EDUCATION AND PRACTICE

CHRONIC STRESS AND ASSOCIATED COPING STRATEGIES AMONG VOLUNTEER EMS PERSONNEL

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ABSTRACT

Objective. This study assessed the chronic (everyday) stress experiences and coping strategies among volunteer Emergency Medical Services personnel. **Methods.** An anonymous, self-report survey using standardized measures of burnout (the Maslach Burnout Inventory) and coping (the Coping Mechanisms Checklist) was completed by a convenience sample of volunteer Emergency Medical Services personnel serving one of six participating ambulance companies in Suffolk County, New York. **Results.** Survey responders included 139 of 175 volunteers who were recruited to participate (response rate = 79%). Alarming percentages of participants scored high on emotional exhaustion (92%) and depersonalization (99%); however, 75% also reported high levels of personal accomplishment. The use of several coping strategies were concerning. Significant differences were found in coping strategies used between genders and number of years served; women were more likely to talk with significant others (97% vs. 81.7%, chi-square = 6.849, $p < 0.001$), whereas men were more likely to indicate that they pick and choose calls to go on (67% vs. 49%, chi-square = 4.062, $p = 0.044$). Participants with 6+ years were more likely than those with fewer years to "keep thoughts/feelings to self" (95.6% vs. 81.2%, chi-square = 5.72, $p = 0.017$) and "engage in risky behaviors" (47.82% vs. 30.43%, chi-square = 3.68, $p = 0.055$). Approximately half of responders indicted that they do the bare minimum required to stay an active member of their ambulance company (53%). ANOVAs revealed that use of several coping strategies were significantly associated with depersonalization and personal accomplishment scores. **Conclusion.** Gender, years of experience, the types of coping strategies used, and high levels of depersonalization and emotional exhaustion must be considered when developing mental health programs for chronic stress among volunteer Emergency Medical Services personnel.
Key words: voluntary workers; adaptations; psychological; emergency medical technicians; general adaptation syndrome; stress.

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INTRODUCTION

Prior studies have shown that Emergency Medical Services (EMS) personnel experience significant occupational stress.[1] Paid and volunteer EMS personnel are often the first responders to a variety of emergencies—from traumatic motor vehicle collisions and natural disasters to minor injuries and illnesses. Among EMS personnel, both emotional and physical stress are associated with stabilizing patients, comforting panicked or distressed victims and loved ones, and ensuring appropriate continuity of care once patients have arrived at their destination medical centers. Acute stressors, also known as critical incidents, have been previously studied among paid ambulance personnel.[1,2] Posttraumatic stress disorder (PTSD), professional burnout and fatigue are well-documented phenomena encountered among paid emergency personnel who respond to a disaster or other traumatic service call.[1–3] These symptoms may lead to decreased job satisfaction, work absenteeism, or departure from the profession. However, critical incidents account for a very small portion of the workload handled by EMS personnel and only occasionally punctuate the landscape of routine—but dynamic and mobile—patient care. Frequent exposure to trauma can be a cumulative threat to the health and well-being of EMS personnel.[4] Less is known about chronic (repetitive exposure to) stress and coping strategies among volunteer EMS personnel with most studies being done outside of the United States.[1]

Chronic stress and coping experiences of volunteer EMS personnel may be unique from that of their paid

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counterparts.[5] In addition to their volunteer work, EMS personnel may be employed part- or full-time by other service professions (e.g., health care and fire fighting); thus, volunteers may have an added burden (above that of paid emergency workers) that places them at elevated risk of professional burnout. Little research has explored the chronic stress and coping strategies among volunteer EMS personnel. This population may need assistance (support services and training programs) to build stress management skills and provide them with the tools needed to counteract the affects of repetitive stress. The purpose of this cross-sectional survey research study was to assess the relationship between chronic stress among volunteer EMS personnel and the strategies they use to cope.

METHODS

Subjects

Participants were a convenience sample of EMS personnel, including drivers, aids, and Emergency Technicians (EMT–basic, critical care, and paramedic) recruited from six ambulance services located in suburban communities of Suffolk County on Long Island, New York. Suffolk County recognizes more than 3,100 volunteer EMS personnel who are organized into 64 fire service and 27 community ambulance agencies. Participants were recruited from a convenience sample of six ambulance organizations. Participants had to be at least 21 years of age, have a minimum of 6 month's experience as volunteer EMS personnel, and had to be an active volunteer at the time of data collection. Surveys were distributed by the first author with the permission of the supervisor of each ambulance service to all EMS personnel who were in attendance at routinely held personnel meetings (scheduled between June 2005 and April 2006). A statement of informed consent accompanied the survey. The study protocol, including the statement of informed consent, survey, and recruitment materials were reviewed and approved by the Committee on Research Involving Human Subjects (CORIHS) at the State University of New York at Stony Brook prior to the start of this research. A waiver of the requirement for written documentation of informed consent was approved.

Participants were instructed that individual responses to survey forms would not be made available to the ambulance service companies and that there would be no way to link responses to the individual. All survey responses were analyzed in the aggregate. Completed surveys were placed in a sealed envelope and collected by the first author immediately upon completion.

Measures

The survey included questions concerning demographic information, such as gender, age (reported in categories organized in 5-year increments beginning with 21–25 and ending at 56+ years), years of volunteer ambulance service and position(s) currently held: aide, driver, Emergency Medical Technician–Basic [EMT-B], Critical Care [EMT-CC], and Paramedic [EMT-P], and type of paid occupation (full- or part-time health care worker, other, or not currently employed). Standardized measures and study-specific items were used to explore symptoms of chronic stress (burnout) and coping.

Chronic Stress

The Maslach Burnout Inventory (MBI) for Health and Human Services[6] was used to assess symptoms of burnout. This is a widely used survey tool that has been used among EMS personnel, nurses, and physicians in past research.[1,2,7] The MBI consists of 22 short statements that correspond with the following 6 response options to assess how often a person feels a certain way about their work: 0 = never, 1 = a few times a year, 2 = once a month or less, 3 = a few times a month, 4 = once a week, 5 = a few times a week, and 6 = everyday. The items are used to measure three dimensions of burnout (with multiple items used to assess more than one dimension): depersonalization (17 items, e.g., "Working with people all day is really a strain for me."); emotional exhaustion (13 items, e.g., "I've become more callous toward people since I took this job."); and personal accomplishment (14 items, e.g., "I feel exhilarated after working closely with my recipients."). Chronbach's alpha has been reported at .79, .90, and .71, respectively.[6] Chronbach's alpha above .90 are considered "excellent," above .80 are considered "good," and above .70 are considered "acceptable."[8]

High to low scores for each dimension are summed and organized into corresponding categories (high, moderate, and low) to characterize levels of burnout among the EMS personnel who participated using a scoring key.[6]

Coping

The Coping Methods Checklist (CMC) has been used to assess the perceived helpfulness of various strategies used by emergency personnel (police, firefighters, and EMTs) to deal with chronic (everyday) occupation related stress.[2] Participants were instructed that everyday stress referred to stress that was experienced in general as an active member of the volunteer agency. They were told not to consider stress in response to a big event or "critical incident stress" when answering the questions. The CMC requires responders to indicate how helpful a list of eight coping strategies are to manage their everyday work stress (e.g., "black humor,"* "talking with colleagues," "looking forward to off-duty") using the following response options: very helpful, helpful,

*The term "black humor" originates with the CMC instrument found in the literature; the term was not created by the authors.

unhelpful, very unhelpful, not sure, or did not use. The investigators developed six additional items to the original CMC tool for study-specific purposes: "have an alcoholic beverage," "pick and choose the calls that you go on," "use available EMS mental health services," "do the bare minimum required to stay an active member of your company," "talk with spouse or significant other," and "engage in risky behaviors (please specify)." The added items were developed by the authors (who have content and survey design expertise) and reviewed by an outside expert in emergency medical services (face validity). Summary scores were organized to identify the proportion of responders who perceived each coping strategy as very helpful to unhelpful and the percentage of responders who indicated that a particular strategy was used (or not) to cope with stress.

Data Management and Analysis

Statistical analyses were completed by using the SPSS 14.0 computer software package for Windows (SPSS, Inc., Chicago, IL). First, basic univariate descriptive statistics were executed (e.g., frequency counts, percentages, means, and standard deviations) to explore the sociodemographic, burnout, and coping characteristics of the sample. Second, bivariate analyses (including Pearson correlations, chi-square for 2×2 tables, and nonparametric tests such as the Mann Whitney U) were executed to assess possible associations between these variables. Lastly, a series of multivariate tests were executed by using the analysis of variance (ANOVA) to explore the association between sociodemographic characteristics of the sample, coping strategies used (or not), and each of the MBI subscales (emotional exhaustion, depersonalization, and personal accomplishment). Statistically significant relationships between variables are reported in the results section.

RESULTS

Sample Characteristics

Of the 175 volunteer EMS personnel who attended data collection sessions, 139 consented and were eligible to participate (response rate = 79%). Participants included 71 males (51.4%) and 67 females (48.6%) with one participant who did not report gender. The roles of participants included EMT-B (n = 64, 46.4%), EMT-CC (n = 17, 12.3%), ambulance drivers (n = 14, 10.1%), aides (n = 12, 8.7%), and EMT-P (n = 6, 4.3%), with 23 (n = 16.6%) individuals who stated combined roles. The majority of responders were within the age category of 21–25 years of age (n = 39, 38.1%). The number of months/years served as volunteer EMS personnel ranged from 6 months to 38 years (mean = 9.1 years, SD = 9.2).

There was a statistically significant difference in the gender distribution by years of experience, whereby there were significantly more women in the group of participants with 5 or fewer years of experience compared to the group of participants with 6 or more years of experience (58.8% vs. 39.1%, respectively, chi-square = 4.56, p = 0.03). Most participants indicated that their full- or part-time paid employment is non-health care related (61%), approximately a quarter of responders (26.7%) stated that it is health care related, and 17 (12.2%) were not currently employed. Basic descriptive statistics summarizing demographic characteristics are provided in Table 1.

TABLE 1. Sample Characteristics

	N	%
Qualification		
Aide Only	12	8.7
Driver Only	14	10.1
EMT-B Only	64	46.4
EMT-CC Only	17	12.3
EMT-Paramedic	6	4.3
Aide & EMT-B	1	0.7
Driver % EMT-B	17	12.2
Aide & Driver	5	3.6
Non-categorized	2	1.4
Age (in years)		
21–25	39	28.1
26–30	14	10.1
31–35	7	5.0
36–40	15	10.8
41–45	19	13.7
46–50	20	14.4
51–55	14	10.1
56+	11	7.9
Occupation		
Full-time health care worker	34	24.5
Full-time other	75	54.0
Part-time health care worker	3	2.2
Part time other	10	7.2
Not currently employed	17	12.2

Chronic Stress

Evaluation of the three MBI subscale summary scores revealed that nearly all of the participants (n = 135, 99.3%) scored 'high' on depersonalization, emotional exhaustion (n = 126, 92%), and personal accomplishment (n = 105, 76.1%). The results of the MBI analysis are presented in Table 2 and include means scores and

TABLE 2. Maslach Burnout Inventory (MBI) Categories

MBI Subscale and Range of Possible Scores	n	%	$\bar{x}$	S.D.
Depersonalization				
High (13 or over)	135	99.3	50.07	12.490
Moderate (7–12)	1	0.7		
Low (0–6)	10	0		
Emotional Exhaustion				
High (27 or over)	126	92.0	41.73	9.871
Moderate (17–26)	9	6.6		
Low (0–16)	2	1.5		
Personal Accomplishment				
High (0–31)	105	76.1	21.13	14.14
Moderate (32–38)	18	13.0		
Low (39 or over)	15	10.9		

standard deviations for each of the subscales, and frequency counts and percentages to indicate the number of responders who fell within the high, moderate, and low categories.

Bivariate analyses using the nonparametric Mann-Whitney U test indicated that female EMS personnel scored significantly lower on personal accomplishment than male personnel ($U = 1791.50$, $p = 0.017$) and on the emotional exhaustion scale ($U = 1841.00$, $p = 0.042$), but there was no significant difference between genders on the depersonalization scale ($U = 2043.00$, $p = 0.307$). The gender difference in MBI responses suggest that female EMS personnel tend to be less influenced by personal accomplishment and emotional exhaustion than male EMS personnel. Years of service were not significantly correlated with MBI scores (using Pearson correlations); however, there was a significant inverse relationship between age and several MBI measures such that younger age was associated with higher scores for: "I feel some recipients blame me for some of their problems." ($r = -0.299$, $p = 0.001$); "I don't really care what happens to some recipients." ($r = -0.224$, $p = 0.008$); "I've become more callous toward people since I took this job." ($r = -0.226$, $p = 0.007$); "I feel I'm positively influencing other people's lives through my work." ($r = -0.248$, $p = 0.003$); "I feel burned out from my work." ($r = -0.185$, $p = 0.029$); and "I feel I treat some recipients as if they were impersonal objects." ($r = -0.191$, $p = 0.024$). No other significant differences in MBI scores were detected between categories of other demographic characteristics.

Coping

CMC responses for use of specific coping strategies and the perceived helpfulness of these strategies were coded and analyzed (frequencies, mean scores, and standard deviations) by using the following scoring system: very helpful = +2, helpful = +1, not sure = 0, unhelpful = −1, very unhelpful = −2. All participants reported "talking with colleagues" (n = 139, 100%) as a strategy employed to reduce stress. In addition, the majority of participants acknowledged using these techniques: "thinking about the positive benefits of work" (n = 132, 94.9%), "thinking about own family" (n = 128, 92.0%), and "thinking about outside interests" (n = 126, 92.0%). Less than 40% of participants reported engaging in risky behaviors (n = 52, 37.9%). Approximately 50% of participants indicated use of these coping strategies: "have an alcoholic beverage" (n = 70, 50.7%), "do the bare minimum required to stay an active member" (n = 72, 52.6%), and "use available EMS mental health services" (n = 75, 55.3%).

Among the responders who indicated using a specified strategy, mean scores suggest that the following were considered helpful or very helpful coping strategies: "talking with colleagues" (n = 139, $\bar{x} = 1.48$, SD = 0.72) and "thinking about positive benefits of work" (n = 132, $\bar{x} = 1.40$, SD = 0.74). Other methods of coping such as "keeping thoughts/feelings to oneself" (n = 118, $\bar{x} = -0.55$, SD = 1.26) and "avoid thinking about what you are doing" (n = 112, $\bar{x} = -0.40$, SD = 1.29) were considered unhelpful or very unhelpful strategies. The following coping methods tended to be reported as unhelpful to deal with chronic stress among the participating volunteer EMS personnel: "pick and choose the calls that you go on," "do the bare minimum required to stay an active member of your company," "have an alcoholic beverage" and "engaging in risky behaviors." A summary of coping strategy results are provided in Table 3.

Chi-square analyses revealed statistically significant gender differences in the use of several coping strategies. Women were significantly more likely than men to indicate that they do not use "black humor" (34.3% of women vs. 9.9% of men; chi-square = 10.74, $p = 0.001$), that they do not "keep to themselves" (17.9% vs. 5.6%, chi-square = 3.94, $p = 0.047$), and that they use "talking with spouse or significant others" to cope (97.0% vs. 81.7%, chi-square = 6.849, $p = 0.009$). Men were significantly more likely to indicate that they tend to "pick and choose the calls that they go on" (67% of men vs. 49% of women, chi-square = 4.062, $p = 0.044$). Statistically significant differences also were detected in the use of coping strategies by the number of years served (dichotomized as greater than or equal to 6 years vs. less than or equal to 5 years, n = 69 per group). Participants with greater than or equal to 6 years of service were more likely to use "keeping to self" (95.6% vs. 81.2%, chi-square = 5.72, $p = 0.017$) and there was a marginally significant difference with regard to

TABLE 3. Coping Strategies Used and Perceived Helpfulness*

Method of Coping	Used Method n	Used Method %	$\bar{X}$*	S.D.
Black humor	104	77.7	0.96	0.98
Talking with colleagues (other volunteers)	139	100.0	1.48	0.72
Looking forward to off-duty	118	85.5	0.69	1.15
Keeping thoughts/feelings to self	118	88.1	−0.55	1.26
Thinking about own family	128	92.0	1.15	0.96
Thinking about outside interests	126	92.0	1.26	0.76
Thinking about positive benefits of work	132	94.9	1.40	0.74
Avoid thinking about what you are doing	112	81.2	−0.40	1.29
Use available EMS mental health services	75	55.3	0.71	1.05
Pick and choose calls you go on	79	58.0	−0.25	1.38
Do the bare minimum required to stay an active member of your company	72	52.6	−0.54	1.41
Have an alcoholic beverage	70	50.7	−0.16	1.44
Talking with spouse or significant other	121	89.0	1.11	1.07
Engage in risky behaviors	52	37.9	−0.48	1.29

*Very Helpful = +2, Helpful = +1, Not Sure = 0, Unhelpful = −1, Very Unhelpful = −2.

"engage in risky behaviors" (47.82% vs. 30.43%, chi-square = 3.68, p = 0.055).

Multivariate Relationships Between Stress and Coping

Multivariate analyses using ANOVA were conducted to explore the relationship between multiple factors measured in the survey with each of the MBI subscales (personal accomplishment, depersonalization, and emotional exhaustion). Preliminary bivariate analyses were used to identify those factors that were likely to be significantly associated with each of the MBI subscale scores. The one-sample Kolmogorov-Smirnov test (an assessment of the normal distribution) indicated that all three MBI subscales could be assumed to have a normal distribution. Therefore, each was used as a dependent variable to execute an ANOVA.

To choose the independent variables (factors) for each ANOVA (one for each of three MBI subscales), a series of independent samples t-tests were executed by using sociodemographic characteristics (male vs. female, years of service 0 to 5 years vs. 6 or greater years) and each of the 14 methods of coping (method used vs. method not used) with the MBI subscales. If there was not at least a marginally significant difference ($p \leq 0.15$) in a dependent variable between groups for each factor, then the factor was not included in that dependent variable's ANOVA.

The independent samples t-tests revealed that for the personal accomplishment subscale there were several factors that had at least marginally significant group differences. These factors included gender, years of service, and use (or not) of these coping methods: "looking forward to off duty," "keeping thoughts/feelings to self," "thinking about the positive benefits of work," "avoid thinking about what you are doing," "picking and choosing calls you go on," "having an alcoholic beverage," and "talking with spouse or significant other."

Similarly, *t*-tests identified that for the emotional exhaustion subscale there were a few coping methods that had at least marginally significant differences: "thinking about outside interests," and "do the bare minimum required to stay an active member of your company." The t-tests also showed that for the depersonalization subscale "do the bare minimum" and "have an alcoholic beverage" there were at least marginally significant group differences in scores among those who did vs. did not tend to use these coping methods.

To identify potential covariates for ANOVA, Pearson's correlations were tested by using age categories and years served with each of the three MBI subscales. Neither of these variables was sufficiently correlated (above 0.30 or below −0.30[9]) with any of the subscales at a level that would sufficiently improve an ANOVA model. Therefore, no covariates were included in any of the final ANOVA models. The ANOVA models for each dependent variable were executed by using those factors found to be at least marginally significant using the independent samples t-tests, with and without interaction terms included in the models.

The ANOVA model used to assess factors associated with *depersonalization* ($R^2 = 9.6\%$, $p = 0.001$) included the coping methods "have an alcoholic beverage" ($F = 9.72$, $p = 0.002$) and "do the bare minimum" ($F = 10.95$, $p = 0.001$). The final model used only main effects because the interaction effects were not statistically significant. This model found that participants who indicated use of the coping method "do the bare minimum" tended to have lower depersonalization scores than those who did not indicate doing so and that participants who indicated "have an alcoholic beverage" as a used coping method tended to have lower depersonalization scores compared to those who did not use that method. The model revealed that depersonalization scores could be 9.6% lower for people who "do the bare minimum required to stay an active member" and use "have an alcoholic beverage" as coping methods compared to those who do neither.

The ANOVA model for *personal accomplishment* ($R^2 = 16.4\%$, $p < 0.0001$) included the main effects for the following coping methods: "having an alcoholic beverage," ($F = 9.45$, $p = 0.003$) "looking forward to off duty," ($F = 4.42$, $p = 0.037$) and "talking with spouse or significant other" ($F = 3.97$, $p = 0.048$) with no interaction effects. This model indicated that participants who use the coping methods "looking forward to off duty," "having an alcoholic beverage" and those who did not indicate use of "talking with spouse or significant other" as a coping method tended to have lower personal accomplishment scores. The ANOVA model revealed that scores for personal accomplishment could be 16.4% higher for people who use "talk with spouse or significant other," do not use "have an alcoholic beverage," and do not use "looking forward to off duty" as coping methods, compared to people who use none of these coping methods.

Lastly, ANOVAs were executed to assess factors associated with emotional exhaustion and included the coping methods "thinking about outside interests" and "do the bare minimum required to stay an active member of your company" as fixed factors. Neither model (with and without interaction terms) was statistically significant.

DISCUSSION

Few studies have addressed the stress and coping experiences of volunteer EMS personnel in the United States. The majority of participants in this study were unpaid EMS personnel in Suffolk County, New York,

who also were employed full-time in health care or other fields. The results of the Maslach Burnout Inventory (MBI) revealed alarming percentages of participants who scored high on depersonalization and emotional exhaustion categories (99% and 92%, respectively). These scores are significantly higher than reported in other studies of health care professionals.[10] The majority of volunteer EMS personnel also scored high on personal accomplishment (76%), which could be reflective of a tendency for volunteers to derive a positive sense of self from providing a service to members of one's own community.

Volunteer EMS personnel in this study identified several coping strategies used to help them deal with everyday stress encountered as a volunteer. Although several positive coping behaviors tended to be used, such as talking with colleagues (100%) and talking with spouse or significant other (89%), there were several behaviors of concern: use of "black humor" (78%), "pick and choose calls you go on" (58%), "do the bare minimum required to stay an active member of the company" (53%), and "have an alcoholic beverage" (51%). Less than half of responders indicated using the available EMS mental health services as a coping strategy. Social support has been well established as a coping strategy useful to health care workers.[2,10–12] Lack of social support at work has been well documented as a major contributor to chronic stress among health care personnel.[11,12] Overall, scores on the MBI were high for depersonalization and emotional exhaustion. This may indicate that while the coping strategies employed are perceived to be helpful, the participants are experiencing high levels of burnout that must be elevated. Efforts should be made to offer more assistance to volunteer EMS personnel.

The results of this study may help to improve our understanding of the chronic stress and coping behaviors of volunteer EMS personnel, and the need to improve the use of organized stress management and mental health services to teach and encourage healthy coping behaviors. Ultimately, the goal is to proactively assist EMS personnel to achieve and maintain high levels of mental and physical health. The findings may serve as a resource for stress management program designers and emergency medicine administrators to address the needs of prehospital EMS personnel.

Several limitations should be noted with regard to the generalizeability of the study findings and scope of findings. Participants were a convenience sample recruited from a single county on Long Island, and therefore the results may not represent the stress and coping experiences of volunteer EMS personnel in other regions. The number of individuals participating in this study was relatively small; however, the information gathered may still be applicable to larger groups. Surveys were self–report, and participants may have felt uncomfortable sharing sensitive information about their stress and coping strategies (e.g., engaging in risky behaviors and drinking alcohol). The ambulance companies that participated are extremely busy suburban volunteer organizations, responding to no fewer than 1,500 emergency calls every year; results may not be generalized to smaller and less busy agencies and those serving rural or urban areas. Lastly, this study used a cross-sectional design, which cannot establish a sequence of events such as a cause-effect relationship; the results are limited in that the findings do not provide information about the sources (causes) of stress among volunteers. Further studies should explore the determinants of emotional exhaustion and depersonalization among unpaid EMS personnel, such as the frequency of high-intensity calls compared to mundane calls, the utilization of skills, satisfaction with the emergency medical care system, personality characteristics, and the availability of social support on the job.

CONCLUSION

Gender, years of experience, the types of coping strategies used, and high levels of depersonalization and emotional exhaustion must be considered when developing mental health programs for chronic stress among volunteer EMS personnel.

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