

# Relationship between Resilience and Quality of Life among Prehospital Emergency Medical Personnel: A Cross-Sectional Study

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## Abstract

**Introduction:** Prehospital emergency personnel are exposed to physical and psychological harm due to their continuous encounter with critical situations. These factors can significantly affect health and quality of life. This study was conducted to determine the association between resilience and quality of life among prehospital emergency personnel.

**Method:** This analytical cross-sectional study included 116 personnel affiliated with Golestan University of Medical Sciences who were on active duty during the COVID-19 pandemic in 2020. Participants were recruited via convenience sampling. Data were collected using the Connor-Davidson Resilience Scale (CD-RISC) and the World Health Organization Quality of Life-Brief Version (WHOQOL-BREF). We performed statistical analyses using SPSS version 26, employing descriptive statistics, Pearson's correlation coefficient, and multiple linear regression.

**Result:** The mean resilience score was 66.77 (SD = 15.29), and the mean quality of life score was 86.58 (SD = 15.23). Resilience was positively correlated with overall quality of life ( $r = 0.61$ ,  $P < 0.001$ ), and all resilience subscales showed significant positive correlations with the quality-of-life domains. In the adjusted regression model, marital status and employment type predicted resilience. Single personnel had lower resilience scores than married personnel ( $B = -7.56$ ,  $P = 0.049$ ), whereas contract-based ( $B = 14.68$ ,  $P = 0.001$ ) and plan-based employees ( $B = 12.36$ ,  $P = 0.003$ ) had higher resilience scores than permanent employees. For quality of life, tobacco use ( $B = -9.93$ ,  $P = 0.012$ ) and resilience ( $B = 0.56$ ,  $P < 0.001$ ) remained significant independent predictors.

**Conclusion:** The findings indicated a significant positive relationship between resilience and quality of life among personnel. These results underscore the importance of attending to psychological resilience alongside individual and organizational determinants of quality of life in this workforce.

**Keywords:** Psychological resilience, Quality of life, Emergency medical technicians, Emergency medical services, Prehospital emergency care.

## Introduction

Prehospital emergency personnel are a cornerstone of the medical emergency response system, playing a pivotal role in the continuum of patient and casualty care. As the first healthcare providers to arrive at scenes of traffic accidents, natural disasters, mass casualty incidents, acute medical emergencies, and life-threatening events, these professionals are entrusted with the critical tasks of primary assessment, immediate intervention, patient stabilization, and safe transport to

definitive care facilities<sup>1</sup>. The very nature of this profession demands that prehospital staff make rapid, precise decisions under severe time constraints, often in unpredictable and occasionally hazardous environments—decisions whose consequences are directly tied to patient survival, prognosis, and overall quality of care<sup>2</sup>.

Unlike many clinical settings that afford a relatively controlled and structured environment, the prehospital

arena is frequently characterized by instability, unpredictability, and limited diagnostic and therapeutic resources. This inherent lack of control consistently exposes emergency personnel to intense, recurrent stressors. Over time, the cumulative burden of these conditions can compromise physical and psychological health, diminish professional performance, and precipitate adverse outcomes, including chronic fatigue, occupational burnout, reduced motivation, interpersonal difficulties, and an increased propensity for turnover<sup>3,4</sup>.

Within this demanding context, the quality of life of prehospital emergency staff assumes particular significance. Quality of life is a multidimensional construct that reflects individuals' perceptions of their position in life within the cultural and value systems in which they live, and in relation to their goals, expectations, standards, and concerns. It encompasses physical health, psychological state, social relationships, and environmental conditions, and is widely recognized as a key indicator of general well-being and health<sup>5</sup>. Among healthcare workers, quality of life is not confined to personal well-being alone; occupational conditions, psychosocial pressures, organizational support, job security, and the intricate balance between personal and professional life<sup>5</sup> also shape it.

The importance of quality of life in the healthcare workforce arguably exceeds that in many other occupational domains, as providers' health and well-being are intrinsically linked to the quality and safety of the care they deliver. Healthcare professionals are better positioned to provide safe, compassionate, and effective care when they themselves enjoy favorable physical and psychological health<sup>6</sup>. Diminished quality of life among health workers has been associated with fatigue, impaired concentration, reduced performance, burnout, and decreased professional satisfaction<sup>7</sup>. These concerns are particularly pronounced among prehospital emergency personnel, given the intensely stressful nature of their work, recurrent exposure to critical incidents, and the high-stakes, rapid decision-making required<sup>3</sup>. Consequently, identifying factors associated with quality of life in this cohort is essential to recognize support needs and design targeted interventions to promote their health and well-being.

Alongside organizational and environmental determinants, individual psychological characteristics

substantially influence how staff experience and manage occupational pressures. Among these, resilience has emerged as one of the most salient. Resilience refers to an individual's capacity to adapt successfully in the face of adversity, maintain psychological equilibrium under stress, recover functioning after traumatic events, and sustain effective performance in unfavorable conditions<sup>8</sup>. In recent years, resilience has gained considerable attention within positive psychology and psychological capital frameworks. It enables individuals to respond more constructively to stressors, setbacks, crises, and environmental threats, favoring adaptive coping strategies over maladaptive responses or surrender to pressure<sup>8</sup>.

Resilience is not a static or purely innate trait; rather, it is a dynamic, malleable process shaped by the ongoing interaction between the individual and their environment. Resilient individuals typically demonstrate stronger emotion regulation, problem-solving, hopefulness, social support use, cognitive flexibility, and the capacity to find meaning in difficult experiences<sup>8</sup>. In high-stress occupational settings, resilience can act as a protective factor, mitigating stress's deleterious effects on mental health and professional performance. Employees with higher resilience tend to show greater occupational adaptation, lower burnout rates, more effective professional communication, and enhanced capacity to maintain performance quality during crises<sup>9</sup>.

From an organizational and managerial perspective, employee resilience is not merely a fixed individual attribute; organizational structures and support systems can also influence it. Evidence indicates that supportive work environments—characterized by transparent communication, ongoing training, participative decision-making, psychological support, and equitable reward systems—are associated with greater staff resilience<sup>9</sup>.

Existing research among healthcare workers has consistently demonstrated that a constellation of individual, occupational, and organizational factors shapes quality of life. High workload, staff shortages, shift work, inadequate remuneration, limited career advancement opportunities, lack of organizational support, and difficulties in reconciling family and professional responsibilities have been identified as prominent correlates of lower quality of life scores<sup>3</sup>. These challenges likely intensify in resource-

constrained health systems, where excessive workload and insufficient support erode staff coping capacity. In Iran, several studies have reported moderate or suboptimal quality of life among healthcare workers, underscoring the urgent need to address determinants of their well-being and mental health<sup>5</sup>.

Importantly, workers' perceived quality of life is not a direct, objective outcome of the physical work environment alone; it is also correlated with how they perceive, appraise, and manage occupational pressures. Even under similar organizational conditions, employees may differ considerably in their levels of adaptation, psychological balance, and sustained professional functioning. These variations can be partially attributed to psychological resources and coping strategies that influence responses to stressors such as time pressure, traumatic events, role conflict, and resource scarcity. Robust adaptive capacities—including resilience—may help staff manage the psychological toll of stressors more effectively, preserve a sense of control and professional competence, and reduce vulnerability to burnout and dissatisfaction<sup>8</sup>. Conversely, persistent occupational stress without adequate support and coping resources may undermine employees' perceptions of security, satisfaction, and overall well-being. Therefore, examining workplace conditions and staff psychological capacities together offers a more comprehensive understanding of the variables associated with quality of life in high-stress environments, particularly prehospital emergency services<sup>4</sup>.

Furthermore, crises such as the COVID-19 pandemic have clearly shown that frontline healthcare workers' resilience and quality of life are integral to the sustainability of service delivery systems. During the pandemic, prehospital emergency staff faced escalating mission volumes, heightened exposure to infectious agents, fears of transmitting infection to family members, shortages of personal protective equipment, societal psychological strain, and ambiguity surrounding evolving care protocols<sup>5</sup>. These unprecedented circumstances once again underscored the importance of protective variables such as resilience—factors that support mental health, sustain professional functioning, and enhance quality of life during public health emergencies.

Given this, the present study aimed to determine the association between resilience and quality of life among prehospital emergency personnel.

## Methods

### Study Design and Setting

This analytical cross-sectional study examined the association between resilience and quality of life among operational prehospital emergency personnel in 2020. The study population included all emergency medical services (EMS) staff employed at urban, road, and air prehospital emergency bases affiliated with Golestan University of Medical Sciences who were actively providing prehospital care during the COVID-19 pandemic.

### Participants and Eligibility Criteria

Inclusion criteria were: (a) current employment as an operational prehospital emergency staff member at an urban, road, or air base; (b) a minimum of two years of work experience; (c) active duty during the COVID-19 pandemic; and (d) provision of informed consent to participate. Exclusion criteria included: less than two years of work experience, non-operational or administrative duties, unwillingness to complete the questionnaires, and incomplete questionnaire responses.

### Sampling and Sample Size

Participants were recruited using non-probability convenience sampling. After obtaining the necessary institutional approvals, the researchers obtained a list of eligible personnel from the affiliated bases and invited qualified individuals to participate. The sample size was calculated based on the primary study objective—namely, examining the correlation between resilience and quality of life—assuming a Type I error rate of 0.05, a statistical power of 80%, and an expected correlation coefficient of 0.30. This yielded a required sample size of 116 participants.

### Data Collection Instruments

We collected data using two validated instruments. The first instrument was the Connor-Davidson Resilience Scale (CD-RISC)<sup>10</sup>, originally developed in 2003, which comprises 25 items. Each item is rated on a five-point Likert scale ranging from 0 to 4, where 0 = "not true at all," 1 = "rarely true," 2 = "sometimes true," 3 = "often true," and 4 = "true nearly all the time." Higher

total scores indicate greater resilience. The scale was developed based on a comprehensive review of the resilience literature and has been psychometrically evaluated in diverse general and clinical populations. Mohammadi<sup>11</sup> initially adapted and validated the Persian version of the scale and confirmed its reliability and validity. Furthermore, studies among Iranian nurses and other healthcare workers—including those by Shirali et al.<sup>12</sup> and Afshari et al.<sup>13</sup>—reported satisfactory internal consistency, with Cronbach's alpha values of approximately 0.89.

The second instrument was the World Health Organization Quality of Life- Brief Version (WHOQOL-BREF)<sup>14</sup>, a standardized 26-item questionnaire. Twenty-four of these items assess four principal domains of quality of life: physical health, psychological health, social relationships, and environmental health. The remaining two items evaluate overall quality of life and general health status. Items are scored on a five-point Likert scale. Items 3, 4, and 26 are reverse-scored. After recoding these items, domain scores are calculated by summing the relevant item scores and, in accordance with WHO guidelines, are transformed to a scale of 4–20 or, where required, to a 0–100 scale, with higher scores reflecting better quality of life. Nejati et al. evaluated the psychometric properties of the Persian version of the WHOQOL-BREF in Iran, reporting a total Cronbach's alpha of 0.87 and domain-specific alphas ranging from 0.55 to 0.84. Additionally, Usefy et al.<sup>16</sup> confirmed the instrument's satisfactory reliability, with an overall Cronbach's alpha of 0.89.

### Data Collection

Before data collection, the institutional research ethics committee and relevant university authorities granted ethical approval. The researchers then coordinated with the prehospital emergency management office of Golestan University of Medical Sciences and the respective base supervisors. After identifying eligible staff, the study objectives, questionnaire completion procedures, the voluntary nature of participation, data confidentiality, and the right to withdraw at any stage were fully explained to all potential participants. After obtaining written informed consent, questionnaires were distributed. Participants completed the questionnaires in full and did not provide their names or any identifiable personal information.

### Statistical Analysis

We analyzed data using SPSS version 26. Descriptive statistics, including frequencies and percentages for categorical variables and means with standard deviations for continuous variables, were calculated. We used Pearson's correlation coefficient to examine the association between resilience and quality of life. We performed multiple linear regression analyses using the enter method, entering all theoretically relevant demographic and occupational variables simultaneously. In the quality-of-life model, resilience was also included as an independent variable. We reported regression coefficients (B), standard errors (SE), and P values. A two-sided P value < 0.05 was considered statistically significant.

### Results

This study included 116 prehospital emergency personnel. Participants' mean age was 32.15 years (SD = 6.16). Demographically, most were male (n = 113, 97.4%), married (n = 95, 81.9%), and aged 20–29 years (n = 58, 50.0%). Table 1 presents additional demographic and occupational characteristics.

As shown in Table 2, the mean total resilience score was 66.77 (SD = 15.29), while the mean total quality of life score was 86.58 (SD = 15.23). Among the resilience subscales, the highest mean score was observed for perception of personal competence, whereas the lowest was for spiritual influences. Regarding the quality of life domains, the highest mean scores were found for physical health and environmental health, while the lowest mean score was observed for social relationships.

Pearson's correlation analysis (Table 3) demonstrated a significant positive correlation between resilience and overall quality of life ( $r = 0.61$ ,  $P < 0.001$ ). Moreover, all resilience subscales showed significant positive correlations with all quality of life domains ( $P < 0.001$  for all, except for the correlation between spiritual influences and psychological health,  $P = 0.002$ ). The strongest correlations were observed between total resilience and psychological health ( $r = 0.59$ ) and between the control dimension of resilience and overall quality of life ( $r = 0.62$ ).

Occupational variables were entered simultaneously into both models (Table 4). For resilience, marital status and employment type were identified as significant independent predictors. Single participants had

resilience scores that were, on average, 7.56 points lower than those of married participants ( $B = -7.56$ ,  $SE = 3.80$ ,  $P = 0.049$ ). Compared with permanent employees, contract-based employees ( $B = 14.68$ ,  $SE = 4.06$ ,  $P = 0.001$ ) and plan-based employees ( $B = 12.36$ ,  $SE = 4.02$ ,  $P = 0.003$ ) had significantly higher resilience scores.

For quality of life, tobacco use and resilience remained significant independent predictors after adjustment for all demographic and occupational

variables. Tobacco users had quality of life scores that were, on average, 9.93 points lower than those of non-users ( $B = -9.93$ ,  $SE = 3.86$ ,  $P = 0.012$ ). In contrast, resilience was positively associated with quality of life, with each one-point increase in resilience corresponding to a 0.56-point increase in quality of life ( $B = 0.56$ ,  $SE = 0.08$ ,  $P < 0.001$ ). No other variables were significantly associated with quality of life.

Table 1. Frequency distribution of demographic and occupational characteristics of participating prehospital emergency personnel

| Variable               |                   | N (%)      | Variable                |                | N (%)     |
|------------------------|-------------------|------------|-------------------------|----------------|-----------|
| Gender                 | Male              | 113 (97.4) | Service location (base) | Urban          | 53 (45.7) |
|                        | Female            | 3 (2.6)    |                         | Road           | 59 (50.9) |
| Marital status         | Married           | 95 (81.9)  |                         | Air            | 4 (3.4)   |
|                        | Single            | 21 (18.1)  | Employment type         | Permanent      | 28 (24.1) |
| Age (years)            | 20–29             | 58 (50.0)  |                         | Contract-based | 24 (20.7) |
|                        | 30–39             | 46 (39.7)  |                         | Fixed-term     | 24 (20.7) |
|                        | >39               | 12 (10.3)  |                         | Company-based  | 8 (6.9)   |
|                        |                   |            |                         | Plan-based     | 32 (27.6) |
| Education level        | Associate degree  | 51 (44.0)  | Shift type              | 12-hour        | 87 (77.7) |
|                        | Bachelor's degree | 61 (52.6)  |                         | 24-hour        | 25 (22.3) |
|                        | Master's degree   | 4 (3.4)    | Work experience (years) | 0–4.9          | 43 (37.1) |
| Tobacco use            | No                | 99 (86.8)  |                         | 5–9.9          | 37 (31.9) |
|                        | Yes               | 15 (13.2)  |                         | 10–14.9        | 26 (22.4) |
| Income (million Toman) | 0–3.9             | 19 (16.5)  |                         | >14.9          | 10 (8.6)  |
|                        | 4–7.9             | 83 (72.2)  |                         |                |           |
|                        | >7.9              | 13 (11.3)  |                         |                |           |

Table 2. Mean and standard deviation of total resilience, total quality of life, and their respective subscales among prehospital emergency personnel

| Resilience                                                                                                                                                                                           | Mean $\pm$ SD     | Quality of Life      | Mean $\pm$ SD     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|-------------------|
| Total                                                                                                                                                                                                | 66.77 $\pm$ 15.29 | Total                | 86.58 $\pm$ 15.23 |
| Perception of personal competence                                                                                                                                                                    | 21.66 $\pm$ 5.53  | Physical health      | 24.42 $\pm$ 4.64  |
| Trust in individual instincts and tolerance of negative affect                                                                                                                                       | 17.73 $\pm$ 4.15  | Psychological health | 20.14 $\pm$ 3.71  |
| Positive acceptance of change and secure relationships                                                                                                                                               | 13.37 $\pm$ 3.43  | Social relationships | 10.65 $\pm$ 2.46  |
| Control                                                                                                                                                                                              | 7.99 $\pm$ 2.50   | Environmental health | 24.32 $\pm$ 5.11  |
| Spiritual influences                                                                                                                                                                                 | 6.02 $\pm$ 1.60   |                      |                   |
| Note: The total quality of life score includes the two general WHOQOL-BREF items in addition to the four domain scores; therefore, the total score is not equal to the sum of the four domain scores |                   |                      |                   |

Table 3. Correlation coefficients between resilience, quality of life, and their respective dimensions among prehospital emergency personnel

| Resilience Dimensions (CD-RISC) | Overall QOL | Physical Health | Psychological Health | Social Relationships | Environmental Health |
|---------------------------------|-------------|-----------------|----------------------|----------------------|----------------------|
| Total Resilience                | 0.61*       | 0.53*           | 0.59*                | 0.48*                | 0.52*                |
| Notions of Personal Competence  | 0.52*       | 0.46*           | 0.49*                | 0.42*                | 0.43*                |
| Trust in One's Instincts        | 0.58*       | 0.51*           | 0.55*                | 0.45*                | 0.50*                |
| Positive Acceptance of Change   | 0.52*       | 0.43*           | 0.54*                | 0.43*                | 0.43*                |
| Control                         | 0.62*       | 0.54*           | 0.60*                | 0.47*                | 0.54*                |
| Spiritual Influences            | 0.41*       | 0.33*           | 0.41**               | 0.29*                | 0.37*                |

Values are Pearson correlation coefficients. All correlations were statistically significant ( $P < 0.001$ ), except the correlation between spiritual influences and psychological health ( $P = 0.002$ ).

Table 4. Multiple linear regression models for resilience and quality of life

| Variable                |                   | B     | SE    | p-value |
|-------------------------|-------------------|-------|-------|---------|
| Quality of Life         |                   |       |       |         |
| Gender                  | Male              | -     |       |         |
|                         | Female            | -2.01 | 9.59  | 0.834   |
| Marital status          | Married           | -     |       |         |
|                         | Single            | -2.71 | 3.51  | 0.443   |
| Age (years)             | 20–29             | -     |       |         |
|                         | 30–39             | 1.06  | 3.88  | 0.785   |
|                         | >39               | -9.14 | 10.13 | 0.369   |
| Education level         | Associate degree  | -     |       |         |
|                         | Bachelor's degree | -2.97 | 2.67  | 0.269   |
|                         | Master's degree   | -8.60 | 7.80  | 0.273   |
| Tobacco use             | No                | -     |       |         |
|                         | Yes               | -9.93 | 3.86  | 0.012   |
| Income (million Toman)  | 0–3.9             | -     |       |         |
|                         | 4–7.9             | 2.98  | 3.47  | 0.785   |
|                         | >7.9              | 2.60  | 4.96  | 0.369   |
| Service location (base) | Urban             | -     |       |         |
|                         | Road              | -1.60 | 2.65  | 0.548   |
|                         | Air               | -2.05 | 8.91  | 0.818   |
| Employment type         | Permanent         | -     |       |         |
|                         | Contract-based    | -1.50 | 4.66  | 0.749   |
|                         | Fixed-term        | -6.77 | 4.53  | 0.139   |
|                         | Company-based     | -2.67 | 6.46  | 0.680   |
|                         | Plan-based        | 4.81  | 6.09  | 0.431   |
| Shift type              | 12-hour           | -     |       |         |
|                         | 24-hour           | -1.06 | 3.42  | 0.758   |
| Work experience (years) | 0–4.9             | -     |       |         |
|                         | 5–9.9             | -2.58 | 4.09  | 0.529   |
|                         | 10–14.9           | -0.40 | 5.87  | 0.945   |
|                         | >14.9             | 5.43  | 12.13 | 0.655   |
| Resilience              |                   | 0.56  | 0.08  | <0.001  |

## Discussion

This study examined the association between resilience

and quality of life among prehospital emergency personnel during the COVID-19 pandemic in 2020. Our

findings revealed a significant positive relationship between resilience and quality of life, with higher resilience scores consistently associated with better overall quality of life and all of its domains. Multiple regression analyses further showed that marital status and employment type significantly predicted resilience, whereas tobacco use and resilience independently predicted quality of life. Specifically, tobacco users reported lower quality of life scores, while higher resilience was associated with better quality of life after adjustment for demographic and occupational characteristics. Because these data were collected during the COVID-19 pandemic, interpret the findings in the context of an extraordinary period marked by increased workload, psychological stress, and operational challenges; they may not fully reflect conditions during routine prehospital emergency practice.

In the current study, participants' mean resilience score reflected a moderate to high level of resilience among prehospital emergency personnel. This finding aligns with Schumann et al., who reported that emergency service workers in Germany, despite chronic exposure to occupational stressors, typically maintain relatively favorable resilience levels and that this attribute plays a critical role in mitigating burnout and sustaining professional performance<sup>4</sup>. Similarly, studies by Shirali et al.<sup>12</sup> among Iranian nurses during the COVID-19 pandemic and by Afshari et al.<sup>13</sup> demonstrated that healthcare workers with higher resilience experienced fewer symptoms of anxiety and psychological distress and exhibited more favorable occupational adjustment. The consistency of these findings may reflect the gradual acquisition of effective coping skills over years of service; recurrent exposure to critical incidents, while inherently stressful, may paradoxically strengthen adaptive capacity and foster resilience in many individuals over time. However, resilience observed in the present study may also reflect adaptive responses developed during the prolonged COVID-19 pandemic, when repeated exposure to crisis conditions may have strengthened coping mechanisms among emergency personnel. Consequently, these resilience levels should not necessarily be interpreted as representative of routine working conditions outside pandemic periods. In contrast, some investigations have reported lower resilience levels among healthcare workers. For example, several studies conducted during the early

months of the COVID-19 pandemic in Asian and European countries documented resilience scores among emergency and intensive care staff that were below expected levels<sup>17,18</sup>. This discrepancy likely reflects temporal differences in study timing. In the initial pandemic phase, shortages of personal protective equipment, the unknown nature of the disease, escalating mortality rates, and unprecedented workload constrained staff adaptation. In contrast, the present study was conducted several years after the pandemic onset—a period when personnel had accumulated more crisis-management experience, had better access to equipment, and had more comprehensive training—which may partially explain the higher resilience levels observed.

In contrast, participants' overall quality of life was moderate. Although the physical health and environmental health domains showed relatively favorable scores, the social relationships domain received the lowest score. This finding is consistent with the systematic review by Lawn et al.<sup>2</sup>, which reported that continuous exposure to critical incidents, psychological stress, long working shifts, and work-life imbalance adversely affects the physical, psychological, and social well-being of emergency medical service personnel, ultimately reducing their overall quality of life. Similarly, Zahednezhad et al.<sup>7</sup> demonstrated a significant association between resilience, burnout, and quality of life among healthcare professionals, indicating that individuals with higher resilience experienced better quality of life. These findings suggest that healthcare workers' quality of life, particularly in high-stress environments such as prehospital emergency services, is influenced by the interaction between individual psychological resources and occupational conditions. Because data collection occurred during the COVID-19 pandemic, pandemic-related factors such as increased workload, fear of infection, rapidly changing clinical protocols, and prolonged psychological stress may have influenced participants' quality of life. Therefore, the observed quality of life scores may differ from those expected under routine working conditions.

In contrast, some studies have reported more favorable quality of life among emergency medical personnel. For example, studies in several European countries have shown higher quality of life among emergency healthcare workers, attributed to stronger organizational

support systems, adequate staffing levels, better financial compensation, and access to structured psychological support services <sup>1,2</sup>. These differences may reflect variations in healthcare system organization, investment in human resources, socioeconomic conditions, and employee welfare policies. In many developing countries, however, limited resources, workforce shortages, mandatory overtime, and heavy operational demands continue to negatively affect the quality of life of emergency personnel. These contextual differences may partly explain the variation in findings across studies. Although prehospital emergency personnel may possess relatively high levels of psychological resilience to cope with occupational challenges, their quality of life remains strongly influenced by job-related stressors, organizational constraints, and working conditions. Therefore, relying solely on individual resilience is unlikely to be sufficient for maintaining staff well-being. Improving quality of life requires comprehensive organizational strategies, including better working conditions, stronger managerial support, and sustainable mental health promotion programs.

The most important finding of the present study was the positive and relatively strong correlation between resilience and quality of life among prehospital emergency personnel. Moreover, all resilience subscales demonstrated significant positive correlations with all quality of life domains, indicating the extensive role of resilience across physical health, psychological health, social relationships, and environmental health. This finding suggests that individuals with greater capacity to adapt to psychological pressures, regulate emotions, maintain a sense of control, and employ effective coping strategies also experience more favorable quality of life. Although this association remained statistically significant during the pandemic, its magnitude may have been affected by the extraordinary psychological demands experienced during COVID-19. Longitudinal studies conducted under non-pandemic conditions are needed to determine whether this relationship remains stable over time.

Our results are consistent with those of Wang et al. <sup>9</sup>, who demonstrated in a study of oncology nurses that resilience is one of the most important factors associated

with work-related quality of life and even serves as a mediating variable in the relationship between empathy and quality of life. In other words, staff with higher resilience are better able to manage the emotional demands of patient care, resulting in greater professional satisfaction. Although their study population comprised nurses, the stressful nature of oncology and emergency environments shares substantial similarities, which may explain the convergence of findings.

Similarly, our findings align with those of Zahednezhad et al., <sup>7</sup> who conducted their study during the COVID-19 pandemic and reported that resilience not only has a positive relationship with work-related quality of life but can also moderate the negative effects of burnout. That is, employees with greater resilience maintained higher professional satisfaction even under conditions of intense pressure. This finding is particularly important because it shows that resilience is not merely a psychological trait but a protective factor that prevents quality-of-life decline from chronic stress.

The present results are also consistent with the systematic review by Schumann et al. <sup>8</sup>, which identified resilience as one of the most effective protective factors against occupational irritability, emotional exhaustion, and burnout among prehospital emergency personnel. That study proposed integrating resilience into organizational safety culture, as employees with greater psychological resources demonstrate more accurate decision-making, better emotional regulation, and superior professional performance in critical situations. Our findings reinforce this perspective, as we observed that increased resilience was associated with improvements across nearly all dimensions of quality of life.

The systematic review by Schumann et al. <sup>8</sup> similarly reported that job satisfaction, work engagement, and quality of life among prehospital emergency personnel are influenced by factors such as organizational support, perceived competence, self-efficacy, and resilience. The authors concluded that psychological factors, alongside organizational conditions, play a decisive role in retaining the emergency workforce. Our findings corroborate this conclusion, suggesting that enhancing resilience without improving workplace conditions is

likely to have limited effect, and that managers must address both factors concurrently.

A notable finding of the present study was the stronger positive correlation between resilience and the psychological health dimension of quality of life compared with other domains. This finding indicates that employees with higher resilience have a greater capacity to manage emotions, regulate psychological responses to stress, maintain hope, and adapt to difficult circumstances—thereby preserving more favorable psychological health when confronted with critical incidents, patient deaths, multiple missions, and life-threatening situations. Similarly, Robertson et al.<sup>19</sup>, in their systematic review of healthcare workers, reported that most resilience-enhancing programs have been associated with improved mental health, increased psychological well-being, and enhanced quality of life. Furthermore, a systematic review and meta-analysis by Joyce et al.<sup>20</sup> found that resilience-promoting interventions were associated with improved mental health outcomes and reduced psychological distress among employees exposed to occupational stress, supporting resilience as a protective factor for psychological well-being and quality of life. In contrast, some studies suggest that although resilience is associated with mental health, the strength of this association depends on factors such as organizational support, workload, work experience, and personality traits; consequently, resilience alone cannot account for all variation in staff mental health outcomes. Differences in measurement instruments, the types of workers studied, and cultural and organizational contexts may partly explain this relative inconsistency across studies.

Another important finding was the stronger association between the control dimension of resilience and quality of life than with other resilience components. This result is expected given the nature of the prehospital emergency profession, in which personnel continuously operate under conditions characterized by rapid decision-making, limited information, uncertainty, and inherent criticality. In such circumstances, a sense of control, self-efficacy, and crisis management ability can reduce perceived stress intensity and support mental health and professional quality of life. This finding is consistent with the results of Norouzinia et al.<sup>21</sup> among Iranian prehospital emergency personnel, which showed that self-efficacy and resilience independently predict

professional quality of life, with components such as personal management, stress outcomes, and composure playing the most significant roles in enhancing job satisfaction and reducing burnout. Additionally, Mantas Jiménez et al.<sup>22</sup> found that Spanish out-of-hospital emergency staff with higher resilience and psychological empowerment reported greater job satisfaction, with team collaboration and a sense of mastery over working conditions strengthening this relationship.

Furthermore, Rojas et al.<sup>23</sup> found that coping strategies based on acceptance and self-efficacy were associated with lower stress, higher job satisfaction, and better mental health among German emergency personnel. In contrast, strategies such as self-blame were linked to reduced professional quality of life. A recent study by Yan et al. on Singaporean emergency medical teams similarly identified perceived control and self-efficacy as the most important components of psychological resilience in crisis environments, noting that a lack of perceived control diminishes staff capacity to cope with psychological pressures<sup>24</sup>. Thus, perceived control appears to be less a purely individual trait than a product of interactions among psychological capabilities, training, professional experience, and organizational support. Strengthening this dimension through crisis decision-making training, realistic scenario simulation, increased professional autonomy, and managerial support may enhance the professional quality of life of emergency personnel.

In contrast, the spiritual influences dimension showed the weakest correlation with quality of life. This may be because, in professional environments such as prehospital emergency services, organizational factors, social support, job security, workload, and working conditions play more prominent roles than spiritual beliefs in determining quality of life. This finding does not imply that spirituality is unimportant; rather, it suggests that, in the present study population, other resilience dimensions contributed more substantially to explaining quality of life.

Collectively, the findings indicate that resilience is one of the most important psychological resources influencing quality of life among prehospital emergency personnel. However, this relationship should not be interpreted as placing the sole responsibility for mental health maintenance on employees themselves. Resilience can effectively improve quality of life only

when accompanied by organizational provisions—including a safe work environment, managerial support, training opportunities, mental health promotion programs, equitable reward systems, and adequate staffing. Therefore, improving the professional quality of life of prehospital emergency personnel requires an integrated approach combining individual-focused interventions and organizational reforms. This strategy may not only safeguard staff well-being but also enhance prehospital service quality and patient safety. This study has several limitations. First, its cross-sectional, single-center design, convenience sampling strategy, and the predominance of male participants may limit the generalizability of the findings. Second, resilience and quality of life, as well as their associations, may not fully reflect routine non-pandemic conditions. Third, although the regression analyses included all theoretically relevant demographic and occupational variables together with resilience, they did not assess other potentially important factors such as burnout, job stress, organizational support, and mental health status. Future multicenter longitudinal studies under routine conditions are recommended to confirm these findings and improve their generalizability.

## Conclusion

This study found a significant positive association between resilience and quality of life among prehospital emergency personnel. This finding underscores the importance of addressing both psychological and organizational factors to preserve and promote occupational health in this workforce. Given the cross-sectional nature of the study, causal inference is not possible; nevertheless, implementing resilience-enhancing programs alongside organizational support improvements, stress management skills training, working condition reforms, and strengthened mental health services may help improve quality of life and occupational well-being. Longitudinal and interventional studies are recommended to evaluate the effectiveness of such approaches.

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## Conflict of Interest Disclosures

The authors declare no conflict of interest

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## Authors' Contributions

Study concept and design:A.K and T.Y; Acquisition of data: A .K and F. M. A.; Analysis and interpretation of data:A.H.N, andA.E.; Drafting of the manuscript:A.E.andT.Y; Review and editing of the manuscript: All authors read and approved the final manuscript.

## Ethical Statement

This study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences (ethics code: IR.MAZUMS.REC.1399.592). All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Before enrolment, all participants were provided with comprehensive information regarding the purpose of the study and were assured that participation was entirely voluntary. They were also informed that non-participation or withdrawal at any stage would carry no adverse consequences. Participant data were kept strictly confidential, anonymized, and used solely for research purposes.

## Declaration of Generative AI and AI-assisted technologies

During the preparation of this manuscript, ChatGPT (OpenAI) was used to improve the clarity, readability, and fluency of the scientific text and to assist in drafting and refining parts of the manuscript, including sections of the Introduction. The authors subsequently reviewed, edited, verified, and approved all content and take full responsibility for the accuracy, originality, and integrity of the final manuscript.

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