;5(1):1–7.
17. Hosseinabadi R, Karampourian A, Beiranvand S, Pournia Y. The effect of quality circles on job satisfaction and quality of work-life of staff in emergency medical services. Int Emerg Nurs [Internet]. 2013;21(4):264–70. Available from: http://dx.doi.org/10.1016/j.ienj.2012.10.002
18. Mohsen Z, K.A.D. A, Gh.H. H, A.A.F. B, M.R. A. Prevalence of job stress among staff of the ports and sailing corporation of Hormozgan and its relation to non fatal accidents. J SHAHID SADOUGHI Univ Med Sci Heal Serv. 2009;17(66):142–8.
19. Soori H, Rahimi M, Mohseni H. Association Between Job Stress and Work-Related Injuries: A Case-Control. Iran J Epidemiol. 2006;1(3):53–8.
20. Srivastava S, Pathak D. Investigating the mediating effect of psychological empowerment on quality of work life-organisational commitment relationship: a study on Indian IT sector managers. Int J Manag Dev. 2016;1(3):196.
21. Anjuman-i Bihdāsht-i Īrān. GN, Dargahi H. Study of Quality of Work Life (QWL). Iran J Public Health. 2006;35(4):8–14.
22. Grote G, Guest D. The case for reinvigorating quality of working life research. Hum Relations. 2017;70(2):149–67.
23. Nazari K, Emami M. Recognition of relationship between occupational stress and satisfication among members of faculty in private and governmental university. Adv Nat Appl Sci. 2012;6(2):219–29.

24. E. AM, M. GF. Reliability And Validity Assessment For The Hse Job Stress Questionnaire. Int J Behav Sci. 2011;4(4):291–7.
25. Van Laar D, Edwards JA, Easton S. The Work-Related Quality of Life scale for healthcare workers. J Adv Nurs. 2007;60(3):325–33.
26. Statistics IBMS. IBM SPSS Statistics for Windows, version 25. 2017;
27. Eshgh ZM, Aghaeinejad AA, Peyman A, Amirkhani A, Chehregosha M. Relationship between Occupational Stress and Mental Health in Male Personnel of Medical Emergency in Golestan Province. J Res Dev Nurs Midwifery. 2015;12(1).
28. Baye Y, Demeke T, Birhan N, Semahegn A, Birhanu S. Nurses' work-related stress and associated factors in governmental hospitals in Harar, Eastern Ethiopia: A cross-sectional study. PLoS One [Internet]. 2020;15(8 August):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0236782
29. Mokhtar K, Shikieri A El, Taha EM, Rayan A. The Relationship between Occupational Stressors and Performance amongst Nurses Working in Pediatric and Intensive Care Units. Am J Nurs Res. 2016;4(2):34–40.

Supplementary:

Supplementary table1: Work-related stress (HSE) Categorized by factors (N=430)

Factors	NO	Questions	Response mean (SD)	% non-response
Demands	1	Different groups at work demand things from me that are hard to combine	1.9 (1.01)	1.4
	2	I have unachievable deadlines	1.42(1.12)	1.4
	3	I have to work very intensively	2.72(1.15)	0.2
	4	I have to neglect some tasks because I have too much to do	1.89(1.21)	0.9
	5	I am unable to take sufficient breaks	2.18(1.21)	1.6
	6	I am pressured to work long hours	2.14(1.26)	2.1
	7	I have to work very fast	2.85(1.05)	0.2
	8	I have unrealistic time pressures	1.9(1.15)	1.2
Mean of response (SD)			2.126 (0.468)	
Control	1	I can decide when to take a break	1.95(1.45)	2.1
	2	I have a say in my own work speed	3.11(0.85)	0.9
	3	I have a choice in deciding how I do my work	2.49(1.11)	0.9
	4	I have a choice in deciding what I do at work	2.56(1.16)	1.6
	5	I have some say over the way I work	2.93(0.91)	2.1
	6	My working time can be flexible	2.21(1.18)	1.4
Mean of response (SD)			2.539 (0.432)	
Manger support	1	I am given supportive feedback on the work I do	2.72(0.89)	0.2
	2	I can rely on my line manager to help me out with a work problem	2.74(1.03)	0.9
	3	I can talk to my line manager about something that has upset or annoyed me about work	2.69(1.13)	2.3
	4	I am supported through emotionally demanding work	2.31(1.09)	0.9
	5	My line manager encourages me at work	2.41(1.27)	1.4
Mean of response (SD)			2.576 (0.199)	
Peer Support	1	If work gets difficult, my colleagues will help me	2.92(0.85)	0.9
	2	I get help and support I need from colleagues	2.96(0.81)	2.1
	3	I receive the respect at work I deserve from my colleagues	3.07(0.78)	0.2
	4	My colleagues are willing to listen to my work-related problems	2.62(0.85)	1.6
Mean of response (SD)			2.892 (0.192)	
Relationship	1	I am subject to personal harassment in the form of unkind words or behavior	1.07(1.12)	0.7
	2	There is friction or anger between colleagues	2.11(1.12)	0.9
	3	I am subject to bullying at work	1.69(1.22)	2.3
	4	Relationships at work are strained	2.16(1.28)	0.7
Mean of response (SD)			1.757 (0.505)	
Role	1	I am clear what is expected of me at work	3.3(0.78)	1.6
	2	I know how to go about getting my job done	3.22(0.82)	2.3
	3	I am clear what my duties and responsibilities are	3.24(0.92)	0.9
	4	I am clear about the goals and objectives for my department	2.98(1.05)	0.2
	5	I understand how my work fits into the overall aim of the organization	2.87(0.92)	0.2
Mean of response (SD)			3.121(0.185)	
Change	1	I have sufficient opportunities to question managers about change at work	2.69(1.06)	1.9
	2	Staff are always consulted about change at work	2.69(1.03)	0.9
	3	When changes are made at work, I am clear how they will work out in practice	2.46(0.92)	2.3
Mean of non-response (SD)			2.613 (0.131)	
Overall mean (SD)			2.694 (0.439)	

Supplementary table 2: Work Related Quality of Life (WRQoL) Response (N=430)

NO	Questions	Response average	% non-response
1	I have a clear set of goals and aims to enable me to do my job	2.935	0.2
2	I feel able to voice opinions and influence changes in my area of work	2.746	0.9
3	I have the opportunity to use my abilities at work	2.537	1.6
4	I feel well at the moment	2.958	2.3
5	My employer provides adequate facilities and flexibility for me to fit work in around my family life	2.602	1.6
6	My current working hours / patterns suit my personal circumstances	2.525	0.2
7	I often feel under pressure at work	2.357	0.2
8	When I have done a good job it is acknowledged by my line manager	2.490	1.3
9	Recently, I have been feeling unhappy and depressed	1.980	1.6
10	I am satisfied with my life	2.918	2.3
11	I am encouraged to develop new skills	2.528	1.4
12	I am involved in decisions that affect me in my own area of work	2.585	2.8
13	My employer provides me with what I need to do my job effectively	2.639	1.2
14	My line manager actively promotes flexible working hours / patterns	2.687	1.4
15	In most ways my life is close to ideal	2.387	0.2
16	I work in a safe environment	2.154	1.4
17	Generally things work out well for me	2.346	2.1
18	I am satisfied with the career opportunities available for me here	2.355	1.4
19	I often feel excessive levels of stress at work	2.295	2.5
20	I am satisfied with the training I receive in order to perform my present job	2.544	0.7
21	Recently, I have been feeling reasonably happy all things considered	2.492	1.4
22	The working conditions are satisfactory	2.476	0.2
23	I am involved in decisions that affect members of the public in my own area of work	2.324	0.9
24	I am satisfied with the overall quality of my working life	2.577	1.6
Overall mean (SD)		2.506 (0.553)	

BMJ Open

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-066744.R1
Article Type:	Original research
Date Submitted by the Author:	07-Feb-2023
Complete List of Authors:	Hashemi, Shima; Lorestan University of Medical Sciences, Department of Health; Ilam University of Medical Sciences, Department of Epidemiology Ghazanfari, Firoozeh; Lorestan University, Department of Psychology, Faculty of Human Sciences Rezaei, Mehdi; University of Birjand, Department of psychology Merzah, Mohammed; University of Debrecen Faculty of Medicine, Public Health and Epidemiology Astaraki, Peyman; Lorestan University of Medical Sciences, Department of Internal Medicine Birjandi, Mehdi; Lorestan University of Medical Sciences, Nutritional Health Research Center
Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health, Public health
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Epidemiology < TROPICAL MEDICINE, PUBLIC HEALTH

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Shima Hashemi[1,2], Firoozeh Ghazanfari[3], Mehdi Rezaei[4], Mohammed Merzah[5], Peyman Astaraki[6], Mehdi Birjandi[7]

[1] Student Research Committee, Lorestan University of Medical Sciences,Khorramabad, Iran
[2]Department of Epidemiology, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran
[3]Department of Psychology, Faculty of Human Sciences, Lorestan University, Khorramabad, Iran, (corresponding author), E-mail: firoozeh.ghazanfari@yahoo.com
[4] Department of psychology, University of Birjand, Birjand, Iran
[5] Department of Community Health, Technical Institute of Karbala, AlFurat AlAwsat Technical University, Karbala, Iraq
[6] Department of Internal Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran
[7]Nutritional Health Research Centre, Lorestan University of Medical Sciences, Khorramabad, Iran

Abstract

Objective: This study was aimed to determine the relationship between job stress and WRQoL among emergency medical technicians (EMTs) in Lorestan Province, Western Iran.
Design: This was a cross-sectional study.
Methods: Totally 430 emergency medical technicians who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province were selected using census method. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-Related Quality of Life (WRQoL). The odd ratio with 95% Confidence Interval (CI) was used to declare the statistical association ($p \leq 0.05$).
Results: All participants were exclusively males, with a mean age of 32±6.87 years. The overall average score of job stress using the HSE scale was 2.69±0.43; while the overall quality of working life score was 2.48±1.01.The type of working shift was found to have a significant impact on the HSE-average score, ($F(3,417) = 5.26$, $P = 0.01$); and on the WRQoL-average score, ($F(3,417) = 6.89$, $P< 0.01$).
Conclusion: Two-thirds of EMTs working in governmental hospitals had job stress and a low quality of work-related life. Work shift was statistically significant associated with EMTs' job stress and WRQoL.

Keywords: Job stress, Work-related quality of life, Emergency medical technician, HSE, WRQoL

STRENGTHS AND LIMITATIONS OF THIS STUDY

1- Based on the previous studies, this is the first study to determine the relationship between job stress and WRQoL among all emergency medical technicians (EMTs) in a large location situated in Lorestan province.
2- Presence of validated questionnaires in literature means that reliable and validated questionnaires have been developed.
3- There was a sufficient number of participants to examine the the relationship between job stress and quality of work life.
4- Including the fact that the cross-sectional study design utilized in this investigation could not determine a temporal association.
5- Given that stress is mainly subjective and psychological, the qualitative method would give rich and reliable information on the EMTs' experiences with stress and related concepts.

Introduction:

Working in emergency medicine can be challenging, and healthcare workers are subjected to a variety of pressures (1). Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are

among them. Additional environmental stressors in the prehospital context include traffic safety concerns and unexpected accident scenes (2). Several studies have demonstrated the alarming prevalence of burnout syndrome, posttraumatic stress disorder (PTSD), and other related health difficulties among first responders and emergency medical service personnel (3)(4)(5)(6)(7). Furthermore, those stressors might cause hostility, aggression, absenteeism, and turnover among emergency medical technicians (EMTs).

Job stress refers to the psychological stress caused by the imbalance between the needs of the target and the individual's ability to adapt to specific job conditions (8). Job stress is one of the most important workplace health risks among employees worldwide (9). One of the complications of modern life is the presence of stress in the workplace (10). It is a common condition of the 21st century that affects people in a variety of conditions and is responsible for absenteeism among health- care workers (11). 137.3 million working days were lost to due to sickness and injury as it is estimated by the UK national statitsics (12). This is only the material dimension of the issue of stress; in addition, stress has a significant impact on employees, their families, and patients (9).

In 2021, job stress (new or long-standing) was the biggest work-related health issue in the UK, which accounted for 50% of all job-related illnesses with an incidence rate of 2,480 per 100,000(13). The cost of sickness and stress-related absenteeism is estimated at 4 billion pounds a year(12). Numerous studies have shown that the job stress experienced by the pre-hospital emergency staff is significantly higher than that of other healthcare workers because they are the first people to be present in a variety of emergencies, from fatal accidents to minor injuries and illnesses (14)(15). Meanwhile, emergency medical technicians face stressful environments such as congested areas and critically ill patients where it is difficult to work (16).

Neglecting the ongoing stress that is inflicted on employees, particularly healthcare workers, would eventually result in a lack of motivation and morale in the staff (17). There is enormous capital lost annually due to the lack of physical and mental health of employees, impaired performance, quitting, and changing jobs due to job stress. Stress and its complications result in the loss of hundreds of working days each year. About 30% of the workforce in developed countries suffers from job stress. The International Labor Organization also estimates that the costs incurred by countries due to job stress are about 1 to 3.5% of GDP and are currently increasing (18)(19).

Work-related quality of life (WRQoL) is an organizational culture or management style in which employees feel ownership, self-reliance, responsibility, and self-esteem(20). WRQoL is a multidimensional structure that includes several concepts such as welfare measures, health services, incentive plans, job fit, job security, job design, importance to the role and position of the individual in the organization, providing growth and development, participation in decision making, reducing job conflicts and ambiguities and education(21). According to the research, companies that provide a better work quality of life for their employees are more successful in retaining their valuable employees and have higher profitability (22). However, job stress reduces the WRQoL and increases the risk of work-related injuries. The WRQoL is critical for organizations to be able to attract and retain human resources (23).

Job stress in emergency medical technicians is typically higher than in other professionals, and since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job

and its contents are in a high level of stress. Research evidence related to job stress among EMTs is limited in the study area.

Existence of remote and deprived villages, dilapidated road structure and vehicle accidents and crashes, being injured by wild animals attacks, high suicide rate, poverty and low income, climate change and mountainous nature of the region, presence of dangerous occupations and related activities, infectious and noncommunicable diseases, and the lack of proper access to health care services are the main issues that affects people and ETMs in times of crisis. Though the evidence is expanding, there have been limited studies comparing the relationship between job stress and work quality of life especially among Emergency Medical Technicians. Therefore, this study was conducted to determine the relationship between job stress and quality of work-life among Emergency Medical Technicians (EMTs) in Lorestan Province, Western Iran in 2019.

Material and methods:

Participants

A census approach was used to conduct a cross-sectional survey among 430 emergency medical technicians (EMTs) who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province. The number of participants was 25, 37, 22, 38, 21, 19, 115, 61, 28, 54, and 10 from Alashtar, Aligoudarz, Azna, Broujerd, Doroud, Dooreh, Khorramabad, Kouhdasht, Nourabad, Poldokhtar, and Sepiddasht, respectively. This study was approved by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all technicians before participating in the study. The confidentiality principle was maintained so that there was no need to mention the names of the individuals in the questionnaires, and it was assured that the information was just provided to the researcher and used in the study. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-related quality of life (WRQoL). Data were collected during all shifts (morning, evening and night), when the (EMTs) were at work at the time being to answer the questions.

The inclusion criteria for emergency medical technicians were, engaged in their respective units for more than six months, eager to participate and complete the research questions. The authors excluded those who had been engaged in their respective units for less than six months from all emergency facilities. Based on Cochran's sample size formula, 430 ETMs with the inclusion criteria were selected. [z= 1.96, N= 450, p=q= 0.5, d= 0.01]

$$n=\frac{Nz^2pq}{Nd^2+z^2pq}=430$$

Job Stress Questionnaire: The management standard was assessed using a 35-item indicator tool created by the Health and Safety Executive (HSE) to measure work-related stress among employees. The tool consists of seven items. These items are: (1) Demands (including such issues as workload, work patterns, and the working environment). (2) Control (how much say the person has in the way they do their work). (3 & 4) Manager and peers' support (including the encouragement, sponsorship, and resources provided by the organization, line management, and colleagues). (5) Relationships at work (including promoting positive working practices to avoid conflict and dealing with unacceptable behaviour). (6) Role (whether people understand their role within the organization and whether the organization ensures that the person does not have conflicting roles). (7) Change (how organizational

change (large or small) is managed and communicated in the organization). The validity of the HSE-scale was 83% (α=0.83). This questionnaire contains 35 questions with 7 subscales. The subscales are: 1- Demand: questions number (18, 6, 9, 12, 16, 3, 20, 22), 2- Control (30, 10, 15, 19, 25, 2), 3- Officials support (7, 27, 24, 31), 4- Colleagues support (8, 23, 29, 33, 35), 5- Relationship (5, 14, 21, 34), 6- Role (1, 7, 11, 13, 17) and 7- Changes (32, 28, 26). The Likert scale was defined as Strongly disagree: 0, Disagree: 1, No opinion: 2, Agree: 3, Strongly agree: 4. All 7 stress-items were scored on a scale of 1 to 4 ranged between 7 to 28. Those above and those below the median value 16, were signified as more and less job stress respectively (24). The validity and reliability of the Persian version of the questionnaire was %78 and %65 using the Cronbach's Alpha and split-half method, respectively and HSE is a valid and reliable questionnaire for studying job stress (25).

Work-Related Quality of Life Questionnaire (WRQoL): This is a multidimensional concept that includes job and professional satisfaction factors, working conditions, general health status, home-work relationship, work stress, and work control. The questionnaire comprises a five-Likert scale from strongly disagree to strongly agree 1 to 5 (25). The validity of the questionnaire was confirmed by experts, and its reliability was determined by the test-retest method. The questions had a 95% correlation value, while the alpha Cronbach coefficient for determining the internal relevance of the questions was 78%. The scale's reliability was 79% (α=0.79). Subscale scores are as: Job and Career Satisfaction (JCS) with a sub-scale reliability of 0-86 (item 5), General Well-Being (GWB) 0-82 (item 18), Home–Work Interface (HWI) 0-82 (item 17), Stress at Work (SAW) 0-81 (item 7), Control at Work (CAW) 0-81 (item 12) and Working Conditions (WCS) 0-75 (item 9)(26). The validity and reliability of the Persian version of the questionnaire was %95 and %78 using the Cronbach's Alpha and it is a valid and reliable questionnaire (27)

Patient and Public Involvement

This was a cross-sectional study that meaningfully engaged all emergency medical technicians working in different cities of Lorestan province in identifying priority research questions, research training, all facets of recruitment and data collection, and in interpreting the results and co-authoring this manuscript. Additionally, we trained them in the informal settlements of the study conducted in their workplaces, who contributed likewise to informing the study focus, and data collection efforts.

Statistical analysis

Descriptive statistics were used to determine the characteristics of participants and the overall scores of job-stress and work-related quality of life. Pearson correlation was used to assess the correlation between the domains of the two questionnaires (HSE and WRQoL). The odd ratio at (95% CI, P-value≤0.05) was used to declare the statistical association. All analyses were done using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Results:

All 430 emergency medical technicians (EMTs) who participated in this study were exclusively male (100%), with a mean age of 32±6.87 years. Based on their educational level, 19.2% held a diploma while the rest (80.8%) had an academic education degree, additionally 58.9% of them were maried. Totally 115 (30.5%) of them were

students while they were working simuntaneously and 395 (91.9%) of them were officially hired by the organization. All other socio-demographic characteristics of the participant are provided in Table 1.

Table 1. Demographic characteristics of the Emergency Medical Technicians (ETMs) (N=430)

Variables [N*]	Categories	n (%)
Age (years) [427]	20-30	222 (51.5)
	30-40	146 (33.9)
	40-50	56 (13.0)
	50-60	3 (0.7)
Education Level [406]	Diploma	78 (19.2)
	Associated Degree	235 (57.9)
	Bachelor	90 (22.2)
	Master	3 (0.7)
Marital Status [406]	Single	167 (41.1)
	Married	239 (58.9)
Employment History (years) [410]	0-5	162(37.6)
	6-10	190(44.2)
	11-15	13(3.1)
	>15	45(10.5)
Native Status [412]	Native to the city	225 (52.3)
	Native to the province	127 (29.5)
	Non-indigenous	60 (14.0)
Working Shift Status [421]	Constant morning shift	6 (1.4)
	Circulating shift	51 (11.9)
	24-hour shift	228(53.0)
	48-hour shift	136 (31.6)
Major [390]	Public Health	3 (0.7)
	Medical emergencies	269 (62.6)
	Accounting	6 (1.4)
	Anesthesia	17 (4.0)
	Mechanics	3 (0.7)
	Crisis Management	5 (1.2)
	Emergency and disaster management	8 (1.9)
	Humanities	52 (12.1)
	Science	8 (1.9)
	Operating room technology	6 (1.4)
	Nursing	13 (3.0)
Number of Shifts (per month) [401]	<10	36 (9.0)
	10-12	293 (73.0)
	≥13	72 (18.0)
Locale of Service [404]	Urban Bases	150 (37.1)
	Road Stations	179 (44.3)
	Urban and Road Bases	75 (18.6)
Type of Bases Location [367]	Canopies	55 (15.0)
	Building	312 (85.0)

*Number of responses for each variables.

Emergency Medical Technicians (EMTs) with a master's degree had the highest HSE (3.5±0.01) and WRQoL (4.0±0.01) average scores. Regarding martial status, native status, and length of service, there were no significant differences of them, neither with HSE nor with WRQoL average scores. However, the type of working shift had a

significant impact on the HSE-average score, *F (3,417)* = 5.26, *P* = 0.01; and on the WRQoL-average score, F (3,417) = 6.89, P< 0.01, as the highest average scores were reported among those who worked on the 48-hour shift (2.79±0.46) of the HSE, and the fixed morning shift (2.87±0.01) of the WRQoL.

The overall average score of job stress using the HSE scale was (2.69±0.43), with peer support as the highest stressor domain among EMTs (2.89±0.63). While the overall quality of working life score was (2.48±1.01), with control at work as the highest factor that might impact the quality of working life (2.47±0.90). (See Table 2 for more details) Generally, 73.5% of respondents reported having work-related stress, with 46% having a low work-related quality of life (lower than the overall mean). The reposne rate for each specific question of the HES and WRQoL standards was provided in supplementary tables 1 and 2.

Table 2: Stressor domain scores and work related quality of life scores by factors among the EMTs (N=430)

	Domains and Factors	n	Score Mean (SD)	95% CI
Stressor domains	Demand	405	2.11 (0.56)	1.93-2.08
	Control	402	2.54 (0.60)	2.44-2.59
	Manager's support	410	2.58 (0.82)	2.48-2.67
	Peer's support	413	2.89 (0.63)	2.82-2.98
	Relationship	414	1.75 (0.81)	1.58-1.78
	Role	415	3.12(0.64)	3.00-3.16
	Change	411	2.61 (0.80)	2.62-2.71
	Overall HSE (N)	**430**	**2.69 (0.43)**	**2.65-2.73**
WRQoL- factors	Job career satisfaction	410	2.39 (0.77)	2.30-2.48
	Control at work	413	2.47 (0.90)	2.37 -2.58
	General well-being	393	2.45 (0.54)	2.38-2.51
	Home-work interface	422	2.44 (1.01)	2.32-2.55
	Stress at work	420	1.96(1.00)	1.84-2.08
	Working conditions	423	2.12 (0.98)	2.00-2.23
	Overall quality of working life	**424**	**2.48 (1.01)**	**2.35-2.60**

The difference in scores between demographic variables are shown in Table 3.

Table 3: Difference in HSE and WRQoL scores between demographic variables

Variable	Category	n	Sum. HSE Mean±SD	Sum. WRQoL Mean±SD
Education Level	Diploma	78	60.70±10.90	56.78±15..42
	Associated Degree	235	61.84±7.93	57.88±14.62
	Bachelor	90	60.76±9.36	57.28±15.50
	Master	3	80.00±0.00	91.66±0.00
Marital Status	Single	167	61.28±9.83	57.62±13.38
	Married	239	62.27±8.85	58.50±15.55
Native Status	Native to the city	225	61.95±9.41	57.80±14.50
	Native to the province	127	61.31±7.59	56.31±14.30
	Non-indigenous	60	62.78±11.21	61.51±18.68
Working Shift Status	Constant morning shift	6	60.71±5.47	74.47±2.85
	Circulating shift	51	63.54±5.72	55.65±4.93

	24-hour shift	228	60.91±10.13	56.29±14.58
	48-hour shift	136	62.01±9.00	60.08±18.20
Locale of Service	Urban Bases	150	65.17±7.49	62.16±13.26
	Road Stations	179	61.24±9.83	56.79±15.92
	Urban and Road Bases	75	57.77±8.25	52.77±14.99
Type of Bases Location	Canopies	55	63.24±11.09	56.57±18.99
	Building	312	62.25±8.89	58.52±13.96

Among the participants, 1.4% had between 0-5 shifts, 52.8% between 6-10 shifts and 39.1% between 11-15 shifts per month. Based on the results, most of the EMTs 337(78.37%) had a moderate level of job stress, 48(11.16%) low and 45(10.46%) had severe job stress. Based on the Tukey's result, there was no significant relationship between job stress and none of the sub-groups related to employment type ($p > 0.05$). Table 4

Table 4. Correlation between job stress and demographic factors on quality of work life among EMTs based on multiple regression model. n=234

Variable	Mean±SD	ß	t	P-Value
Educational level	2.09±0.66	-0.53	-0.39	0.69
Marital status	1.57±0.49	0.69	0.35	0.72
Job status	8.19±5.97	0.71	3.16	0.002
Shifts per month	11.03±2.36	0.57	1.58	0.11
Job stress score (HSE)	62.14±8.64	0.76	7.98	<0.001
Quality of work life score (QWL)	58.80±13.92			

To assess the linear relationship between stresser domains and WRQoL factors, pearson correlation was used (Table 4). There were a strong positive relationship between two domains of HSE, which are peer support and the change ($r = 0.72$, $N = 394$, $p<0.001$). In other words, increasing the peers' support in work environment the higher the change might apply. Regarding the WRQoL factors, however, job career satisfaction was found to have a significant positive impact on control at work ($r = 0.72$, $N = 395$, $P<0.001$), general well-being ($r = 0.72$, $N = 379$, $P<0.001$), home-work interference ($r = 0.77$, $N = 407$, $P<0.001$), and working conditions ($r = 0.77$, $N = 407$, $P<0.001$). Table 5

Table 5: Correlation between HSE-domains and WRQoL factors.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Demand	(0.80)													
2	Control	0.03	(0.74)												
3	Manager support	-0.11*	0.55**	(0.72)											
4	Peer support	-0.20**	0.56**	0.67**	(0.74)										
5	Relationship	0.50**	-0.03	-0.16**	-0.26**	(0.81)									
6	Role	-0.17**	0.34**	0.28**	0.47**	-0.24**	(0.76)								
7	Change	-0.11*	0.54**	**0.72****	0.64**	-0.17**	0.35**	(0.73)							
8	Job career satisfaction	-0.25**	0.31**	0.52**	0.41**	-0.25**	0.25**	0.48**	(0.71)						
9	Control at work	-0.13*	0.40**	0.60**	0.42**	-0.11*	0.22**	0.55**	**0.72****	(0.71)					
10	General well-being	-0.30**	0.45**	0.43**	0.44**	-0.25**	0.34**	0.41**	**0.73****	0.64**	(0.73)				
11	Home-work interface	-0.25**	0.30**	0.50**	0.38**	-0.18**	0.24**	0.41**	**0.77****	0.65**	0.62**	(0.72)			
12	Stress at work	0.38**	-0.02	-0.18**	-0.23**	0.40**	-0.20**	-0.19**	-0.23**	-0.11*	-0.26**	-0.24**	(0.83)		
13	Working conditions	-0.24**	0.24**	0.48**	0.37**	-0.19**	0.30**	0.47**	**0.77****	0.63**	0.64**	**0.72****	-0.28**	(0.72)	
14	Overall quality of working life	-0.30**	0.20**	0.39**	0.30**	-0.18**	0.28**	0.32**	0.66**	0.52**	0.59**	0.52**	-0.29**	0.64**	(0.74)

Note: Pearson's correlation coefficient was used. Alpha reliability coefficients are given in parenthesis.
* P value <0.05, ** P value < 0.01.

Discussion

Considering that the work environment for emergency medical personnel is very stressful since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job and its contents are subject to a high level of stress. Research evidence related to job stress among EMTs is limited in the study area. Hence, this study was conducted to determine the relationship between job stress and the quality of work-life among EMT personnel in Lorestan province.

The results of the present study showed that most of the EMTs 337(78.37%) had a moderate level of job stress (M, 2.69; IC, 2.65-2.73). This finding is in a harmony with the Ashgh et al. study, in which the male employees of emergencies in Golestan province were found to experience moderate work stress(28). Another study shows that emergency physicians experience a subclinical level of anxiety due to repetitive exposure to serious incidents like the death of an adolescent or a child (7). In regards to WRQoL, the overall quality of working life was a little less than the moderate range (M, 2.48; IC, 2.35-2.60). A cross-sectional analysis of 908 health employees from 15 hospitals shows that the majority of employees were dissatisfied with occupational health and safety and also indicated that their work was not interesting and satisfying (21). High WRQoL seems to have a protective factor. All of these, high stress and low WRQoL, not only affect the EMTs themselves, but can also have an adverse impact on patient care (7).

In the present study, a significant association was found between work shift and work-related stress. Rotating shift EMTs were more stressed than fixed-shift EMTs. This finding was consistent with research reported in Ethiopia (29) and Jordan(30), which indicated that employees working on rotating shifts were more stressed than their counterparts who worked on fixed shifts; however, those studies were done on nurses. Therefore, working on a fixed shift might be beneficial in improving the WRQoL, as the current study reported.

Change in the work place form emergency wards to other wards suited to the employee, by their choice, was found to be related to the peers' and managers' support. A lack of social support among emergency care personnel is a well-known predictor of occupational stress (7). A study found that facilitating social support from coworkers can help in the rehabilitation process after being confronted with traumatic experiences and occupational dangers among those who work in EM(7). Yang et.al (2002) also reported similar results on the difference between job stress of nurses in the emergency department compared to other departments (31). Employees working in different departments of the hospital experience different degrees of job stress due to their types of activities (32). However, few studies reported a low level of job stress for nurses in comparison to other employees (33); perhaps it is due to, in addition to the differences in the populations studied, the adjustment of nurses to severe and chronic conditions with stressful working conditions compared to other employees. In the present study, it was found that there was no significant difference between the mean score of job stress and marital status, education level, native status, type of employment and type of base location, while the relationship between the mean of job stress score and working shift status and employment history were significant. According to a study conducted by Golshiri et al. (2013), it was found that there is a significant reverse relationship between the employment history and the level of job stress; in other words, the higher job experience, the lower job stress is. Accordingly, it can be concluded that the most compatibility of nurses with the unique status of the medical emergency department and the increase in

work skills and work experience as a result of increasing the job record is one that can explain this relationship (34). In the study of Khodaveysi et.al (2005), they approved that the increase in skills and work experience due to the increase in job records was mentioned as the most important factors in job stress (35). This study has some limitations, including the fact that the cross-sectional study design utilized in this investigation could not determine a temporal association between stress and WRQoL. Given that stress is mainly subjective and psychological, the qualitative method would give rich and reliable information on the EMTs' experiences with stress and related concepts. Furthermore, since the sampling method in the present study was a census, some of the technicians were reluctant and were not satisfied to participate in the study.

Conclusion

This study determined the level of job stress and its relation to the WRQoL among EMT personnel working in government hospitals in Lorestan, Iran. Based on the evidence provided from the current analysis, two-third of EMTs working in governmental hospitals had work-related stress. Work shift was statistically significantly associated with EMTs' work-related stress and WRQoL. In this study, peer support was found to be the most stressful domain among EMTs; while the control domain at work was the highest factor that might impact the quality of working life. It is likely that EMT personnel may have a tremendous role in the health care delivery system world-wide, especially in emergency situations. Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among the challenges that EMTs may face during their work. In the mean time, EMTs' experienced work-related stress and low WRQoL may affect not only the health care services but also might increase medical errors and resource expenditure. It would seem that to improve the quality of work among EMTs, the urgent need for organizational interventions aim to diminish work-related stress could be used as a comprehensive assessment. Moreover, rescheduling should be explored as a strategy for reducing stress caused by shift work. To demonstrate a true cause-and-effect link, more research employing a mixed-method and analytical design in government and commercial health institutions is recommended.

Declarations:

Ethical Approval and Consent to participate:

Human Participants with the ethical approval ID: IR.LUMS.REC.1397-1-99-1254. This study was approved and funded by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all participants. All experimental protocols were approved by Lorestan University of Medical Sciences and the ethical approval ID is: IR.LUMS.REC.1397-1-99-1254.

Consent for publication:

Not applicable.

Availability of supporting data:

All data generated or analyzed during this study are included in this published article.

Competing interests

Not applicable.

Funding:

This study was funded by Lorestan University of Medical Sciences.

Author's contributions:

H.Sh, Gh.F, and A.P, conceptualized and designed the main idea of this study. H.Sh, and R.M. designed the data extraction file, extracted data, and interpreted data. M.M, and B.M. analysed the data. All authors wrote the initial

draft of the manuscript and approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

Acknowledgment:

Researchers express their sincere gratitude to all ETMs that participated in the study.

References

1. Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. Cogn Behav Ther [Internet]. 2017;46(6):522–32. Available from: http://doi.org/10.1080/16506073.2017.1315612
2. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion Satisfaction, Burnout, and Compassion Fatigue Among Emergency Nurses Compared With Nurses in Other Selected Inpatient Specialties. J Emerg Nurs [Internet]. 2010;36(5):420–7. Available from: http://dx.doi.org/10.1016/j.jen.2009.11.027
3. Haile KK, Asnakew S, Waja T, Kerbih HB. Shift work sleep disorders and associated factors among nurses at federal government hospitals in Ethiopia: A cross-sectional study. BMJ Open. 2019;9(8):1–8.
4. Hegg-Deloye S, Brassard P, Jauvin N, Prairie J, Larouche D, Poirier P, et al. Current state of knowledge of post-traumatic stress, sleeping problems, obesity and cardiovascular disease in paramedics. Emerg Med J. 2014;31(3):242–7.
5. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psychiatry Psychiatr Epidemiol [Internet]. 2018;53(9):897–909. Available from: http://dx.doi.org/10.1007/s00127-018-1539-5
6. Ayyala RS, Ahmed FS, Ruzal-Shapiro C, Taylor GA. Stressors contributing to burnout amongst pediatric radiologists: results from a survey of the Society for Pediatric Radiology. Pediatr Radiol. 2019;49(6):714–22.
7. Somville FJ, De Gucht V, Maes S. The impact of occupational hazards and traumatic events among Belgian emergency physicians. Scand J Trauma Resusc Emerg Med [Internet]. 2016;24(1). Available from: http://dx.doi.org/10.1186/s13049-016-0249-9
8. Xu H, Zhang M, Hudson A. Occupational Health Protection for Health Workers in China With Lessons Learned From the UK: Qualitative Interview and Policy Analysis. Saf Health Work [Internet]. 2021;12(3):304–10. Available from: https://doi.org/10.1016/j.shaw.2021.02.002
9. Konstantinos N, Ouzouni C. Factors influencing stress and job satisfaction of nurses working in psychiatric units: a research review. Heal Sci J [Internet]. 2008;2(4):183–95. Available from: https://www.hsj.gr/medicine/factors-influencing-stress-and-job-satisfaction-of-nurses-working-in-psychiatric-units-a-research-review.php?aid=3653
10. Padma V, Anand NN, Gurukul SMGS, Javid SMASM, Prasad A, Arun S. Health problems and stress in Information Technology and Business Process Outsourcing employees. J Pharm Bioallied Sci. 2015;7(April):S9–13.
11. Belita A, Mbindyo P, English M. Absenteeism amongst health workers - developing a typology to support empiric work in low-income countries and characterizing reported associations. Hum Resour Health. 2013;11(1):1–10.
12. Kinman G. Sickness presenteeism at work: Prevalence, costs and management. Br Med Bull. 2019;129(1):107–16.
13. Work-related stress, anxiety or depression statistics in Great Britain. 2019;(March). Available from: https://www.hse.gov.uk/statistics/causdis/stress.pdf
14. Eshgh ZM, Aghaeinejad A akbar, Peyman A, Amirkhani A, Taghinezhad F, Sheikhi A akbar. The relationship between occupational stresses with job burnout in pre-hospital emergency staff. Hakim Jorjani J. 2015;2(2):33–41.
15. Torshizi L, Ahmadi F. Job Stressors from Clinical Nurses' Perspective. Iran J Nurs. 2011;24(70):49–60.
16. Ghorbanian A, Bahadori M, Nejati M. The relationship between managers' leadership styles and emergency medical technicians' job satisfaction. Australas Med J. 2012;5(1):1–7.
17. Hosseinabadi R, Karampourian A, Beiranvand S, Pournia Y. The effect of quality circles on job satisfaction and quality of work-life of staff in emergency medical services. Int Emerg Nurs [Internet]. 2013;21(4):264–70. Available from: http://dx.doi.org/10.1016/j.ienj.2012.10.002
18. Mohsen Z, K.A.D. A, Gh.H. H, A.A.F. B, M.R. A. Prevalence of job stress among staff of the ports and

sailing corporation of Hormozgan and its relation to non fatal accidents. J SHAHID SADOUGHI Univ Med Sci Heal Serv. 2009;17(66):142–8.
19. Soori H, Rahimi M, Mohseni H. Association Between Job Stress and Work-Related Injuries: A Case-Control. Iran J Epidemiol. 2006;1(3):53–8.
20. Srivastava S, Pathak D. Investigating the mediating effect of psychological empowerment on quality of work life-organisational commitment relationship: a study on Indian IT sector managers. Int J Manag Dev. 2016;1(3):196.
21. Anjuman-i Bihdāsht-i Īrān. GN, Dargahi H. Study of Quality of Work Life (QWL). Iran J Public Health. 2006;35(4):8–14.
22. Grote G, Guest D. The case for reinvigorating quality of working life research. Hum Relations. 2017;70(2):149–67.
23. Nazari K, Emami M. Recognition of relationship between occupational stress and satisfication among members of faculty in private and governmental university. Adv Nat Appl Sci. 2012;6(2):219–29.
24. E. AM, M. GF. Reliability And Validity Assessment For The Hse Job Stress Questionnaire. Int J Behav Sci. 2011;4(4):291–7.
25- Azad marzabadi, E, Gholami Fesharaki, M. Reliability and Validity Assessment for the HSE Job Stress Questionnaire. Journal of Behavioral Sciences. 2011: 4(4): 291-297
26. Van Laar D, Edwards JA, Easton S. The Work-Related Quality of Life scale for healthcare workers. J Adv Nurs. 2007;60(3):325–33.
27- Shabaninejad H, Arab M, Rashidian A, Zeraati H, Bahrami S. Quality of working life of Family Physicians in Mazandaran. Hakim Research Journal 2012; 15(2): 178- 184.
28. Eshgh ZM, Aghaeinejad AA, Peyman A, Amirkhani A, Chehregosha M. Relationship between Occupational Stress and Mental Health in Male Personnel of Medical Emergency in Golestan Province. J Res Dev Nurs Midwifery. 2015;12(1).
29. Baye Y, Demeke T, Birhan N, Semahegn A, Birhanu S. Nurses' work-related stress and associated factors in governmental hospitals in Harar, Eastern Ethiopia: A cross-sectional study. PLoS One [Internet]. 2020;15(8 August):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0236782
30. Mokhtar K, Shikieri A El, Taha EM, Rayan A. The Relationship between Occupational Stressors and Performance amongst Nurses Working in Pediatric and Intensive Care Units. Am J Nurs Res. 2016;4(2):34–40.
31. Yang Y, Koh D, Ng V, Lee CY, Chan G, Dong F, et al. Self perceived work related stress and the relation with salivary IgA and lysozyme among emergency department nurses. Occup Environ Med 2002; 59(12): 836-41.
32. Landeweerd JA, Boumans NP. Nurses' work satisfaction and feelings of health and stress in three psychiatric departments. Int J Nurs Stud 1988; 25(3): 225-34.
33. Callaghan P, Tak-Ying SA, Wyatt PA. Factors related to stress and coping among Chinese nurses in Hong Kong. J Adv Nurs 2000; 31(6): 1518-27.
34. Golshiri P, Pourabdian S, Najimi A, Mosa Zadeh H, Hasheminia J. Factors Effective on Job Stress of Nurses Working in Emergency Wards. Journal of Health System Research. 2013; 9(1): 50-6.
35. Khodaveysi M, Mohammadi N, Omidi A. Assessment of job stress in nurses. Scientific Journal of Hamadan Nursing & Midwifery Faculty 2005; 13(2): 44-50.

Supplementary:

Supplementary table1: Work-related stress (HSE) Categorized by factors (N=430)

Factors	NO	Questions	Response mean (SD)	% non-response
Demands	1	Different groups at work demand things from me that are hard to combine	1.9 (1.01)	1.4
	2	I have unachievable deadlines	1.42(1.12)	1.4
	3	I have to work very intensively	2.72(1.15)	0.2
	4	I have to neglect some tasks because I have too much to do	1.89(1.21)	0.9
	5	I am unable to take sufficient breaks	2.18(1.21)	1.6
	6	I am pressured to work long hours	2.14(1.26)	2.1
	7	I have to work very fast	2.85(1.05)	0.2
	8	I have unrealistic time pressures	1.9(1.15)	1.2
Mean of response (SD)			2.126 (0.468)	
Control	1	I can decide when to take a break	1.95(1.45)	2.1
	2	I have a say in my own work speed	3.11(0.85)	0.9
	3	I have a choice in deciding how I do my work	2.49(1.11)	0.9
	4	I have a choice in deciding what I do at work	2.56(1.16)	1.6
	5	I have some say over the way I work	2.93(0.91)	2.1
	6	My working time can be flexible	2.21(1.18)	1.4
Mean of response (SD)			2.539 (0.432)	
Manger support	1	I am given supportive feedback on the work I do	2.72(0.89)	0.2
	2	I can rely on my line manager to help me out with a work problem	2.74(1.03)	0.9
	3	I can talk to my line manager about something that has upset or annoyed me about work	2.69(1.13)	2.3
	4	I am supported through emotionally demanding work	2.31(1.09)	0.9
	5	My line manager encourages me at work	2.41(1.27)	1.4
Mean of response (SD)			2.576 (0.199)	
Peer Support	1	If work gets difficult, my colleagues will help me	2.92(0.85)	0.9
	2	I get help and support I need from colleagues	2.96(0.81)	2.1
	3	I receive the respect at work I deserve from my colleagues	3.07(0.78)	0.2
	4	My colleagues are willing to listen to my work-related problems	2.62(0.85)	1.6
Mean of response (SD)			2.892 (0.192)	
Relationship	1	I am subject to personal harassment in the form of unkind words or behavior	1.07(1.12)	0.7
	2	There is friction or anger between colleagues	2.11(1.12)	0.9
	3	I am subject to bullying at work	1.69(1.22)	2.3
	4	Relationships at work are strained	2.16(1.28)	0.7
Mean of response (SD)			1.757 (0.505)	
Role	1	I am clear what is expected of me at work	3.3(0.78)	1.6
	2	I know how to go about getting my job done	3.22(0.82)	2.3
	3	I am clear what my duties and responsibilities are	3.24(0.92)	0.9
	4	I am clear about the goals and objectives for my department	2.98(1.05)	0.2
	5	I understand how my work fits into the overall aim of the organization	2.87(0.92)	0.2
Mean of response (SD)			3.121(0.185)	
Change	1	I have sufficient opportunities to question managers about change at work	2.69(1.06)	1.9
	2	Staff are always consulted about change at work	2.69(1.03)	0.9
	3	When changes are made at work, I am clear how they will work out in practice	2.46(0.92)	2.3
Mean of non-response (SD)			2.613 (0.131)	
Overall mean (SD)			2.694 (0.439)	

Supplementary table 2: Work Related Quality of Life (WRQoL) Response (N=430)

NO	Questions	Response average	% non-response
1	I have a clear set of goals and aims to enable me to do my job	2.935	0.2
2	I feel able to voice opinions and influence changes in my area of work	2.746	0.9
3	I have the opportunity to use my abilities at work	2.537	1.6
4	I feel well at the moment	2.958	2.3
5	My employer provides adequate facilities and flexibility for me to fit work in around my family life	2.602	1.6
6	My current working hours / patterns suit my personal circumstances	2.525	0.2
7	I often feel under pressure at work	2.357	0.2
8	When I have done a good job it is acknowledged by my line manager	2.490	1.3
9	Recently, I have been feeling unhappy and depressed	1.980	1.6
10	I am satisfied with my life	2.918	2.3
11	I am encouraged to develop new skills	2.528	1.4
12	I am involved in decisions that affect me in my own area of work	2.585	2.8
13	My employer provides me with what I need to do my job effectively	2.639	1.2
14	My line manager actively promotes flexible working hours / patterns	2.687	1.4
15	In most ways my life is close to ideal	2.387	0.2
16	I work in a safe environment	2.154	1.4
17	Generally things work out well for me	2.346	2.1
18	I am satisfied with the career opportunities available for me here	2.355	1.4
19	I often feel excessive levels of stress at work	2.295	2.5
20	I am satisfied with the training I receive in order to perform my present job	2.544	0.7
21	Recently, I have been feeling reasonably happy all things considered	2.492	1.4
22	The working conditions are satisfactory	2.476	0.2
23	I am involved in decisions that affect members of the public in my own area of work	2.324	0.9
24	I am satisfied with the overall quality of my working life	2.577	1.6
Overall mean (SD)		2.506 (0.553)	

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	Line 1
		Page 1
Introduction		
Background/rationale	2	Line 51-99
Objectives	3	Line 21
Methods		
Study design	4	Line 103
Setting	5	Line 103-112
Participants	6	(*a*) Line 103-106, 114-116
Variables	7	Line 119-145
Data sources/ measurement	8*	Line 104-106
Bias	9	NA
Study size	10	Line 117-118
Quantitative variables	11	NA
Statistical methods	12	(*a*) Line 152-157
		(*b*) NA
		(*c*) NA
		(*d*) NA
		(*e*) NA
Results		
Participants	13*	(a) Line 160
		(b) NA
		(c) NA
Descriptive data	14*	(a) Line 160-167
		(b) NA
Outcome data	15*	Line 206-207
Main results	16	(*a*) Line 170-207
		(*b*) NA
		(*c*) NA
Other analyses	17	NA
Discussion		
Key results	18	Line 36
Limitations	19	Line 255-260
Interpretation	20	Line 262-276
Generalisability	21	NA
Other information		
Funding	22	Line 280-283, 290-291

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-066744.R2
Article Type:	Original research
Date Submitted by the Author:	06-Apr-2023
Complete List of Authors:	Hashemi, Shima; Lorestan University of Medical Sciences, Department of Health; Ilam University of Medical Sciences, Department of Epidemiology Ghazanfari, Firoozeh; Lorestan University, Department of Psychology, Faculty of Human Sciences Merzah, Mohammed; University of Debrecen Faculty of Medicine, Public Health and Epidemiology Rezaei, Mehdi; University of Birjand, Department of psychology Astaraki, Peyman; Lorestan University of Medical Sciences, Department of Internal Medicine Birjandi, Mehdi; Lorestan University of Medical Sciences, Nutritional Health Research Center
Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health, Public health
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Epidemiology < TROPICAL MEDICINE, PUBLIC HEALTH

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Abstract

Objective: This study was aimed to determine the relationship between job stress and WRQoL among emergency medical technicians (EMTs) in Lorestan Province, Western Iran.
Design: This was a cross-sectional study.
Methods: Totally 430 emergency medical technicians who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province were selected using census method. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-Related Quality of Life (WRQoL). The odd ratio with 95% Confidence Interval (CI) was used to declare the statistical association ($p \leq 0.05$).
Results: All participants were exclusively males, with a mean age of 32±6.87 years. The overall average score of job stress using the HSE scale was 2.69±0.43; while the overall quality of working life score was 2.48±1.01.The type of working shift was found to have a significant impact on the HSE-average score, ($F(3,417) = 5.26$, $P = 0.01$); and on the WRQoL-average score, ($F(3,417) = 6.89$, $P< 0.01$).
Conclusion: Two-thirds of EMTs working in governmental hospitals had job stress and a low quality of work-related life. Additionally, work shift was statistically significant associated with EMTs' job stress and WRQoL.

Keywords: Job stress, Work-related quality of life, Emergency medical technician, HSE, WRQoL

STRENGTHS AND LIMITATIONS

1. First study to examine job stress and WRQoL among EMTs in a specific region.
2. Validated questionnaires used for data collection.
3. Sample size sufficient for examining job stress and WRQoL relationship.
4. Cross-sectional design limits temporal association determination.
5. Qualitative methods can provide reliable and rich information on EMTs' experiences with stress.

Introduction:

Working in emergency medicine can be challenging, and healthcare workers are subjected to a variety of pressures (1). Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among them. Additional environmental stressors in the prehospital context include traffic safety concerns and unexpected accident scenes (2). Several studies have demonstrated the alarming prevalence of burnout syndrome, posttraumatic stress disorder (PTSD), and other related health difficulties among first responders and emergency medical service personnel (3)(4)(5)(6)(7). Furthermore, those stressors might cause hostility, aggression, absenteeism, and turnover among emergency medical technicians (EMTs).

Job stress refers to the psychological stress caused by the imbalance between the needs of the target and the individual's ability to adapt to specific job conditions (8). Job stress is one of the most important workplace health risks among employees worldwide (9). One of the complications of modern life is the presence of stress in the workplace (10). It is a common condition of the 21st century that affects people in a variety of conditions and is responsible for absenteeism among health- care workers (11). 137.3 million working days were lost to due to

sickness and injury as it is estimated by the UK national statitsics (12). This is only the material dimension of the issue of stress; in addition, stress has a significant impact on employees, their families, and patients (9).

In 2021, job stress (new or long-standing) was the biggest work-related health issue in the UK, which accounted for 50% of all job-related illnesses with an incidence rate of 2,480 per 100,000(13). The cost of sickness and stress-related absenteeism is estimated at 4 billion pounds a year(12). Numerous studies have shown that the job stress experienced by the pre-hospital emergency staff is significantly higher than that of other healthcare workers because they are the first people to be present in a variety of emergencies, from fatal accidents to minor injuries and illnesses (14)(15). Meanwhile, emergency medical technicians face stressful environments such as congested areas and critically ill patients where it is difficult to work (16).

Neglecting the ongoing stress that is inflicted on employees, particularly healthcare workers, would eventually result in a lack of motivation and morale in the staff (17). There is enormous capital lost annually due to the lack of physical and mental health of employees, impaired performance, quitting, and changing jobs due to job stress. Stress and its complications result in the loss of hundreds of working days each year. About 30% of the workforce in developed countries suffers from job stress. The International Labor Organization also estimates that the costs incurred by countries due to job stress are about 1 to 3.5% of GDP and are currently increasing (18)(19).

Work-related quality of life (WRQoL) is an organizational culture or management style in which employees feel ownership, self-reliance, responsibility, and self-esteem(20). WRQoL is a multidimensional structure that includes several concepts such as welfare measures, health services, incentive plans, job fit, job security, job design, importance to the role and position of the individual in the organization, providing growth and development, participation in decision making, reducing job conflicts and ambiguities and education(21). According to the research, companies that provide a better work quality of life for their employees are more successful in retaining their valuable employees and have higher profitability (22). However, job stress reduces the WRQoL and increases the risk of work-related injuries. The WRQoL is critical for organizations to be able to attract and retain human resources (23).

Job stress in emergency medical technicians is typically higher than in other professionals, and since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job and its contents are in a high level of stress. Research evidence related to job stress among EMTs is limited in the study area.

Lorestan Province in Western Iran is a region that faces numerous challenges, including remote and deprived villages, dilapidated road structures, and the presence of dangerous occupations. Emergency Medical Technicians (EMTs) in this region are particularly vulnerable to these challenges, which can have a significant impact on their job stress and work-related quality of life (WRQoL). Despite the importance of this topic, there have been limited studies that have investigated the relationship between job stress and WRQoL among EMTs in this region. Therefore, the present study aims to fill this gap by examining the relationship between job stress and WRQoL among EMTs in Lorestan Province. By doing so, we hope to provide new insights into the factors that affect the well-being of EMTs in this region and contribute to the development of effective interventions to improve their working conditions and overall quality of life.

Material and methods:

Participants

A census approach was used to conduct a cross-sectional survey among 430 emergency medical technicians (EMTs) who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province. The number of participants was 25, 37, 22, 38, 21, 19, 115, 61, 28, 54, and 10 from Alashtar, Aligoudarz, Azna, Broujerd, Doroud, Dooreh, Khorramabad, Kouhdasht, Nourabad, Poldokhtar, and Sepiddasht, respectively. This study was approved by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all technicians before participating in the study. The confidentiality principle was maintained so that there was no need to mention the names of the individuals in the questionnaires, and it was assured that the information was just provided to the researcher and used in the study. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-related quality of life (WRQoL). Data were collected during all shifts (morning, evening and night), when the (EMTs) were at work at the time being to answer the questions.

Eligible emergency medical technicians (EMTs) were those who had been working in their respective units for at least six months and were willing to participate in the study. EMTs who had been working for less than six months or who did not meet the inclusion criteria were excluded. Using Cochran's sample size formula ($n=\frac{Nz^2pq}{Nd^2+z^2pq}=430$) where [z= 1.96, N= 450, p=q= 0.5, d= 0.01], we selected a total of 430 EMTs who met the inclusion criteria.

Job Stress Questionnaire: The management standard was assessed using a 35-item indicator tool created by the Health and Safety Executive (HSE) to measure work-related stress among employees. The tool consists of seven items. These items are: (1) Demands (including such issues as workload, work patterns, and the working environment). (2) Control (how much say the person has in the way they do their work). (3 & 4) Manager and peers' support (including the encouragement, sponsorship, and resources provided by the organization, line management, and colleagues). (5) Relationships at work (including promoting positive working practices to avoid conflict and dealing with unacceptable behaviour). (6) Role (whether people understand their role within the organization and whether the organization ensures that the person does not have conflicting roles). (7) Change (how organizational change (large or small) is managed and communicated in the organization). The validity of the HSE-scale was 83% (α=0.83). This questionnaire contains 35 questions with 7 subscales. The subscales are: 1- Demand: questions number (18, 6, 9, 12, 16, 3, 20, 22), 2- Control (30, 10, 15, 19, 25, 2), 3- Officials support (7, 27, 24, 31), 4- Colleagues support (8, 23, 29, 33, 35), 5- Relationship (5, 14, 21, 34), 6- Role (1, 7, 11, 13, 17) and 7- Changes (32, 28, 26). The Likert scale was defined as Strongly disagree: 0, Disagree: 1, No opinion: 2, Agree: 3, Strongly agree: 4. All 7 stress-items were scored on a scale of 1 to 4 ranged between 7 to 28. Those above and those below the median value 16, were signified as more and less job stress respectively (24). The validity and reliability of the Persian version of the questionnaire was %78 and %65 using the Cronbach's Alpha and split-half method, respectively and HSE is a valid and reliable questionnaire for studying job stress (25).

Work-Related Quality of Life Questionnaire (WRQoL): This is a multidimensional concept that includes job and professional satisfaction factors, working conditions, general health status, home-work relationship, work stress, and work control. The questionnaire comprises a five-Likert scale from strongly disagree to strongly agree 1 to 5 (25). The validity of the questionnaire was confirmed by experts, and its reliability was determined by the test-retest method. The questions had a 95% correlation value, while the alpha Cronbach coefficient for determining the internal relevance of the questions was 78%. The scale's reliability was 79% (α=0.79). Subscale scores are as: Job and Career Satisfaction (JCS) with a sub-scale reliability of 0-86 (item 5), General Well-Being (GWB) 0-82 (item 18), Home–Work Interface (HWI) 0-82 (item 17), Stress at Work (SAW) 0-81 (item 7), Control at Work (CAW) 0-81 (item 12) and Working Conditions (WCS) 0-75 (item 9)(26). The validity and reliability of the Persian version of the questionnaire was %95 and %78 using the Cronbach's Alpha and it is a valid and reliable questionnaire (27)

Patient and Public Involvement

This was a cross-sectional study that meaningfully engaged all emergency medical technicians working in different cities of Lorestan province in identifying priority research questions, research training, all facets of recruitment and data collection, and in interpreting the results and co-authoring this manuscript. Additionally, we trained them in the informal settlements of the study conducted in their workplaces, who contributed likewise to informing the study focus, and data collection efforts.

Statistical analysis

Descriptive statistics were used to determine the characteristics of participants and the overall scores of job-stress and work-related quality of life. Pearson correlation was used to assess the correlation between the domains of the two questionnaires (HSE and WRQoL). The odd ratio at (95% CI, P-value≤0.05) was used to declare the statistical association. All analyses were done using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Results:

All 430 emergency medical technicians (EMTs) who participated in this study were exclusively male (100%), with a mean age of 32±6.87 years. Based on their educational level, 19.2% held a diploma while the rest (80.8%) had an academic education degree, additionally 58.9% of them were maried. Totally 115 (30.5%) of them were students while they were working simuntaneously and 395 (91.9%) of them were officially hired by the organization. All other socio-demographic characteristics of the participant are provided in Table 1.

Table 1. Demographic characteristics of the Emergency Medical Technicians (ETMs) (N=430)

Variables [N*]	Categories	n (%)
Age (years) [427]	20-30	222 (51.5)
	30-40	146 (33.9)
	40-50	56 (13.0)
	50-60	3 (0.7)
Education Level [406]	Diploma	78 (19.2)
	Associated Degree	235 (57.9)
	Bachelor	90 (22.2)
	Master	3 (0.7)

Marital Status [406]	Single	167 (41.1)
	Married	239 (58.9)
Employment History (years) [410]	0-5	162(37.6)
	6-10	190(44.2)
	11-15	13(3.1)
	>15	45(10.5)
Native Status [412]	Native to the city	225 (52.3)
	Native to the province	127 (29.5)
	Non-indigenous	60 (14.0)
Working Shift Status [421]	Constant morning shift	6 (1.4)
	Circulating shift	51 (11.9)
	24-hour shift	228(53.0)
	48-hour shift	136 (31.6)
Major [390]	Public Health	3 (0.7)
	Medical emergencies	269 (62.6)
	Accounting	6 (1.4)
	Anesthesia	17 (4.0)
	Mechanics	3 (0.7)
	Crisis Management	5 (1.2)
	Emergency and disaster management	8 (1.9)
	Humanities	52 (12.1)
	Science	8 (1.9)
	Operating room technology	6 (1.4)
	Nursing	13 (3.0)
Number of Shifts (per month) [401]	<10	36 (9.0)
	10-12	293 (73.0)
	≥13	72 (18.0)
Locale of Service [404]	Urban Bases	150 (37.1)
	Road Stations	179 (44.3)
	Urban and Road Bases	75 (18.6)
Type of Bases Location [367]	Canopies	55 (15.0)
	Building	312 (85.0)

*Number of responses for each variables.

Emergency Medical Technicians (EMTs) with a master's degree had the highest HSE (3.5±0.01) and WRQoL (4.0±0.01) average scores. Regarding martial status, native status, and length of service, there were no significant differences of them, neither with HSE nor with WRQoL average scores. However, the type of working shift had a significant impact on the HSE-average score, $F\ (3,417) = 5.26$, $P = 0.01$; and on the WRQoL-average score, F (3,417) = 6.89, P< 0.01, as the highest average scores were reported among those who worked on the 48-hour shift (2.79±0.46) of the HSE, and the fixed morning shift (2.87±0.01) of the WRQoL.

The overall average score of job stress using the HSE scale was (2.69±0.43), with peer support as the highest stressor domain among EMTs (2.89±0.63). While the overall quality of working life score was (2.48±1.01), with control at work as the highest factor that might impact the quality of working life (2.47±0.90). (See Table 2 for more details) Generally, 73.5% of respondents reported having work-related stress, with 46% having a low work-related quality of life (lower than the overall mean). The reposne rate for each specific question of the HES and WRQoL standards was provided in supplementary tables 1 and 2.

Table 2: Stressor domain scores and work related quality of life scores by factors among the EMTs (N=430)

	Domains and Factors	n	Score Mean (SD)	95% CI
Stressor domains	Demand	405	2.11 (0.56)	1.93-2.08
	Control	402	2.54 (0.60)	2.44-2.59
	Manager's support	410	2.58 (0.82)	2.48-2.67
	Peer's support	413	2.89 (0.63)	2.82-2.98
	Relationship	414	1.75 (0.81)	1.58-1.78
	Role	415	3.12(0.64)	3.00-3.16
	Change	411	2.61 (0.80)	2.62-2.71
	Overall HSE (N)	**430**	**2.69 (0.43)**	**2.65-2.73**
WRQoL- factors	Job career satisfaction	410	2.39 (0.77)	2.30-2.48
	Control at work	413	2.47 (0.90)	2.37 -2.58
	General well-being	393	2.45 (0.54)	2.38-2.51
	Home-work interface	422	2.44 (1.01)	2.32-2.55
	Stress at work	420	1.96(1.00)	1.84-2.08
	Working conditions	423	2.12 (0.98)	2.00-2.23
	Overall quality of working life	**424**	**2.48 (1.01)**	**2.35-2.60**

The difference in scores between demographic variables are shown in Table 3.

Table 3: Difference in HSE and WRQoL scores between demographic variables

Variable	Category	n	Sum. HSE Mean±SD	Sum. WRQoL Mean±SD
Education Level	Diploma	78	60.70±10.90	56.78±15..42
	Associated Degree	235	61.84±7.93	57.88±14.62
	Bachelor	90	60.76±9.36	57.28±15.50
	Master	3	80.00±0.00	91.66±0.00
Marital Status	Single	167	61.28±9.83	57.62±13.38
	Married	239	62.27±8.85	58.50±15.55
Native Status	Native to the city	225	61.95±9.41	57.80±14.50
	Native to the province	127	61.31±7.59	56.31±14.30
	Non-indigenous	60	62.78±11.21	61.51±18.68
Working Shift Status	Constant morning shift	6	60.71±5.47	74.47±2.85
	Circulating shift	51	63.54±5.72	55.65±4.93
	24-hour shift	228	60.91±10.13	56.29±14.58
	48-hour shift	136	62.01±9.00	60.08±18.20
Locale of Service	Urban Bases	150	65.17±7.49	62.16±13.26
	Road Stations	179	61.24±9.83	56.79±15.92
	Urban and Road Bases	75	57.77±8.25	52.77±14.99
Type of Bases Location	Canopies	55	63.24±11.09	56.57±18.99
	Building	312	62.25±8.89	58.52±13.96

Among the participants, 1.4% had between 0-5 shifts, 52.8% between 6-10 shifts and 39.1% between 11-15 shifts per month. Based on the results, most of the EMTs 337(78.37%) had a moderate level of job stress, 48(11.16%) low and 45(10.46%) had severe job stress. Based on the Tukey's result, there was no significant relationship between job stress and none of the sub-groups related to employment type ($p > 0.05$). Table 4

Table 4. Correlation between job stress and demographic factors on quality of work life among EMTs based on multiple regression model. n=234

Variable	Mean±SD	ß	t	P-Value
Educational level	2.09±0.66	-0.53	-0.39	0.69
Marital status	1.57±0.49	0.69	0.35	0.72
Job status	8.19±5.97	0.71	3.16	0.002
Shifts per month	11.03±2.36	0.57	1.58	0.11
Job stress score (HSE)	62.14±8.64	0.76	7.98	<0.001
Quality of work life score (QWL)	58.80±13.92			

To assess the linear relationship between stresser domains and WRQoL factors, pearson correlation was used (Table 4). There were a strong positive relationship between two domains of HSE, which are peer support and the change ($r = 0.72$, $N= 394$, $p<0.001$). In other words, increasing the peers' support in work environment the higher the change might apply. Regarding the WRQoL factors, however, job career satisfaction was found to have a significant positive impact on control at work ($r = 0.72$, $N = 395$, $P<0.001$), general well-being ($r = 0.72$, $N = 379$, $P<0.001$), home-work interference ($r = 0.77$, $N = 407$, $P<0.001$), and working conditions ($r = 0.77$, $N = 407$, $P<0.001$). (See Supplementary Table. 1)

Discussion

Emergency medical personnel work in an inherently stressful environment, as they are often the first healthcare team to respond to critical and traumatic incidents. This constant exposure to high-pressure situations and sick patients can result in significant levels of job stress. Despite the challenges faced by emergency medical technicians (EMTs), research on job stress in this profession is limited in the study area. Therefore, to bridge this gap in the literature, we conducted a study aimed at exploring the relationship between job stress and the quality of work-life among EMT personnel in Lorestan province. By understanding the impact of job stress on the quality of work-life, we can identify strategies and interventions that promote better mental health and well-being for EMTs.

The findings of the present study indicate that a substantial proportion of EMTs, comprising 337 (78.37%), experienced moderate levels of job stress (M, 2.69; IC, 2.65-2.73). This result aligns with a previous study conducted by Ashgh et al., which reported that male emergency employees in Golestan province experienced moderate work stress (28). Similarly, a study on emergency physicians demonstrated that repetitive exposure to critical incidents, such as the death of a child or adolescent, can result in a subclinical level of anxiety(7). Regarding

WRQoL, the overall quality of work life among EMTs was found to be slightly lower than moderate (M, 2.48; IC, 2.35-2.60). This result is consistent with the findings of a cross-sectional analysis of 908 health employees from 15 hospitals, which revealed that a majority of participants reported dissatisfaction with occupational health and safety and uninteresting work (21). Moreover, high levels of WRQoL were found to have a protective effect, as high levels of stress and low levels of WRQoL not only impact EMTs but also negatively affect patient care (7).

In the present study, a significant association was found between work shift and work-related stress. Rotating shift EMTs were more stressed than fixed-shift EMTs. This finding was consistent with research reported in Ethiopia (29) and Jordan(30), which indicated that employees working on rotating shifts were more stressed than their counterparts who worked on fixed shifts; however, those studies were done on nurses. Rotating shift work can disrupt the natural circadian rhythm of the body, leading to sleep deprivation and exhaustion. This can increase the likelihood of errors and decrease work performance, causing more stress for the EMTs. Additionally, rotating shift work can make it difficult to maintain a healthy work-life balance, which can also contribute to higher levels of stress (31). It may be helpful to include suggestions for potential solutions, such as offering more flexible scheduling options or providing resources for stress management and coping strategies. Therefore, working on a fixed shift might be beneficial in improving the WRQoL, as the current study reported.

Change in the work place form emergency wards to other wards suited to the employee, by their choice, was found to be related to the peers' and managers' support. A lack of social support among emergency care personnel is a well-known predictor of occupational stress (7). A study found that facilitating social support from coworkers can help in the rehabilitation process after being confronted with traumatic experiences and occupational dangers among those who work in EM(7). Yang et.al (2002) also reported similar results on the difference between job stress of nurses in the emergency department compared to other departments (32). Employees working in different departments of the hospital experience different degrees of job stress due to their types of activities (33). However, few studies reported a low level of job stress for nurses in comparison to other employees (34); perhaps it is due to, in addition to the differences in the populations studied, the adjustment of nurses to severe and chronic conditions with stressful working conditions compared to other employees. In the present study, it was found that there was no significant difference between the mean score of job stress and marital status, education level, native status, type of employment and type of base location, while the relationship between the mean of job stress score and working shift status and employment history were significant. According to a study conducted by Golshiri et al. (2013), it was found that there is a significant reverse relationship between the employment history and the level of job stress; in other words, the higher job experience, the lower job stress is. Accordingly, it can be concluded that the most compatibility of nurses with the unique status of the medical emergency department and the increase in work skills and work experience as a result of increasing the job record is one that can explain this relationship (35). In the study of Khodaveysi et.al (2005), they approved that the increase in skills and work experience due to the increase in job records was mentioned as the most important factors in job stress (36).

The present study is not without limitations. Firstly, the cross-sectional study design utilized in this investigation precludes us from determining a temporal association between stress and WRQoL. Augmenting the quantitative approach with qualitative methods, which offer in-depth and trustworthy information on EMTs' stress

experiences and related concepts, may have enhanced the study's findings. Semi-structured interviews or focus groups could be used to obtain detailed information on specific stressors and coping strategies experienced by EMTs. Additionally, the use of observational methods could provide insights into the nonverbal behaviors and interactions that occur between EMTs and their patients, which may impact their stress levels and WRQoL. By incorporating such qualitative methods, the study could have achieved a more nuanced understanding of the complex and multidimensional nature of stress and its impact on EMTs. Secondly, the census sampling method employed in this study faced reluctance from some technicians, which could have introduced selection bias. Lastly, an important limitation is the gender bias in the Emergency Medical Services centers in Lorestan province. During our study, there were no female employees or dispatch codes, and the administrative and dispatch and MCHC (Medical Care Monitoring Center) personnel were predominantly female, rendering them ineligible for inclusion in our study. While the Sanjeh Organization has been recruiting female emergency medicine students in large cities like Tehran and has female personnel in dispatch codes in these areas, there are presently no female personnel in dispatch codes in Lorestan province due to cultural and operational limitations, precluding us from including female patients in our study. Furthermore, the study did not provide detailed information about the conditions of the research environment, such as the types of emergencies that the workers were responding to or the work schedules and procedures. These conditions may have affected the level of job stress and the quality of work life of the EMTs. Therefore, future studies should take into account the specific characteristics of the work environment to better understand the factors that contribute to job stress and work quality of life among EMTs. In addition, future research could explore the perspectives of EMTs themselves, as well as those of their supervisors and colleagues, to gain a more comprehensive understanding of the work-related stressors and their impact on the quality of work life in this profession. By addressing these limitations, future studies can help to inform the development of effective interventions and policies aimed at reducing job stress and improving the quality of work life among EMT personnel.

Conclusion

This study determined the level of job stress and its relation to the WRQoL among EMT personnel working in government hospitals in Lorestan, Iran. Based on the evidence provided from the current analysis, two-third of EMTs working in governmental hospitals had work-related stress. Work shift was statistically significantly associated with EMTs' work-related stress and WRQoL. In this study, peer support was found to be the most stressful domain among EMTs; while the control domain at work was the highest factor that might impact the quality of working life. It is likely that EMT personnel may have a tremendous role in the health care delivery system world-wide, especially in emergency situations. Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among the challenges that EMTs may face during their work. In the mean time, EMTs' experienced work-related stress and low WRQoL may affect not only the health care services but also might increase medical errors and resource expenditure. It would seem that to improve the quality of work among EMTs, the urgent need for organizational interventions aim to diminish work-related stress could be used as

a comprehensive assessment. Moreover, rescheduling should be explored as a strategy for reducing stress caused by shift work. To demonstrate a true cause-and-effect link, more research employing a mixed-method and analytical design in government and commercial health institutions is recommended.

Declarations:

Ethical Approval and Consent to participate:

Human Participants with the ethical approval ID: IR.LUMS.REC.1397-1-99-1254. This study was approved and funded by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all participants. All experimental protocols were approved by Lorestan University of Medical Sciences and the ethical approval ID is: IR.LUMS.REC.1397-1-99-1254.

Consent for publication:

Not applicable.

Availability of supporting data:

All data generated or analyzed during this study are included in this published article.

Competing interests

Not applicable.

Funding:

This study was funded by Lorestan University of Medical Sciences.

Author's contributions:

H.Sh, Gh.F, and A.P, conceptualized and designed the main idea of this study. H.Sh, and R.M. designed the data extraction file, extracted data, and interpreted data. M.M, and B.M. analysed the data. All authors wrote the initial draft of the manuscript and approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

Acknowledgment:

Researchers express their sincere gratitude to all ETMs that participated in the study.

References

1. Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. Cogn Behav Ther [Internet]. 2017;46(6):522–32. Available from: http://doi.org/10.1080/16506073.2017.1315612
2. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion Satisfaction, Burnout, and Compassion Fatigue Among Emergency Nurses Compared With Nurses in Other Selected Inpatient Specialties. J Emerg Nurs [Internet]. 2010;36(5):420–7. Available from: http://dx.doi.org/10.1016/j.jen.2009.11.027
3. Haile KK, Asnakew S, Waja T, Kerbih HB. Shift work sleep disorders and associated factors among nurses at federal government hospitals in Ethiopia: A cross-sectional study. BMJ Open. 2019;9(8):1–8.
4. Hegg-Deloye S, Brassard P, Jauvin N, Prairie J, Larouche D, Poirier P, et al. Current state of knowledge of post-traumatic stress, sleeping problems, obesity and cardiovascular disease in paramedics. Emerg Med J. 2014;31(3):242–7.
5. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psychiatry Psychiatr Epidemiol [Internet]. 2018;53(9):897–909. Available from: http://dx.doi.org/10.1007/s00127-018-1539-5
6. Ayyala RS, Ahmed FS, Ruzal-Shapiro C, Taylor GA. Stressors contributing to burnout amongst pediatric

radiologists: results from a survey of the Society for Pediatric Radiology. Pediatr Radiol. 2019;49(6):714–22.

7. Somville FJ, De Gucht V, Maes S. The impact of occupational hazards and traumatic events among Belgian emergency physicians. Scand J Trauma Resusc Emerg Med [Internet]. 2016;24(1). Available from: http://dx.doi.org/10.1186/s13049-016-0249-9

8. Xu H, Zhang M, Hudson A. Occupational Health Protection for Health Workers in China With Lessons Learned From the UK: Qualitative Interview and Policy Analysis. Saf Health Work [Internet]. 2021;12(3):304–10. Available from: https://doi.org/10.1016/j.shaw.2021.02.002

9. Konstantinos N, Ouzouni C. Factors influencing stress and job satisfaction of nurses working in psychiatric units: a research review. Heal Sci J [Internet]. 2008;2(4):183–95. Available from: https://www.hsj.gr/medicine/factors-influencing-stress-and-job-satisfaction-of-nurses-working-in-psychiatric-units-a-research-review.php?aid=3653

10. Padma V, Anand NN, Gurukul SMGS, Javid SMASM, Prasad A, Arun S. Health problems and stress in Information Technology and Business Process Outsourcing employees. J Pharm Bioallied Sci. 2015;7(April):S9–13.

11. Belita A, Mbindyo P, English M. Absenteeism amongst health workers - developing a typology to support empiric work in low-income countries and characterizing reported associations. Hum Resour Health. 2013;11(1):1–10.

12. Kinman G. Sickness presenteeism at work: Prevalence, costs and management. Br Med Bull. 2019;129(1):107–16.

13. Work-related stress, anxiety or depression statistics in Great Britain. 2019;(March). Available from: https://www.hse.gov.uk/statistics/causdis/stress.pdf

14. Eshgh ZM, Aghaeinejad A akbar, Peyman A, Amirkhani A, Taghinezhad F, Sheikhi A akbar. The relationship between occupational stresses with job burnout in pre-hospital emergency staff. Hakim Jorjani J. 2015;2(2):33–41.

15. Torshizi L, Ahmadi F. Job Stressors from Clinical Nurses' Perspective. Iran J Nurs. 2011;24(70):49–60.

16. Ghorbanian A, Bahadori M, Nejati M. The relationship between managers' leadership styles and emergency medical technicians' job satisfaction. Australas Med J. 2012;5(1):1–7.

17. Hosseinabadi R, Karampourian A, Beiranvand S, Pournia Y. The effect of quality circles on job satisfaction and quality of work-life of staff in emergency medical services. Int Emerg Nurs [Internet]. 2013;21(4):264–70. Available from: http://dx.doi.org/10.1016/j.ienj.2012.10.002

18. Mohsen Z, K.A.D. A, Gh.H. H, A.A.F. B, M.R. A. Prevalence of job stress among staff of the ports and sailing corporation of Hormozgan and its relation to non fatal accidents. J SHAHID SADOUGHI Univ Med Sci Heal Serv. 2009;17(66):142–8.

19. Soori H, Rahimi M, Mohseni H. Association Between Job Stress and Work-Related Injuries: A Case-Control. Iran J Epidemiol. 2006;1(3):53–8.

20. Srivastava S, Pathak D. Investigating the mediating effect of psychological empowerment on quality of work life-organisational commitment relationship: a study on Indian IT sector managers. Int J Manag Dev. 2016;1(3):196.

21. Anjuman-i Bihdāsht-i Īrān. GN, Dargahi H. Study of Quality of Work Life (QWL). Iran J Public Health. 2006;35(4):8–14.

22. Grote G, Guest D. The case for reinvigorating quality of working life research. Hum Relations. 2017;70(2):149–67.

23. Nazari K, Emami M. Recognition of relationship between occupational stress and satisfication among members of faculty in private and governmental university. Adv Nat Appl Sci. 2012;6(2):219–29.

24. E. AM, M. GF. Reliability And Validity Assessment For The Hse Job Stress Questionnaire. Int J Behav Sci. 2011;4(4):291–7.

25. Azad marzabadi, E, Gholami Fesharaki, M. Reliability and Validity Assessment for the HSE Job Stress Questionnaire. Journal of Behavioral Sciences. 2011: 4(4): 291-297

26. Van Laar D, Edwards JA, Easton S. The Work-Related Quality of Life scale for healthcare workers. J Adv Nurs. 2007;60(3):325–33.

27. Shabaninejad H, Arab M, Rashidian A, Zeraati H, Bahrami S. Quality of working life of Family Physicians in Mazandaran. Hakim Research Journal 2012; 15(2): 178- 184.

28. Eshgh ZM, Aghaeinejad AA, Peyman A, Amirkhani A, Chehregosha M. Relationship between

Occupational Stress and Mental Health in Male Personnel of Medical Emergency in Golestan Province. J Res Dev Nurs Midwifery. 2015;12(1).
29. Baye Y, Demeke T, Birhan N, Semahegn A, Birhanu S. Nurses' work-related stress and associated factors in governmental hospitals in Harar, Eastern Ethiopia: A cross-sectional study. PLoS One [Internet]. 2020;15(8 August):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0236782
30. Mokhtar K, Shikieri A El, Taha EM, Rayan A. The Relationship between Occupational Stressors and Performance amongst Nurses Working in Pediatric and Intensive Care Units. Am J Nurs Res. 2016;4(2):34–40.
31. Emerson M. Wickwire, Jeanne Geiger-Brown, Steven M. Scharf, Christopher L. Drake. Shift Work and Shift Work Sleep Disorder Clinical and Organizational Perspectives. CHEST. 2017; 151(5): 1156-1172.
32. Yang Y, Koh D, Ng V, Lee CY, Chan G, Dong F, et al. Self perceived work related stress and the relation with salivary IgA and lysozyme among emergency department nurses. Occup Environ Med 2002; 59(12): 836-41.
33. Landeweerd JA, Boumans NP. Nurses' work satisfaction and feelings of health and stress in three psychiatric departments. Int J Nurs Stud 1988; 25(3): 225-34.
34. Callaghan P, Tak-Ying SA, Wyatt PA. Factors related to stress and coping among Chinese nurses in Hong Kong. J Adv Nurs 2000; 31(6): 1518-27.
35. Golshiri P, Pourabdian S, Najimi A, Mosa Zadeh H, Hasheminia J. Factors Effective on Job Stress of Nurses Working in Emergency Wards. Journal of Health System Research. 2013; 9(1): 50-6.
36. Khodaveysi M, Mohammadi N, Omidi A. Assessment of job stress in nurses. Scientific Journal of Hamadan Nursing & Midwifery Faculty 2005; 13(2): 44-50.

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Shima Hashemi[1,2], Firoozeh Ghazanfari[3], Mohammed Merzah[4], Mehdi Rezaei[5], Peyman Astaraki[6], Mehdi Birjandi[7]

[1] *Student Research Committee, Lorestan University of Medical Sciences,Khorramabad, Iran*
[2]*Department of Epidemiology, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran*
[3]*Department of Psychology, Faculty of Human Sciences, Lorestan University, Khorramabad, Iran, (corresponding author), E-mail: firoozeh.ghazanfari@yahoo.com*
[4] *Department of Community Health, Technical Institute of Karbala, AlFurat AlAwsat Technical University, Karbala, Iraq*
[5] *Department of psychology, University of Birjand, Birjand, Iran*
[6] *Department of Internal Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran*
[7]*Nutritional Health Research Centre, Lorestan University of Medical Sciences, Khorramabad, Iran*

Table 5: Correlation between HSE-domains and WRQoL factors.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Demand	(0.80)													
2	Control	0.03	(0.74)												
3	Manager support	-0.11*	0.55**	(0.72)											
4	Peer support	-0.20**	0.56**	0.67**	(0.74)										
5	Relationship	0.50**	-0.03	-0.16**	-0.26**	(0.81)									
6	Role	-0.17**	0.34**	0.28**	0.47**	-0.24**	(0.76)								
7	Change	-0.11*	0.54**	**0.72****	0.64**	-0.17**	0.35**	(0.73)							
8	Job career satisfaction	-0.25**	0.31**	0.52**	0.41**	-0.25**	0.25**	0.48**	(0.71)						
9	Control at work	-0.13*	0.40**	0.60**	0.42**	-0.11*	0.22**	0.55**	**0.72****	(0.71)					
10	General well-being	-0.30**	0.45**	0.43**	0.44**	-0.25**	0.34**	0.41**	**0.73****	0.64**	(0.73)				
11	Home-work interface	-0.25**	0.30**	0.50**	0.38**	-0.18**	0.24**	0.41**	**0.77****	0.65**	0.62**	(0.72)			
12	Stress at work	0.38**	-0.02	-0.18**	-0.23**	0.40**	-0.20**	-0.19**	-0.23**	-0.11*	-0.26**	-0.25**	(0.83)		
13	Working conditions	-0.24**	0.24**	0.48**	0.37**	-0.19**	0.30**	0.47**	**0.77****	0.63**	0.64**	**0.72****	-0.28**	(0.72)	
14	Overall quality of working life	-0.30**	0.20**	0.39**	0.30**	-0.18**	0.28**	0.32**	0.66**	0.52**	0.59**	0.52**	-0.29**	0.64**	(0.74)

Note: Pearson's correlation coefficient was used. Alpha reliability coefficients are given in parenthesis.
* P value <0.05, ** P value < 0.01.

Supplementary:

Supplementary table1: Work-related stress (HSE) Categorized by factors (N=430)

Factors	NO	Questions	Response mean (SD)	% non-response
Demands	1	Different groups at work demand things from me that are hard to combine	1.9 (1.01)	1.4
	2	I have unachievable deadlines	1.42(1.12)	1.4
	3	I have to work very intensively	2.72(1.15)	0.2
	4	I have to neglect some tasks because I have too much to do	1.89(1.21)	0.9
	5	I am unable to take sufficient breaks	2.18(1.21)	1.6
	6	I am pressured to work long hours	2.14(1.26)	2.1
	7	I have to work very fast	2.85(1.05)	0.2
	8	I have unrealistic time pressures	1.9(1.15)	1.2
Mean of response (SD)			2.126 (0.468)	
Control	1	I can decide when to take a break	1.95(1.45)	2.1
	2	I have a say in my own work speed	3.11(0.85)	0.9
	3	I have a choice in deciding how I do my work	2.49(1.11)	0.9
	4	I have a choice in deciding what I do at work	2.56(1.16)	1.6
	5	I have some say over the way I work	2.93(0.91)	2.1
	6	My working time can be flexible	2.21(1.18)	1.4
Mean of response (SD)			2.539 (0.432)	
Manger support	1	I am given supportive feedback on the work I do	2.72(0.89)	0.2
	2	I can rely on my line manager to help me out with a work problem	2.74(1.03)	0.9
	3	I can talk to my line manager about something that has upset or annoyed me about work	2.69(1.13)	2.3
	4	I am supported through emotionally demanding work	2.31(1.09)	0.9
	5	My line manager encourages me at work	2.41(1.27)	1.4
Mean of response (SD)			2.576 (0.199)	
Peer Support	1	If work gets difficult, my colleagues will help me	2.92(0.85)	0.9
	2	I get help and support I need from colleagues	2.96(0.81)	2.1
	3	I receive the respect at work I deserve from my colleagues	3.07(0.78)	0.2
	4	My colleagues are willing to listen to my work-related problems	2.62(0.85)	1.6
Mean of response (SD)			2.892 (0.192)	
Relationship	1	I am subject to personal harassment in the form of unkind words or behavior	1.07(1.12)	0.7
	2	There is friction or anger between colleagues	2.11(1.12)	0.9
	3	I am subject to bullying at work	1.69(1.22)	2.3
	4	Relationships at work are strained	2.16(1.28)	0.7
Mean of response (SD)			1.757 (0.505)	
Role	1	I am clear what is expected of me at work	3.3(0.78)	1.6
	2	I know how to go about getting my job done	3.22(0.82)	2.3
	3	I am clear what my duties and responsibilities are	3.24(0.92)	0.9
	4	I am clear about the goals and objectives for my department	2.98(1.05)	0.2
	5	I understand how my work fits into the overall aim of the organization	2.87(0.92)	0.2
Mean of response (SD)			3.121(0.185)	
Change	1	I have sufficient opportunities to question managers about change at work	2.69(1.06)	1.9
	2	Staff are always consulted about change at work	2.69(1.03)	0.9
	3	When changes are made at work, I am clear how they will work out in practice	2.46(0.92)	2.3
Mean of non-response (SD)			2.613 (0.131)	
Overall mean (SD)			2.694 (0.439)	

Supplementary table 2: Work Related Quality of Life (WRQoL) Response (N=430)

NO	Questions	Response average	% non-response
1	I have a clear set of goals and aims to enable me to do my job	2.935	0.2
2	I feel able to voice opinions and influence changes in my area of work	2.746	0.9
3	I have the opportunity to use my abilities at work	2.537	1.6
4	I feel well at the moment	2.958	2.3
5	My employer provides adequate facilities and flexibility for me to fit work in around my family life	2.602	1.6
6	My current working hours / patterns suit my personal circumstances	2.525	0.2
7	I often feel under pressure at work	2.357	0.2
8	When I have done a good job it is acknowledged by my line manager	2.490	1.3
9	Recently, I have been feeling unhappy and depressed	1.980	1.6
10	I am satisfied with my life	2.918	2.3
11	I am encouraged to develop new skills	2.528	1.4
12	I am involved in decisions that affect me in my own area of work	2.585	2.8
13	My employer provides me with what I need to do my job effectively	2.639	1.2
14	My line manager actively promotes flexible working hours / patterns	2.687	1.4
15	In most ways my life is close to ideal	2.387	0.2
16	I work in a safe environment	2.154	1.4
17	Generally things work out well for me	2.346	2.1
18	I am satisfied with the career opportunities available for me here	2.355	1.4
19	I often feel excessive levels of stress at work	2.295	2.5
20	I am satisfied with the training I receive in order to perform my present job	2.544	0.7
21	Recently, I have been feeling reasonably happy all things considered	2.492	1.4
22	The working conditions are satisfactory	2.476	0.2
23	I am involved in decisions that affect members of the public in my own area of work	2.324	0.9
24	I am satisfied with the overall quality of my working life	2.577	1.6
Overall mean (SD)		2.506 (0.553)	

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	Line 1
		Page 1
Introduction		
Background/rationale	2	Line 51-99
Objectives	3	Line 21
Methods		
Study design	4	Line 103
Setting	5	Line 103-112
Participants	6	(*a*) Line 103-106, 114-116
Variables	7	Line 119-145
Data sources/ measurement	8*	Line 104-106
Bias	9	NA
Study size	10	Line 117-118
Quantitative variables	11	NA
Statistical methods	12	(*a*) Line 152-157
		(*b*) NA
		(*c*) NA
		(*d*) NA
		(*e*) NA
Results		
Participants	13*	(a) Line 160
		(b) NA
		(c) NA
Descriptive data	14*	(a) Line 160-167
		(b) NA
Outcome data	15*	Line 206-207
Main results	16	(*a*) Line 170-207
		(*b*) NA
		(*c*) NA
Other analyses	17	NA
Discussion		
Key results	18	Line 36
Limitations	19	Line 255-260
Interpretation	20	Line 262-276
Generalisability	21	NA
Other information		
Funding	22	Line 280-283, 290-291

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-066744.R3
Article Type:	Original research
Date Submitted by the Author:	06-May-2023
Complete List of Authors:	Hashemi, Shima; Lorestan University of Medical Sciences, Department of Health; Ilam University of Medical Sciences, Department of Epidemiology Ghazanfari, Firoozeh; Lorestan University, Department of Psychology, Faculty of Human Sciences Merzah, Mohammed; University of Debrecen Faculty of Medicine, Public Health and Epidemiology Rezaei, Mehdi; University of Birjand, Department of psychology Astaraki, Peyman; Lorestan University of Medical Sciences, Department of Internal Medicine Birjandi, Mehdi; Lorestan University of Medical Sciences, Nutritional Health Research Center
Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health, Public health
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Epidemiology < TROPICAL MEDICINE, PUBLIC HEALTH

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

The relationship between Job Stress and Work-Related Quality of Life among Emergency Medical Technicians: A cross-sectional Study

Shima Hashemi[1,2], Firoozeh Ghazanfari[3], Mohammed Merzah[4], Mehdi Rezaei[5], Peyman Astaraki[6], Mehdi Birjandi[7]

[1] Student Research Committee, Lorestan University of Medical Sciences,Khorramabad, Iran
[2]Department of Epidemiology, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran
[3]Department of Psychology, Faculty of Human Sciences, Lorestan University, Khorramabad, Iran, (corresponding author), E-mail: firoozeh.ghazanfari@yahoo.com
[4] Department of Community Health, Technical Institute of Karbala, AlFurat AlAwsat Technical University, Karbala, Iraq
[5] Department of psychology, University of Birjand, Birjand, Iran
[6] Department of Internal Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran
[7]Nutritional Health Research Centre, Lorestan University of Medical Sciences, Khorramabad, Iran

Corresponding author: Proffesor Firoozeh Ghazanfari, Department of Psychology, Lorestan University, Khorramabad, Iran. E-mail: firoozeh.ghazanfari@yahoo.com, Tel: +989124054816

Abstract

Objective: This study was aimed to determine the relationship between job stress and WRQoL among emergency medical technicians (EMTs) in Lorestan Province, Western Iran.
Design: This was a cross-sectional study.
Methods: Totally 430 emergency medical technicians who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province were selected using single stage cluster sampling method. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-Related Quality of Life (WRQoL). The odd ratio with 95% Confidence Interval (CI) was used to declare the statistical association ($p \leq 0.05$).
Results: All participants were exclusively males, with a mean age of 32±6.87 years. The overall average score of job stress using the HSE scale was 2.69±0.43; while the overall quality of working life score was 2.48±1.01.The type of working shift was found to have a significant impact on the HSE-average score, ($F(3,417) = 5.26$, $P = 0.01$); and on the WRQoL-average score, ($F(3,417) = 6.89$, $P < 0.01$).
Conclusion: Two-thirds of EMTs working in governmental hospitals had job stress and a low quality of work-related life. Additionally, work shift was statistically significant associated with EMTs' job stress and WRQoL.

Keywords: Job stress, Quality of work life, Emergency medical technician, Stress, HSE, WRQoL

STRENGTHS AND LIMITATIONS

1. First study to examine job stress and WRQoL among EMTs in a specific region.
2. Validated questionnaires used for data collection.
3. Sample size sufficient for examining job stress and WRQoL relationship.
4. Cross-sectional design limits temporal association determination.
5. Qualitative methods can provide reliable and rich information on EMTs' experiences with stress.

Introduction:

Working in emergency medicine can be challenging, and healthcare workers are subjected to a variety of pressures (1). Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among them. Additional environmental stressors in the prehospital context include traffic safety concerns and unexpected accident scenes (2). Several studies have demonstrated the alarming prevalence of burnout syndrome, posttraumatic stress disorder (PTSD), and other related health difficulties among first responders and emergency medical service personnel (3)(4)(5)(6)(7). Furthermore, those stressors might cause hostility, aggression, absenteeism, and turnover among emergency medical technicians (EMTs).

Job stress refers to the psychological stress caused by the imbalance between the needs of the target and the individual's ability to adapt to specific job conditions (8). Job stress is one of the most important workplace health risks among employees worldwide (9). One of the complications of modern life is the presence of stress in the workplace (10). It is a common condition of the 21st century that affects people in a variety of conditions and is responsible for absenteeism among health- care workers (11). 137.3 million working days were lost to due to sickness and injury as it is estimated by the UK national statitsics (12). This is only the material dimension of the issue of stress; in addition, stress has a significant impact on employees, their families, and patients (9).

In 2021, job stress (new or long-standing) was the biggest work-related health issue in the UK, which accounted for 50% of all job-related illnesses with an incidence rate of 2,480 per 100,000(13). The cost of sickness and stress-related absenteeism is estimated at 4 billion pounds a year(12). Numerous studies have shown that the job stress experienced by the pre-hospital emergency staff is significantly higher than that of other healthcare workers because they are the first people to be present in a variety of emergencies, from fatal accidents to minor injuries and illnesses (14)(15). Meanwhile, emergency medical technicians face stressful environments such as congested areas and critically ill patients where it is difficult to work (16).

Neglecting the ongoing stress that is inflicted on employees, particularly healthcare workers, would eventually result in a lack of motivation and morale in the staff (17). There is enormous capital lost annually due to the lack of physical and mental health of employees, impaired performance, quitting, and changing jobs due to job stress. Stress and its complications result in the loss of hundreds of working days each year. About 30% of the workforce in developed countries suffers from job stress. The International Labor Organization also estimates that the costs incurred by countries due to job stress are about 1 to 3.5% of GDP and are currently increasing (18)(19).

Work-related quality of life (WRQoL) is an organizational culture or management style in which employees feel ownership, self-reliance, responsibility, and self-esteem(20). WRQoL is a multidimensional structure that includes several concepts such as welfare measures, health services, incentive plans, job fit, job security, job design, importance to the role and position of the individual in the organization, providing growth and development, participation in decision making, reducing job conflicts and ambiguities and education(21). According to the research, companies that provide a better work quality of life for their employees are more successful in retaining their valuable employees and have higher profitability (22). However, job stress reduces the WRQoL and increases the risk of work-related injuries. The WRQoL is critical for organizations to be able to attract and retain human resources (23).

Job stress in emergency medical technicians is typically higher than in other professionals, and since they are often the first healthcare team exposed to different stressful conditions and sick patients, the nature of the job and its contents are in a high level of stress. Research evidence related to job stress among EMTs is limited in the study area.

Lorestan Province in Western Iran is a region that faces numerous challenges, including remote and deprived villages, dilapidated road structures, and the presence of dangerous occupations. Emergency Medical Technicians (EMTs) in this region are particularly vulnerable to these challenges, which can have a significant impact on their job stress and work-related quality of life (WRQoL). Despite the importance of this topic, there have been limited studies that have investigated the relationship between job stress and WRQoL among EMTs in this region. Therefore, the present study aims to fill this gap by examining the relationship between job stress and WRQoL among EMTs in Lorestan Province. By doing so, we hope to provide new insights into the factors that affect the well-being of EMTs in this region and contribute to the development of effective interventions to improve their working conditions and overall quality of life.

Material and methods:

Participants

Single stage cluster approach was used to conduct a cross-sectional survey among 430 emergency medical technicians (EMTs) who had been engaged in their respective units for more than six months from all emergency facilities in Lorestan Province. In this study, single stage cluster sampling method method was used. In this way, each city in Lorestan province was considered as a cluster and participants were selected by simple random sampling based on the proportion of the desired sample in each city. The number of participants was 25, 37, 22, 38, 21, 19, 115, 61, 28, 54, and 10 from Alashtar, Aligoudarz, Azna, Broujerd, Doroud, Dooreh, Khorramabad, Kouhdasht, Nourabad, Poldokhtar, and Sepiddasht, respectively.

This study was approved by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all technicians before participating in the study. The confidentiality principle was maintained so that there was no need to mention the names of the individuals in the questionnaires, and it was assured that the information was just provided to the researcher and used in the study. Data were collected from April to July 2019 using two standard questionnaires: Job Stress (HSE) and Work-related quality of life (WRQoL). Data were collected during all shifts (morning, evening and night), when the (EMTs) were at work at the time being to answer the questions. Eligible emergency medical technicians (EMTs) were those who had been working in their respective units for at least six months and were willing to participate in the study. EMTs who had been working for less than six months or who did not meet the inclusion criteria were excluded. Using Cochran's sample size formula ($n=\frac{Nz^2pq}{Nd^2+z^2pq}=430$) where [z= 1.96, N= 450, p=q= 0.5, d= 0.01], we selected a total of 430 EMTs who met the inclusion criteria.

During our study, there were no female employees or dispatch codes, and the administrative and dispatch and MCHC (Medical Care Monitoring Center) personnel were predominantly female, rendering them ineligible for inclusion in our study. While the Sanjeh Organization has been recruiting female emergency medicine students in large cities like Tehran and has female personnel in dispatch codes in these areas, there are presently no female

personnel in dispatch codes in Lorestan province due to cultural and operational limitations, precluding us from including female patients in our study.

Job Stress Questionnaire: The management standard was assessed using a 35-item indicator tool created by the Health and Safety Executive (HSE) to measure work-related stress among employees. The tool consists of seven items. These items are: (1) Demands (including such issues as workload, work patterns, and the working environment). (2) Control (how much say the person has in the way they do their work). (3 & 4) Manager and peers' support (including the encouragement, sponsorship, and resources provided by the organization, line management, and colleagues). (5) Relationships at work (including promoting positive working practices to avoid conflict and dealing with unacceptable behaviour). (6) Role (whether people understand their role within the organization and whether the organization ensures that the person does not have conflicting roles). (7) Change (how organizational change (large or small) is managed and communicated in the organization). The validity of the HSE-scale was 83% (α=0.83). This questionnaire contains 35 questions with 7 subscales. The subscales are: 1- Demand: questions number (18, 6, 9, 12, 16, 3, 20, 22), 2- Control (30, 10, 15, 19, 25, 2), 3- Officials support (7, 27, 24, 31), 4- Colleagues support (8, 23, 29, 33, 35), 5- Relationship (5, 14, 21, 34), 6- Role (1, 7, 11, 13, 17) and 7- Changes (32, 28, 26). The Likert scale was defined as Strongly disagree: 0, Disagree: 1, No opinion: 2, Agree: 3, Strongly agree: 4. All 7 stress-items were scored on a scale of 1 to 4 ranged between 7 to 28. Those above and those below the median value 16, were signified as more and less job stress respectively (24). The validity and reliability of the Persian version of the questionnaire was %78 and %65 using the Cronbach's Alpha and split-half method, respectively and HSE is a valid and reliable questionnaire for studying job stress (25).

Work-Related Quality of Life Questionnaire (WRQoL): This is a multidimensional concept that includes job and professional satisfaction factors, working conditions, general health status, home-work relationship, work stress, and work control. The questionnaire comprises a five-Likert scale from strongly disagree to strongly agree 1 to 5 (25). The validity of the questionnaire was confirmed by experts, and its reliability was determined by the test-retest method. The questions had a 95% correlation value, while the alpha Cronbach coefficient for determining the internal relevance of the questions was 78%. The scale's reliability was 79% (α=0.79). Subscale scores are as: Job and Career Satisfaction (JCS) with a sub-scale reliability of 0-86 (item 5), General Well-Being (GWB) 0-82 (item 18), Home–Work Interface (HWI) 0-82 (item 17), Stress at Work (SAW) 0-81 (item 7), Control at Work (CAW) 0-81 (item 12) and Working Conditions (WCS) 0-75 (item 9)(26). The validity and reliability of the Persian version of the questionnaire was %95 and %78 using the Cronbach's Alpha and it is a valid and reliable questionnaire (27)

Patient and Public Involvement

This was a cross-sectional study that meaningfully engaged all emergency medical technicians working in different cities of Lorestan province in identifying priority research questions, research training, all facets of recruitment and data collection, and in interpreting the results and co-authoring this manuscript. Additionally, we trained them in the informal settlements of the study conducted in their workplaces, who contributed likewise to informing the study focus, and data collection efforts.

Statistical analysis

Descriptive statistics were used to determine the characteristics of participants and the overall scores of job-stress and work-related quality of life. Pearson correlation was used to assess the correlation between the domains of the two questionnaires (HSE and WRQoL). The odd ratio at (95% CI, P-value≤0.05) was used to declare the statistical association. All analyses were done using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Results:

All 430 emergency medical technicians (EMTs) who participated in this study were exclusively male (100%), with a mean age of 32±6.87 years. Based on their educational level, 19.2% held a diploma while the rest (80.8%) had an academic education degree, additionally 58.9% of them were maried. Totally 115 (30.5%) of them were students while they were working simuntaneously and 395 (91.9%) of them were officially hired by the organization. All other socio-demographic characteristics of the participant are provided in Table 1.

Table 1. Demographic characteristics of the Emergency Medical Technicians (ETMs) (N=430)

Variables [N*]	Categories	n (%)
Age (years) [427]	20-30	222 (51.5)
	30-40	146 (33.9)
	40-50	56 (13.0)
	50-60	3 (0.7)
Education Level [406]	Diploma	78 (19.2)
	Associated Degree	235 (57.9)
	Bachelor	90 (22.2)
	Master	3 (0.7)
Marital Status [406]	Single	167 (41.1)
	Married	239 (58.9)
Employment History (years) [410]	0-5	162(37.6)
	6-10	190(44.2)
	11-15	13(3.1)
	>15	45(10.5)
Native Status [412]	Native to the city	225 (52.3)
	Native to the province	127 (29.5)
	Non-indigenous	60 (14.0)
Working Shift Status [421]	Constant morning shift	6 (1.4)
	Circulating shift	51 (11.9)
	24-hour shift	228(53.0)
	48-hour shift	136 (31.6)
Major [390]	Public Health	3 (0.7)
	Medical emergencies	269 (62.6)
	Accounting	6 (1.4)
	Anesthesia	17 (4.0)
	Mechanics	3 (0.7)
	Crisis Management	5 (1.2)
	Emergency and disaster management	8 (1.9)
	Humanities	52 (12.1)
	Science	8 (1.9)
	Operating room technology	6 (1.4)
	Nursing	13 (3.0)
Number of Shifts (per month)	<10	36 (9.0)

[401]	10-12	293 (73.0)
	≥13	72 (18.0)
Locale of Service	Urban Bases	150 (37.1)
[404]	Road Stations	179 (44.3)
	Urban and Road Bases	75 (18.6)
Type of Bases Location	Canopies	55 (15.0)
[367]	Building	312 (85.0)

*Number of responses for each variables.

Emergency Medical Technicians (EMTs) with a master's degree had the highest HSE (3.5±0.01) and WRQoL (4.0±0.01) average scores. Regarding martial status, native status, and length of service, there were no significant differences of them, neither with HSE nor with WRQoL average scores. However, the type of working shift had a significant impact on the HSE-average score, $F\ (3,417) = 5.26$, $P = 0.01$; and on the WRQoL-average score, F (3,417) = 6.89, P< 0.01, as the highest average scores were reported among those who worked on the 48-hour shift (2.79±0.46) of the HSE, and the fixed morning shift (2.87±0.01) of the WRQoL.

The overall average score of job stress using the HSE scale was (2.69±0.43), with peer support as the highest stressor domain among EMTs (2.89±0.63). While the overall quality of working life score was (2.48±1.01), with control at work as the highest factor that might impact the quality of working life (2.47±0.90). (See Table 2 for more details) Generally, 73.5% of respondents reported having work-related stress, with 46% having a low work-related quality of life (lower than the overall mean). The reposne rate for each specific question of the HES and WRQoL standards was provided in supplementary tables 1 and 2.

Table 2: Stressor domain scores and work related quality of life scores by factors among the EMTs (N=430)

	Domains and Factors	n	Score Mean (SD)	95% CI
Stressor domains	Demand	405	2.11 (0.56)	1.93-2.08
	Control	402	2.54 (0.60)	2.44-2.59
	Manager's support	410	2.58 (0.82)	2.48-2.67
	Peer's support	413	2.89 (0.63)	2.82-2.98
	Relationship	414	1.75 (0.81)	1.58-1.78
	Role	415	3.12(0.64)	3.00-3.16
	Change	411	2.61 (0.80)	2.62-2.71
	Overall HSE (N)	**430**	**2.69 (0.43)**	**2.65-2.73**
WRQoL- factors	Job career satisfaction	410	2.39 (0.77)	2.30-2.48
	Control at work	413	2.47 (0.90)	2.37 -2.58
	General well-being	393	2.45 (0.54)	2.38-2.51
	Home-work interface	422	2.44 (1.01)	2.32-2.55
	Stress at work	420	1.96(1.00)	1.84-2.08
	Working conditions	423	2.12 (0.98)	2.00-2.23
	Overall quality of working life	**424**	**2.48 (1.01)**	**2.35-2.60**

The difference in scores between demographic variables are shown in Table 3.

Table 3: Difference in HSE and WRQoL scores between demographic variables

Variable	Category	n	Sum. HSE Mean±SD	Sum. WRQoL Mean±SD
Education Level	Diploma	78	60.70±10.90	56.78±15..42
	Associated Degree	235	61.84±7.93	57.88±14.62
	Bachelor	90	60.76±9.36	57.28±15.50
	Master	3	80.00±0.00	91.66±0.00
Marital Status	Single	167	61.28±9.83	57.62±13.38
	Married	239	62.27±8.85	58.50±15.55
Native Status	Native to the city	225	61.95±9.41	57.80±14.50
	Native to the province	127	61.31±7.59	56.31±14.30
	Non-indigenous	60	62.78±11.21	61.51±18.68
Working Shift Status	Constant morning shift	6	60.71±5.47	74.47±2.85
	Circulating shift	51	63.54±5.72	55.65±4.93
	24-hour shift	228	60.91±10.13	56.29±14.58
	48-hour shift	136	62.01±9.00	60.08±18.20
Locale of Service	Urban Bases	150	65.17±7.49	62.16±13.26
	Road Stations	179	61.24±9.83	56.79±15.92
	Urban and Road Bases	75	57.77±8.25	52.77±14.99
Type of Bases Location	Canopies	55	63.24±11.09	56.57±18.99
	Building	312	62.25±8.89	58.52±13.96

Among the participants, 1.4% had between 0-5 shifts, 52.8% between 6-10 shifts and 39.1% between 11-15 shifts per month. Based on the results, most of the EMTs 337(78.37%) had a moderate level of job stress, 48(11.16%) low and 45(10.46%) had severe job stress. Based on the Tukey's result, there was no significant relationship between job stress and none of the sub-groups related to employment type ($p > 0.05$). Table 4

Table 4. Correlation between job stress and demographic factors on quality of work life among EMTs based on multiple regression model. n=234

Variable	Mean±SD	ß	t	P-Value
Educational level	2.09±0.66	-0.53	-0.39	0.69
Marital status	1.57±0.49	0.69	0.35	0.72
Job status	8.19±5.97	0.71	3.16	0.002
Shifts per month	11.03±2.36	0.57	1.58	0.11
Job stress score (HSE)	62.14±8.64	0.76	7.98	<0.001
Quality of work life score (QWL)	58.80±13.92			

To assess the linear relationship between stresser domains and WRQoL factors, pearson correlation was used (Table 4). There were a strong positive relationship between two domains of HSE, which are peer support and the change ($r = 0.72$, $N = 394$, $p<0.001$). In other words, increasing the peers' support in work environment the higher the change might apply. Regarding the WRQoL factors, however, job career satisfaction was found to have a significant positive impact on control at work ($r = 0.72$, $N = 395$, $P<0.001$), general well-being ($r = 0.72$, $N = 379$,

P<0.001), home-work interference (r = 0.77, N = 407, P<0.001), and working conditions (r = 0.77, N = 407, P<0.001). (See Supplementary Table. 1)

Discussion

Emergency medical personnel work in an inherently stressful environment, as they are often the first healthcare team to respond to critical and traumatic incidents. This constant exposure to high-pressure situations and sick patients can result in significant levels of job stress. Despite the challenges faced by emergency medical technicians (EMTs), research on job stress in this profession is limited in the study area. Therefore, to bridge this gap in the literature, we conducted a study aimed at exploring the relationship between job stress and the quality of work-life among EMT personnel in Lorestan province. By understanding the impact of job stress on the quality of work-life, we can identify strategies and interventions that promote better mental health and well-being for EMTs.

The findings of the present study indicate that a substantial proportion of EMTs, comprising 337 (78.37%), experienced moderate levels of job stress (M, 2.69; IC, 2.65-2.73). This result aligns with a previous study conducted by Ashgh et al., which reported that male emergency employees in Golestan province experienced moderate work stress (28). Similarly, a study on emergency physicians demonstrated that repetitive exposure to critical incidents, such as the death of a child or adolescent, can result in a subclinical level of anxiety(7). Regarding WRQoL, the overall quality of work life among EMTs was found to be slightly lower than moderate (M, 2.48; IC, 2.35-2.60). This result is consistent with the findings of a cross-sectional analysis of 908 health employees from 15 hospitals, which revealed that a majority of participants reported dissatisfaction with occupational health and safety and uninteresting work (21). Moreover, high levels of WRQoL were found to have a protective effect, as high levels of stress and low levels of WRQoL not only impact EMTs but also negatively affect patient care (7).

In the present study, a significant association was found between work shift and work-related stress. Rotating shift EMTs were more stressed than fixed-shift EMTs. This finding was consistent with research reported in Ethiopia (29) and Jordan(30), which indicated that employees working on rotating shifts were more stressed than their counterparts who worked on fixed shifts; however, those studies were done on nurses. Rotating shift work can disrupt the natural circadian rhythm of the body, leading to sleep deprivation and exhaustion. This can increase the likelihood of errors and decrease work performance, causing more stress for the EMTs. Additionally, rotating shift work can make it difficult to maintain a healthy work-life balance, which can also contribute to higher levels of stress (31). It may be helpful to include suggestions for potential solutions, such as offering more flexible scheduling options or providing resources for stress management and coping strategies. Therefore, working on a fixed shift might be beneficial in improving the WRQoL, as the current study reported.

Change in the work place form emergency wards to other wards suited to the employee, by their choice, was found to be related to the peers' and managers' support. A lack of social support among emergency care personnel is a well-known predictor of occupational stress (7). A study found that facilitating social support from coworkers can help in the rehabilitation process after being confronted with traumatic experiences and occupational dangers among those who work in EM(7). Yang et.al (2002) also reported similar results on the difference between job stress of nurses in the emergency department compared to other departments (32). Employees working in different departments of the hospital experience different degrees of job stress due to their types of activities (33). However, few studies reported a low level of job stress for nurses in comparison to other employees (34); perhaps it is due to, in addition to the differences in the populations studied, the adjustment of nurses to severe and chronic conditions with stressful working conditions compared to other employees. In the present study, it was found that there was no significant difference between the mean score of job stress and marital status, education level, native status, type of employment and type of base location, while the relationship between the mean of job stress score and working shift status and employment history were significant. According to a study conducted by Golshiri et al. (2013), it was found that there is a significant reverse relationship between the employment history and the level of job stress; in other words, the higher job experience, the lower job stress is. Accordingly, it can be concluded that the most compatibility of nurses with the unique status of the medical emergency department and the increase in work skills and work experience as a result of increasing the job record is one that can explain this relationship (35). In the study of Khodaveysi et.al (2005), they approved that the increase in skills and work experience due to the increase in job records was mentioned as the most important factors in job stress (36).

The present study is not without limitations. Firstly, the cross-sectional study design utilized in this investigation precludes us from determining a temporal association between stress and WRQoL. Augmenting the quantitative approach with qualitative methods, which offer in-depth and trustworthy information on EMTs' stress experiences and related concepts, may have enhanced the study's findings. Semi-structured interviews or focus groups could be used to obtain detailed information on specific stressors and coping strategies experienced by EMTs. Additionally, the use of observational methods could provide insights into the nonverbal behaviors and interactions that occur between EMTs and their patients, which may impact their stress levels and WRQoL. By incorporating such qualitative methods, the study could have achieved a more nuanced understanding of the complex and multidimensional nature of stress and its impact on EMTs. Lastly, an important limitation is the gender bias in the Emergency Medical Services centers in Lorestan province. During our study, there were no female employees or dispatch codes, and the administrative and dispatch and MCHC (Medical Care Monitoring Center) personnel were predominantly female, rendering them ineligible for inclusion in our study. While the Sanjeh Organization has been recruiting female emergency medicine students in large cities like Tehran and has female personnel in dispatch codes in these areas, there are presently no female personnel in dispatch codes in Lorestan province due to cultural and operational limitations, precluding us from including female patients in our study. Furthermore, the study did not provide detailed information about the conditions of the research environment, such as the types of emergencies that the workers were responding to or the work schedules and procedures. These conditions may have affected the level of job stress and the quality of work life of the EMTs. Therefore, future

studies should take into account the specific characteristics of the work environment to better understand the factors that contribute to job stress and work quality of life among EMTs. In addition, future research could explore the perspectives of EMTs themselves, as well as those of their supervisors and colleagues, to gain a more comprehensive understanding of the work-related stressors and their impact on the quality of work life in this profession. By addressing these limitations, future studies can help to inform the development of effective interventions and policies aimed at reducing job stress and improving the quality of work life among EMT personnel.

Conclusion

This study determined the level of job stress and its relation to the WRQoL among EMT personnel working in government hospitals in Lorestan, Iran. Based on the evidence provided from the current analysis, two-third of EMTs working in governmental hospitals had work-related stress. Work shift was statistically significantly associated with EMTs' work-related stress and WRQoL. In this study, peer support was found to be the most stressful domain among EMTs; while the control domain at work was the highest factor that might impact the quality of working life. It is likely that EMT personnel may have a tremendous role in the health care delivery system world-wide, especially in emergency situations. Critical incident exposure, workplace aggression, unpredictability, workload, and time pressure are among the challenges that EMTs may face during their work. In the mean time, EMTs' experienced work-related stress and low WRQoL may affect not only the health care services but also might increase medical errors and resource expenditure. It would seem that to improve the quality of work among EMTs, the urgent need for organizational interventions aim to diminish work-related stress could be used as a comprehensive assessment. Moreover, rescheduling should be explored as a strategy for reducing stress caused by shift work. To demonstrate a true cause-and-effect link, more research employing a mixed-method and analytical design in government and commercial health institutions is recommended.

Declarations:

Ethical Approval and Consent to participate:

Human Participants with the ethical approval ID: IR.LUMS.REC.1397-1-99-1254. This study was approved and funded by the institutional review of Lorestan University of medical Sciences. Written informed consent and verbal agreement was taken from all participants. All experimental protocols were approved by Lorestan University of Medical Sciences and the ethical approval ID is: IR.LUMS.REC.1397-1-99-1254.

Consent for publication:

Not applicable.

Availability of supporting data:

All data generated or analyzed during this study are included in this published article.

Competing interests

Not applicable.

Funding:

This study was funded by Lorestan University of Medical Sciences.

Author's contributions:

H.Sh, Gh.F, and A.P, conceptualized and designed the main idea of this study. H.Sh, and R.M. designed the data extraction file, extracted data, and interpreted data. M.M, and B.M. analysed the data. All authors wrote the initial draft of the manuscript and approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

Acknowledgment:

Researchers express their sincere gratitude to all ETMs that participated in the study.

References

1. Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. Cogn Behav Ther [Internet]. 2017;46(6):522–32. Available from: http://doi.org/10.1080/16506073.2017.1315612
2. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion Satisfaction, Burnout, and Compassion Fatigue Among Emergency Nurses Compared With Nurses in Other Selected Inpatient Specialties. J Emerg Nurs [Internet]. 2010;36(5):420–7. Available from: http://dx.doi.org/10.1016/j.jen.2009.11.027
3. Haile KK, Asnakew S, Waja T, Kerbih HB. Shift work sleep disorders and associated factors among nurses at federal government hospitals in Ethiopia: A cross-sectional study. BMJ Open. 2019;9(8):1–8.
4. Hegg-Deloye S, Brassard P, Jauvin N, Prairie J, Larouche D, Poirier P, et al. Current state of knowledge of post-traumatic stress, sleeping problems, obesity and cardiovascular disease in paramedics. Emerg Med J. 2014;31(3):242–7.
5. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psychiatry Psychiatr Epidemiol [Internet]. 2018;53(9):897–909. Available from: http://dx.doi.org/10.1007/s00127-018-1539-5
6. Ayyala RS, Ahmed FS, Ruzal-Shapiro C, Taylor GA. Stressors contributing to burnout amongst pediatric radiologists: results from a survey of the Society for Pediatric Radiology. Pediatr Radiol. 2019;49(6):714–22.
7. Somville FJ, De Gucht V, Maes S. The impact of occupational hazards and traumatic events among Belgian emergency physicians. Scand J Trauma Resusc Emerg Med [Internet]. 2016;24(1). Available from: http://dx.doi.org/10.1186/s13049-016-0249-9
8. Xu H, Zhang M, Hudson A. Occupational Health Protection for Health Workers in China With Lessons Learned From the UK: Qualitative Interview and Policy Analysis. Saf Health Work [Internet]. 2021;12(3):304–10. Available from: https://doi.org/10.1016/j.shaw.2021.02.002
9. Konstantinos N, Ouzouni C. Factors influencing stress and job satisfaction of nurses working in psychiatric units: a research review. Heal Sci J [Internet]. 2008;2(4):183–95. Available from: https://www.hsj.gr/medicine/factors-influencing-stress-and-job-satisfaction-of-nurses-working-in-psychiatric-units-a-research-review.php?aid=3653
10. Padma V, Anand NN, Gurukul SMGS, Javid SMASM, Prasad A, Arun S. Health problems and stress in Information Technology and Business Process Outsourcing employees. J Pharm Bioallied Sci. 2015;7(April):S9–13.
11. Belita A, Mbindyo P, English M. Absenteeism amongst health workers - developing a typology to support empiric work in low-income countries and characterizing reported associations. Hum Resour Health. 2013;11(1):1–10.
12. Kinman G. Sickness presenteeism at work: Prevalence, costs and management. Br Med Bull. 2019;129(1):107–16.
13. Work-related stress, anxiety or depression statistics in Great Britain. 2019;(March). Available from: https://www.hse.gov.uk/statistics/causdis/stress.pdf

14. Eshgh ZM, Aghaeinejad A akbar, Peyman A, Amirkhani A, Taghinezhad F, Sheikhi A akbar. The relationship between occupational stresses with job burnout in pre-hospital emergency staff. Hakim Jorjani J. 2015;2(2):33–41.
15. Torshizi L, Ahmadi F. Job Stressors from Clinical Nurses' Perspective. Iran J Nurs. 2011;24(70):49–60.
16. Ghorbanian A, Bahadori M, Nejati M. The relationship between managers' leadership styles and emergency medical technicians' job satisfaction. Australas Med J. 2012;5(1):1–7.
17. Hosseinabadi R, Karampourian A, Beiranvand S, Pournia Y. The effect of quality circles on job satisfaction and quality of work-life of staff in emergency medical services. Int Emerg Nurs [Internet]. 2013;21(4):264–70. Available from: http://dx.doi.org/10.1016/j.ienj.2012.10.002
18. Mohsen Z, K.A.D. A, Gh.H. H, A.A.F. B, M.R. A. Prevalence of job stress among staff of the ports and sailing corporation of Hormozgan and its relation to non fatal accidents. J SHAHID SADOUGHI Univ Med Sci Heal Serv. 2009;17(66):142–8.
19. Soori H, Rahimi M, Mohseni H. Association Between Job Stress and Work-Related Injuries: A Case-Control. Iran J Epidemiol. 2006;1(3):53–8.
20. Srivastava S, Pathak D. Investigating the mediating effect of psychological empowerment on quality of work life-organisational commitment relationship: a study on Indian IT sector managers. Int J Manag Dev. 2016;1(3):196.
21. Anjuman-i Bihdāsht-i Īrān. GN, Dargahi H. Study of Quality of Work Life (QWL). Iran J Public Health. 2006;35(4):8–14.
22. Grote G, Guest D. The case for reinvigorating quality of working life research. Hum Relations. 2017;70(2):149–67.
23. Nazari K, Emami M. Recognition of relationship between occupational stress and satisfication among members of faculty in private and governmental university. Adv Nat Appl Sci. 2012;6(2):219–29.
24. E. AM, M. GF. Reliability And Validity Assessment For The Hse Job Stress Questionnaire. Int J Behav Sci. 2011;4(4):291–7.
25. Azad marzabadi, E, Gholami Fesharaki, M. Reliability and Validity Assessment for the HSE Job Stress Questionnaire. Journal of Behavioral Sciences. 2011: 4(4): 291-297
26. Van Laar D, Edwards JA, Easton S. The Work-Related Quality of Life scale for healthcare workers. J Adv Nurs. 2007;60(3):325–33.
27. Shabaninejad H, Arab M, Rashidian A, Zeraati H, Bahrami S. Quality of working life of Family Physicians in Mazandaran. Hakim Research Journal 2012; 15(2): 178- 184.
28. Eshgh ZM, Aghaeinejad AA, Peyman A, Amirkhani A, Chehregosha M. Relationship between Occupational Stress and Mental Health in Male Personnel of Medical Emergency in Golestan Province. J Res Dev Nurs Midwifery. 2015;12(1).
29. Baye Y, Demeke T, Birhan N, Semahegn A, Birhanu S. Nurses' work-related stress and associated factors in governmental hospitals in Harar, Eastern Ethiopia: A cross-sectional study. PLoS One [Internet]. 2020;15(8 August):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0236782
30. Mokhtar K, Shikieri A El, Taha EM, Rayan A. The Relationship between Occupational Stressors and Performance amongst Nurses Working in Pediatric and Intensive Care Units. Am J Nurs Res. 2016;4(2):34–40.
31. Emerson M. Wickwire, Jeanne Geiger-Brown, Steven M. Scharf, Christopher L. Drake. Shift Work and Shift Work Sleep Disorder Clinical and Organizational Perspectives. CHEST. 2017; 151(5): 1156-1172.
32. Yang Y, Koh D, Ng V, Lee CY, Chan G, Dong F, et al. Self perceived work related stress and the relation with salivary IgA and lysozyme among emergency department nurses. Occup Environ Med 2002; 59(12): 836-41.
33. Landeweerd JA, Boumans NP. Nurses' work satisfaction and feelings of health and stress in three psychiatric departments. Int J Nurs Stud 1988; 25(3): 225-34.
34. Callaghan P, Tak-Ying SA, Wyatt PA. Factors related to stress and coping among Chinese nurses in Hong Kong. J Adv Nurs 2000; 31(6): 1518-27.
35. Golshiri P, Pourabdian S, Najimi A, Mosa Zadeh H, Hasheminia J. Factors Effective on Job Stress of Nurses Working in Emergency Wards. Journal of Health System Research. 2013; 9(1): 50-6.
36. Khodaveysi M, Mohammadi N, Omidi A. Assessment of job stress in nurses. Scientific Journal of Hamadan Nursing & Midwifery Faculty 2005; 13(2): 44-50.

Supplementary:

Supplementary table1: Work-related stress (HSE) Categorized by factors (N=430)

Factors	NO	Questions	Response mean (SD)	% non-response
Demands	1	Different groups at work demand things from me that are hard to combine	1.9 (1.01)	1.4
	2	I have unachievable deadlines	1.42(1.12)	1.4
	3	I have to work very intensively	2.72(1.15)	0.2
	4	I have to neglect some tasks because I have too much to do	1.89(1.21)	0.9
	5	I am unable to take sufficient breaks	2.18(1.21)	1.6
	6	I am pressured to work long hours	2.14(1.26)	2.1
	7	I have to work very fast	2.85(1.05)	0.2
	8	I have unrealistic time pressures	1.9(1.15)	1.2
Mean of response (SD)			2.126 (0.468)	
Control	1	I can decide when to take a break	1.95(1.45)	2.1
	2	I have a say in my own work speed	3.11(0.85)	0.9
	3	I have a choice in deciding how I do my work	2.49(1.11)	0.9
	4	I have a choice in deciding what I do at work	2.56(1.16)	1.6
	5	I have some say over the way I work	2.93(0.91)	2.1
	6	My working time can be flexible	2.21(1.18)	1.4
Mean of response (SD)			2.539 (0.432)	
Manger support	1	I am given supportive feedback on the work I do	2.72(0.89)	0.2
	2	I can rely on my line manager to help me out with a work problem	2.74(1.03)	0.9
	3	I can talk to my line manager about something that has upset or annoyed me about work	2.69(1.13)	2.3
	4	I am supported through emotionally demanding work	2.31(1.09)	0.9
	5	My line manager encourages me at work	2.41(1.27)	1.4
Mean of response (SD)			2.576 (0.199)	
Peer Support	1	If work gets difficult, my colleagues will help me	2.92(0.85)	0.9
	2	I get help and support I need from colleagues	2.96(0.81)	2.1
	3	I receive the respect at work I deserve from my colleagues	3.07(0.78)	0.2
	4	My colleagues are willing to listen to my work-related problems	2.62(0.85)	1.6
Mean of response (SD)			2.892 (0.192)	
Relationship	1	I am subject to personal harassment in the form of unkind words or behavior	1.07(1.12)	0.7
	2	There is friction or anger between colleagues	2.11(1.12)	0.9
	3	I am subject to bullying at work	1.69(1.22)	2.3
	4	Relationships at work are strained	2.16(1.28)	0.7
Mean of response (SD)			1.757 (0.505)	
Role	1	I am clear what is expected of me at work	3.3(0.78)	1.6
	2	I know how to go about getting my job done	3.22(0.82)	2.3
	3	I am clear what my duties and responsibilities are	3.24(0.92)	0.9
	4	I am clear about the goals and objectives for my department	2.98(1.05)	0.2
	5	I understand how my work fits into the overall aim of the organization	2.87(0.92)	0.2
Mean of response (SD)			3.121(0.185)	
Change	1	I have sufficient opportunities to question managers about change at work	2.69(1.06)	1.9
	2	Staff are always consulted about change at work	2.69(1.03)	0.9
	3	When changes are made at work, I am clear how they will work out in practice	2.46(0.92)	2.3
Mean of non-response (SD)			2.613 (0.131)	
Overall mean (SD)			2.694 (0.439)	

Supplementary table 2: Work Related Quality of Life (WRQoL) Response (N=430)

NO	Questions	Response average	% non-response
1	I have a clear set of goals and aims to enable me to do my job	2.935	0.2
2	I feel able to voice opinions and influence changes in my area of work	2.746	0.9
3	I have the opportunity to use my abilities at work	2.537	1.6
4	I feel well at the moment	2.958	2.3
5	My employer provides adequate facilities and flexibility for me to fit work in around my family life	2.602	1.6
6	My current working hours / patterns suit my personal circumstances	2.525	0.2
7	I often feel under pressure at work	2.357	0.2
8	When I have done a good job it is acknowledged by my line manager	2.490	1.3
9	Recently, I have been feeling unhappy and depressed	1.980	1.6
10	I am satisfied with my life	2.918	2.3
11	I am encouraged to develop new skills	2.528	1.4
12	I am involved in decisions that affect me in my own area of work	2.585	2.8
13	My employer provides me with what I need to do my job effectively	2.639	1.2
14	My line manager actively promotes flexible working hours / patterns	2.687	1.4
15	In most ways my life is close to ideal	2.387	0.2
16	I work in a safe environment	2.154	1.4
17	Generally things work out well for me	2.346	2.1
18	I am satisfied with the career opportunities available for me here	2.355	1.4
19	I often feel excessive levels of stress at work	2.295	2.5
20	I am satisfied with the training I receive in order to perform my present job	2.544	0.7
21	Recently, I have been feeling reasonably happy all things considered	2.492	1.4
22	The working conditions are satisfactory	2.476	0.2
23	I am involved in decisions that affect members of the public in my own area of work	2.324	0.9
24	I am satisfied with the overall quality of my working life	2.577	1.6
Overall mean (SD)		2.506 (0.553)	

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	Line 1
		Page 1
Introduction		
Background/rationale	2	Line 51-99
Objectives	3	Line 21
Methods		
Study design	4	Line 103
Setting	5	Line 103-112
Participants	6	(*a*) Line 103-106, 114-116
Variables	7	Line 119-145
Data sources/ measurement	8*	Line 104-106
Bias	9	NA
Study size	10	Line 117-118
Quantitative variables	11	NA
Statistical methods	12	(*a*) Line 152-157
		(*b*) NA
		(*c*) NA
		(*d*) NA
		(*e*) NA
Results		
Participants	13*	(a) Line 160
		(b) NA
		(c) NA
Descriptive data	14*	(a) Line 160-167
		(b) NA
Outcome data	15*	Line 206-207
Main results	16	(*a*) Line 170-207
		(*b*) NA
		(*c*) NA
Other analyses	17	NA
Discussion		
Key results	18	Line 36
Limitations	19	Line 255-260
Interpretation	20	Line 262-276
Generalisability	21	NA
Other information		
Funding	22	Line 280-283, 290-291

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.