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Development and Validation of the Emergency Medical Technicians Occupational Stress Scale

Abdulrahman Jubayr ALyasi[1], Naif Aali Hossan Alsolmi[2], RAED MAUID ALTHUBITY[3], Tail khalaf alolyani[4], MOHAMMED MUSLIH ALMASOUDI[5], Rayan Ali Alharbi[6], Wadei Abdullah Badarb[7] and Yahya Dahal Mahnashi[8]

Abstract

Introduction. The population of interested workers for this study included Emergency Medical Technicians (EMTs) in the United States. This group of workers was chosen because of the nature of their work, which requires their presence at the scenes of life and death situations. Certainly, their work conditions can have an effect on their psychological well-being. Yet, the work of these workers, with all of its stressors, has not been adequately studied through the use of appropriate measuring instruments. Emergency Medical Technicians are not unknown in occupational stress research. This report discusses previous studies on EMT workers and occupational stressors and explains the curative process through the development and validation of an EMT Occupational Stress Scale. The report also highlights the psychometric investigation of this scale. Paramedics/EMTs face increased risk of physical and psychological stress due to the nature of their work. It is crucial to understand the stressors affecting their well-being in order to develop appropriate management strategies. Research suggests that EMTs may lack preparation for their roles, requiring additional training in empathy and emotional intelligence. The relationship between stressors experienced and clinical service provided needs further investigation. Standardized measures of stress for paramedics/EMTs are lacking and more comprehensive instruments are needed. This report aims to develop a comprehensive stress scale specifically for EMTs/paramedics, addressing validation concerns and incorporating environmental stress within a larger theoretical framework. Methods. This study was This study was conducted using a mixed-methods approach to develop and validate the Emergency Medical Technicians Occupational Stress Scale. The scale was pilot tested with a sample of EMTs to ensure reliability and validity. by the ethics committee and is based on a literature review. The Canadian EMT Job Satisfaction Questionnaire was used to measure organizational stress levels of EMTs. The questionnaire was reviewed by professionals and academics, resulting in the inclusion of five new items. The final item list consisted of 58 questions. Permission was obtained. Results. The outcomes and findings obtained from the comprehensive study conducted on the Development and Validation of the Emergency Medical Technicians Occupational Stress Scale have shed light on significant discoveries pertaining to the intricate realm of stress levels experienced by our dedicated EMT professionals. Conclusion. The rapidly evolving scope of Emergency Medical Services (EMS) practice has placed increasing demands on the relatively small professional community that consists of EMTs and paramedics. An Occupational Stress model was developed to examine interpersonal work stressors unique to the EMT role, and a measure was developed to assess the construct. Initial results suggest that the OSM is an accurate, reliable, and potentially valuable assessment tool. High levels of interpersonal stress may influence the EMTs to cope with their daily activities by seeking outlets for tension and depression through increased use of alcohol, legal drugs, and caffeine. Alcohol is used more frequently than other legal drugs are to modify interpersonal stress symptoms. The EMTs are in a prime position to help each other identify these symptoms when arising and offer assistance. Staff stress management programs are essential in solving and preventing occupational stress. A move toward prevention rather than reaction to such stress, which for many results in alcoholism, drug addiction, or job related emotional illness, will serve to preserve the health of the EMTs. The medical community has a vested interest in the health of these dedicated professionals. Not only does such prevention attempt to manage the human tragedy of alcoholism, legal drug addiction, and job related emotional illness, but it also prevents the more tangible, but no less important cost factors to the EMT.

Keywords: *EMTs, First Aid, Red Crescent, Ambulance*

[1] Emergency medical technician saudi red crescent authority. E-mail: Shsh-5522@hotmail.com

[2] Emergency medical technician saudi red crescent authority.

[3] Emergency medical technician saudi red crescent authority.

[4] Emergency medical technician saudi red crescent authority.

[5] Emergency medical technician saudi red crescent authority

[6] Emergency medical technician saudi red crescent authority

[7] Emergency medical technician saudi red crescent authority

[8] Emergency medical technician saudi red crescent authority.

INTRODUCTION

Background and Rationale

Occupational stress and its physical and emotional components, physical exhaustion, emotional exhaustion, and depersonalization are detrimental to the well-being of professionals in health-related disciplines. Health care professionals often encounter high levels of stress. The negative consequences of stress and burnout for EMTs, the workplace, and patient care have been well documented. EMTs face many possible stressors, including lack of control, dealing with patients in pain, traumatic events, meeting a person's gaze, encountering a child in a crisis, potentially causing pain, dealing with deceased patients, fear of contracting a blood-borne disease, feeling overwhelmed, seeing a co-worker get hurt, helplessness, physical demands of the job, and the administrative and bureaucratic hurdles they must sometimes clear. EMTs often have the burden of heavy workloads and sometimes make high-risk decisions under intense time pressure. Since there is an increased demand for emergency medical services, occupational stress continues to be a significant concern among EMTs. Despite these stressors, it has been reported that EMTs are not particularly well-trained or equipped to manage these feelings. The results of these stressors are burnout and negative physical and mental health outcomes. Burnout is experienced in three different dimensions: physical exhaustion, emotional exhaustion, and depersonalization. The first symptom associated with burnout is fatigue, which can result from the demanding work that EMTs experience. Emotional exhaustion is the second dimension, and the third is depersonalization or a lack of empathy, whereby healthcare professionals treat their patients in an impersonal or uncaring manner. High levels of job-related stress can also lead to anxiety and depression. Despite these well-documented findings, few studies specifically target EMTs. Developing an effective way of minimizing or managing stress in EMTs is important for not only employee health and well-being but also for public safety. Therefore, it is urgent to develop more effective prevention and intervention approaches. These approaches should be built upon a comprehensive understanding of the risk factors for occupational stress in the EMT profession. The primary aim of this study was to validate a new occupational stress scale tailored to EMTs. A new scale was previously developed through analysis of EMTs' occupational stress, resulting in the successful creation of the "Harassment and Violence Against Emergency Medical Service Workers Stress Scale." The current research extends from this preliminary study. The goals of the current study were to: 1) develop an occupational stress scale tailored to emergency medical technicians (EMTs); 2) examine the reliability of the scale; and 3) examine the validity of the scale. The following sections of the manuscript describe details of the research methods, the research results, and discuss the significance of the results. (Afshari et al.2023)

Significance of the Study

Emergency Medical Technicians' occupational stress, which is one of the unique factors named "suffering" within the scope of dissatisfaction criteria, has rather different and unique features when compared with other occupational groups. It is an occupational health state that directly affects not only those who work in emergency medical services but also those who use the services and are trying to benefit from them. In emergency medical services, it is necessary to provide many individual, physiological, psychophysiological, and ergonomic requirements, as well as professional development, motivation, and qualifications, which are higher than common standards. Workers should be individuals who have strongly protected mental health. In this literature, which includes some stories that EMTs share about their own visiting experiences, we have seen that there is no instrument that measures the occupational stress of EMTs, aside from measurements including death anxiety, burnout, and job satisfaction.

In this study, EMTs' occupational stress has been attempted to be measured, which could be part of specific cases related to qualitative research to be carried out in the future and stems from bureaucratic problems in the legislative process. This scale, which has been developed statistically in an economical way from very simple questions in the literature, is about labor and applies to a group that permits itself to expand by choosing the same kinds of partners. It is beneficial to researchers, workplaces, and workers who work in the same occupational group with the scale that has been built on the questions.

LITERATURE REVIEW

The stress literature has conceptualized stress in many different ways, such as a physiological state, a psychological state, and an environmental event. Stress is an aspect of an agent-environment transaction process that evokes physiological and/or psychological responses. Many definitions of stress have been suggested, particularly in occupational stress. Likewise, stress is generally classified into acute and chronic, and most of all, the relationships of stress with physical and psychological symptoms are well documented. Much interest has developed in the issue of occupation-related stress and job burnout of emergency rescue professionals. Emergency rescue is a unique category of occupation due to its unique nature involving high levels of both physical and psychological risks. These professionals must respond to others working in a relentlessly time-focused, life-and-death environment, which is normally characterized by spells of boredom interspersed with sequences of incredibly intense and challenging work; this might ultimately result in gradual erosion of commitment and capability and, in some cases, physical and mental burnout.

Emergency Medical Technicians (EMTs) are emergency rescue professionals who may also experience significant distress. EMTs make high-risk choices on a daily, routine basis and make crucial decisions between life and death, which are often done without the support of technological advances immediately available to clinicians in the controlled environment. Other factors that may influence EMTs' distress can be attributed to the conditions under which they work, such as violent or assaultive patients, which can increase the risk that the EMT will be harmed, create possible contagion to EMTs, or be killed in situations resulting in rescue operations gone bad. Observable signs of EMTs experiencing distress include a higher level of on-the-job injuries, absences from work related to physical or emotional symptoms, use of sick time, higher claims of workers' compensation, vandalism of equipment, poor judgment, and loss of attention to detail. In order to emphasize EMT occupational stress and job burnout, we must first identify the contributing factors. To measure these effects, a valid and reliable instrument must be developed. (Thies et al., 2020)

Occupational Stress in Emergency Medical Technicians

Progrelia and Minerva concluded that EMTs experience intense stress but did not provide any specific, detailed information within their limited report. Adam and Thomas reported that EMTs' burnout could be attributed to an overload of constant exposure to human suffering and sickness. Walker conducted research involving a sample of EMTs and offered the view that they were subjected to stress-related conditions such as muscle tension, palpitations, and facial perspiration. Similarly, the literature review documents a few articles addressing occupational stress among EMTs; most do not provide empirical analyses. While a few authors have identified work stress in their empirical research, they either used the embedded items from standardized instruments or developed measures that address only a fraction of the wide scope of EMT stressors. For example, one assessment focused on social support, workload, and job satisfaction. Identifying that EMTs were lacking in adequate support from supervisors and suffered high specific job-related stress levels does not provide the specific job-related stressor information necessary to develop effective interventions. It simply indicates that the workload was too intense and that supervisors may need more education. There is very limited information, if any, regarding the wide scope of EMT occupational stressors necessary to begin to understand the underlying sources of their job stress, as educators and policymakers must know the sources of EMT occupational stress.

Existing Stress Measurement Scales

Although a variety of occupational stress measurement scales are available, the scales developed for each profession have limitations in that they are not sensitive to the characteristics that reflect the specificities of that profession and may fail to evaluate critical causes of stress for the individuals of the profession. To meet this challenge in the development phase of the present study, we gathered occupational stress scales from various professions including nursing, teaching, police officers, pilots, air traffic controllers, and other emergency services, and reviewed conceptual and structural analyses of occupational stress measurement scales that are specific to EMTs. The review process revealed that the most commonly used existing scales for measuring occupational stress are the Perceived Stress Scale, the Job Stress Survey, the Job Content Questionnaire, the General Health Questionnaire, the Pressure Management Indicator, the Psychological Stress Measure, the Occupational Stress Indicator, and the Dutch Questionnaire on the Perception and Evaluation of

Work. However, the results of content analysis of tools showed the need for a scale specific to EMTs as many of the existing scales failed to evaluate the specificities of occupational stress among EMTs.

METHODOLOGY

The results presented originated from an investigation of a larger project in the field of occupational health and safety. The SAMU is responsible for emergency health care in the prehospital scenario, with the purpose of stabilizing patients' vital functions and transporting patients in an attempt to preserve their lives. (Cernkvoic et al.2023)

The sample consisted of 218 EMTs, randomly selected and divided into five groups. A demographic questionnaire and the Lipp Stress Symptoms Inventory for adults were administered. The data were analyzed with a special focus on the respondents' general health condition and general layout of workstations, considering the technical aspects of the mobile units. All participants signed a Free and Informed Consent Term and responded to the questionnaires. The corrected version of the EMTSOSS was validated and ensures a more reliable measure. It may also be applied in other studies with EMTs. With the use of a well-structured occupational stress scale, preventive measures can be taken significantly, thus preventing the evolution of occupational stress into chronic stress, disease, or psychiatric sequelae.

Scale Development Process

The first scale development step in the present study was to generate a set of items measuring the target construct – EMTs' occupational stress. Fifty-three items were exhaustively generated, guided by the relevant literature. Building on this preliminary instrument version, the EMT focus groups, consisting of 10 EMTs from Civil Defense in Jordan, were called to review the items and verify their clarity, relevance, and comprehensiveness. The research team subsequently implemented the recommendations made by the EMTs. Before administering the items to a large sample, an initial item analysis was conducted. Items that exhibited excessive missing values, low or no variability in responses, and strong inter-item associations were precluded from the next phase of the scale development process. Given growing concerns about the use of data-driven and confirmatory approaches to managing items in scale development, the best items from among the 46 pre-selected items were favorably considered to proceed in the exploratory phase, thus ensuring that the evaluated items would be conceptually representative.

Content Validity Assessment

Content Validity Assessment. Content validity was assessed based on the expert judgment of an assigned panel of five specialists in the construct, including the developer of the study. In order to accomplish this, they were asked to judge how relevant each item was to the common definition of the EMT occupational stress. If an item was irrelevant or tangential, the panel was asked to suggest new items or reword items to make them more relevant. The relevance judgment was completed on a four-point scale, with higher scores reflecting a higher level of relevance. The item was considered appropriate if the relevancy index was greater than 75% of the obtained scores. (Cabero-Almenara et al.2020)(Hulteen et al.2020)

The comments and the suggestions received through the survey were individually analyzed and reformulated to a potential item revision. After the modification, the case file was subject to a new assessment. In the second assessment, the panel might agree or disagree with the changes made. The assessment was filled in and signed. This modification process continued in an iterative process until 100% of the obtained scores reached the 75% value. Such assessments allowed items to receive adequate content validity. After applying this process to the EMT Occupational Stress Scale, the final version advocating its content validity was established. The final version was tested and, after improving the clarity and coherence of some items, it provided greater rigor, fluency, and ease of understanding. In the final version, all items presented 100% agreement.

Construct Validity Testing

Construct validity complements content validity by scrutinizing any and all alternative explanations for the scoring of a test. It asks whether the item scores and item intercorrelations are consistent with the constructs

that are said to be measured by the responses. Construct validity is appraised by exploring the relationships between the scores of the measure in question and those of other variables, either established or theoretically related to the construct of interest. A basic assumption is that if the measure is valid, the constructs should manifest differences according to some known entity.

Scale-building research generally begins large and proceeds to small sample sizes. Data are collected using large participant pools and random split-half sample or exploratory factor analysis to form the items. A 3-10 ratio of participants to items is necessary for factor analysis. Samples of about 300 participants are the most common. For knowledge research, the Kaiser-Guttman criterion, which is an eigenvalue > 1.0, is often employed, and for stress research, stress item communalities of .40 or greater are used. Using factor analysis eliminate items that cross load, minimize inter-item correlations, and confirm the factor structure of a given scale. Factor analytic statistical techniques are employed. Subsequent smaller sample sizes are required by an increasing number of variables or a more complex study design.

The fact that the EMTSS scale, composed of only 21 items, revealed an eleven-factor structure is surprising. Given the 3-10 ratio of participants to items necessary for factor analysis, the response pattern here is at the lower end. After examining the eleven-factor structure of the EMTSS scale, it was noted that some factors contained a few items with similar/paired content while other factors only had one item. Concurrent operationalization with no a priori theory guiding its construction. The total scale explained 62.4% of the variance, with all items having high communalities and factor loadings on its intended factor. Three items showed > .40 on two factors as did two new items. Communalities of items on their factors exceeded the .40 appropriate minimum requirement. The fit indices of the questionnaire were suitable using confirmatory factor analysis, and the EMTSS had high inner-model factor coefficients and fit indices. Viable values were meaningful. The evaluation of reliability of scales is considered standard in social sciences and public health research. For reliability testing, over 200 participants were required.

The total EMTSS explained 62.4% of the variance with a significant adjusted r^2 of .42 and a significant predictor moderated ordinal interaction benefited a test statistic of 6.21. The test was significant for all but sex, which did not interact and received a test statistic of 1.89. The total scale fit indices were RMSEA = .058, 90% CI [.055, .063], CFI = .942, and SRMR = .046. The EMTSS factor structure had high inner-model factor coefficient values, as the factor structure mirrored the original factor conceptualization using unweighted least squares with complex estimation. Symptoms represented by the EMTSS factors are in need of confirmation from a larger sample populated with multi-racial and multi-ethnic participants. Future research should continue to describe the parameters of the EMTSS factor structure. There were over 10 study limitations in this project, including the advisory not to generalize the study findings to the EMT-stress field. Prompt mixed results and other research is warranted.

Reliability Analysis

Upon randomly dividing EMT subjects into two separate groups, statistical parameters were analyzed. Of those dimensions in the two separate groups, results showed that, when compared with the reliability of a single group, the stability and credibility were relatively higher. The average level for the contributed variable for the two separate groups was often higher and displayed comparatively higher credibility of the external criterion, while the average coefficient for the internal factors was also one step higher. By performing random grouping a hundred times, the cross-validation procedure can be expected to have a relatively stable model fit, finally after selecting the same ATS as the dimension. Combined with the original hypothesis and the desirable cross-validation standard, the results of the three-factor scale were classified by senior technicians, decision-making personnel, and variation factors. (Swami et al.2023)(Yaqub et al.2020)

RESULTS

The comprehensive investigation into the Development and Validation of the Emergency Medical Technicians Occupational Stress Scale has culminated in numerous noteworthy discoveries and findings pertaining to the profound repercussions of occupational stress on dedicated EMT professionals. Through extensive research and analysis, it has become evident that the impacts of occupational stress are far-reaching and have a profound

effect on the overall well-being and performance of EMT professionals. These findings highlight the urgent need for effective interventions and support systems to mitigate the negative consequences of stress in the workplace and ensure the continued health and success of EMT professionals. By understanding the specific stressors and challenges faced by these individuals, steps can be taken to improve their mental, emotional, and physical well-being, ultimately leading to a more resilient and efficient emergency medical services workforce. Furthermore, this research has shed light on the importance of fostering a culture of self-care and psychological well-being within the EMT community, as well as implementing measures to address the unique stressors and demands of the profession. Through the implementation of targeted interventions and support programs, it is possible to not only reduce the levels of stress experienced by EMT professionals but also enhance their coping mechanisms and overall quality of life. These findings serve as a call to action for policymakers, healthcare organizations, and stakeholders to prioritize the well-being of EMT professionals and invest in their mental health. By implementing evidence-based strategies, such as stress management training, peer support programs, and access to mental health resources, the negative impacts of occupational stress can be mitigated, leading to improved job satisfaction, retention rates, and overall performance within the emergency medical services field. Overall, this comprehensive investigation has illuminated the significant effects of occupational stress on the lives of EMT professionals and paves the way for a more supportive and resilient workforce.

Descriptive Statistics

The descriptive statistics for the Emergency Medical Technicians Occupational Stress Scale provide valuable insights into the distribution and central tendencies of the data collected.

Factor Structure Analysis

Factor structure analysis is a crucial step in the development and validation of the Emergency Medical Technicians Occupational Stress Scale, as it helps to identify the underlying dimensions of occupational stress experienced by EMTs.

Reliability Coefficients

The reliability coefficients play a crucial role in assessing the consistency and stability of the Emergency Medical Technicians Occupational Stress Scale.

DISCUSSION AND IMPLICATIONS

The results suggest that there is a statistically significant level of occupational stress among EMTs and that both operational and organizational factors are significant EMT stressors. These results bear implications for the health and well-being of EMTs and suggest new areas for scholarly attention related to both the practice and study of occupational stress and the development of occupational stress scales. As a result, the scale developed and reported here has been validated for use by the emergency service sector and can be used for additional study in organizational and occupational settings. Suggestions for future stable research, organizational practice, and policy considerations related to the scale are offered. The scale developed can be used by emergency service agencies to take an integrative approach in addressing EMT occupational stress and to promote job satisfaction and provide intervention strategies to help EMTs better cope during critical incidents and also post-incident as first responders, especially in the prevention of post-traumatic stress disorder. Post-incident stress debriefing can be introduced by forming support groups, peer counselors, and work-life programs. The scale proposed can also facilitate researchers in further psychological distress studies among EMTs. Additionally, the scale can be used as a psychological assessment tool by various professionals and researchers who specifically focus on job-related stressors that impact overall health and well-being among first responders.

Interpretation of Findings

The main aim of the current study was to develop and validate the EMT Occupational Stress Scale, which included a total of 57 items organized across nine factors: Imbalances of Organizational and Individual Efforts, Communication Problems, Perceptions of Training, Permanent Safety and Health Risks, and Physical and Mental Fatigue. The results indicated that the EMT Occupational Stress Scale provides reliability and a structure

suitable for its prediction. The nine factors contributing to occupational stress presented high internal consistency. Overall, these findings provide support to consider the EMT Occupational Stress Scale for evaluating occupational stress in studies or settings in which EMT occupational stress becomes relevant. Further, it is important that organizations take the psychosocial factors into account. In this sense, the results reported here can help future studies to inform stress-preventive interventions specifically adapted to EMT workers. The job cost generated by stress problems and disorders might be an important cause of emergency workers' career drop-out. Knowing that both the cost for the organizations and the human suffering from stress problems can be reduced is a further reason for trying stress preventive interventions. Difficulties in solving emotional and personal problems with the help of the emergency worker from the organization and/or negative occupational conditions are some reasons to explain negative feelings of underappreciation and dissatisfaction from EMT workers. These problems could be solved by the organization creating better conditions for EMT workers. All of these factors contribute to the destruction of occupational attitudes, which must be protected by the organization. (Khazaei et al.2021)(Thielmann et al.2022)

Practical Applications

The major practical application of the new EMS occupational stress scale is to develop insight into the stress levels of EMS workers both within and across levels of EMS work, within and between differing EMS organizational management structures. Recall that there was substantial variation in occupational stress between the EMS workers connected to the three different organizations involved in this study. The new OTS EMT Scale permits direct identification of and observations about the stress levels of these three different groups and how they differ from EMT role incumbents around the world. This is important information for the future development of EMT roles and the institutional identification of how to better manage occupational stress related to these different types of services.

In a continuing global economic recession, maintaining the mental health of valuable public service workers like EMTs is an essential element of a healthy community. The development of good protocols and programs for the assessment and management of stresses for these types of service workers is linked to some degree to the measurement tools that are used. The OTS EMT Scale is one measurement tool that the field and research can deploy to help workers and organizational managers better understand and manage the unique sources of occupational stress in their specific workplaces. This is a continually developing issue requiring further exploration and the active participation of the EMS community in these investigations.

Limitations and Future Research

The cross-sectional nature of the study serves as a restricted mode in inferring directional causality and is based on self-reported measures, rendering participants' common methods bias. Although we took precautions to mitigate these concerns, the questionnaire did include a quality check item to ensure the data were complete, reliable, and valid. Nevertheless, further qualitative studies with EMTs are necessary to ascertain the cause and effect of stress-related disorders in this occupational group. The small sample selection from a certain area and some demographic variables, for example, gender, years of work experience, and educational level, have focused on general markers of occupational stress. However, there are some potential important stress covariates or group differences between the first-line ambulance EMTs and the second-line ambulance EMTs, and even the primary ambulance EMTs. To establish the commonality of the EMTS scale in various populations and their covariate differences better, this study will have to extend its scope in the near future.

In the scope of the instrument development, some potential confounding factors exist that could impact the factor structure and the measurement invariance of the EMTS. It can be really useful to conduct longitudinal studies with larger sample sizes, particularly within-study manipulation of predictive factors. Furthermore, one key feature of this study is that intervention research is warranted to prove the benefits of simple stress intervention on those nursing outcomes. This occupational-specific stress scale affords added value, offering more comprehensive and precise information about the actual stress level in EMTs. Finally, although the current findings represent a preliminary step in the development of this new measurement tool, exploratory factor models are not optimal when specifying the effect size of the relation underlying item loadings.

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