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# Malpractice Risk Assessment in Emergency Medical Services: A Field Study

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## Abstract

**Aim:** This study examined the malpractice risks in emergency medical services as assessed by emergency medical workers.

**Materials and Methods:** This methodological, descriptive and cross-sectional study was conducted with 447 emergency medical workers across Türkiye. Data were collected using the malpractice risk assessment scale in emergency health services, developed by the researchers within the scope of this research. In the scale development study, according to the explanatory factor analysis, the scale was formed with a single dimension and 23 items. Confirmatory factor analysis fit indices for this structure were $X^2$/standard deviation=3.05, goodness of fit index=0.88, comparative fit index=0.90, Tucker Lewis index=0.90, root mean square error of approximation=0.07 and root mean square residual=0.07. Cronbach's alpha value was 0.931.

**Results:** The mean score of the emergency medical workers on the malpractice risk assessment scale in emergency medical services was 3.390±0.737. The participants reported that adverse physical conditions in emergency departments, patient density, medical procedures performed at night, negative attitudes or behavior of patient relatives during emergency medical intervention processes, and the presence of pediatric patients are high-risk factors for malpractice. The emergency medical workers with less than one year of experience, being single, working in the private sector, working 41 hours or more per week, working in shifts, and following mixed work patterns had higher scores.

**Conclusion:** Malpractice risk assessment scale in emergency medical services is a valid and reliable measurement tool. Emergency medical workers face a moderate level of malpractice risk exposure. Malpractice risk assessment is influenced by the characteristics of emergency medical providers. Strategies should be developed, on topics identified as high risk for malpractice.

**Keywords:** Emergency medical services, emergency medical workers, malpractice, medical error, risk assessment.

## Introduction

In 2021, as per the World Health Organization's Global Patient Safety Action Plan (2021-2030), a decision was made to aim for "a world in which no one is harmed in health care, and every patient receives safe and respectful care, every time, everywhere" (1). It is estimated that 1 in 10 patients in high-income countries are harmed while receiving hospital care, with approximately 50% of these harms thought to be preventable (2). Zuccotti et al. (3) examined 477 malpractice claims involving seven different topics in the USA and found that approximately half of these errors were preventable.

Wong et al. (4) examined 135.490 malpractice claims, referred to as medical professional liability, in emergency departments (ED) and emergency care settings between 2001 and 2015 in the USA, and reported that emergency medicine ranked first among 6.779 claims. Malpractice claims are an important problem for emergency medical physicians (MDs) and the medical system that needs to be addressed rationally and effectively. In solving this problem, claims analysis seems to be the best way to identify risk factors and areas, which elaborates risk management recommendations. Emergency medical units are known to be one of the high-risk areas (5). Therefore, it seems important to examine the risks of malpractice in the ED in this study.

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This study aimed to investigate the malpractice risks in emergency medical care units based on the assessments of emergency MDs. In the literature, the risk attitudes of emergency MDs (6), recommendations to reduce malpractice risks in emergency nurses (RNs) (7), or brief approaches for emergency MDs to minimise the risk of malpractice (8). However, no study has been found that demonstrates malpractice risks by using a valid and reliable measurement tool that covers the evaluation of all emergency medical workers in units providing emergency medical services (EMS). As such, we aimed to develop a "malpractice risk assessment scale in "EMS" to realise the study's aim, thus making a secondary contribution to the literature.

## Materials and Methods

### Study Design and Time Period

This study was conducted using a methodological, descriptive and cross-sectional design between November 2022 and May 2023. The required ethics committee permission was obtained from the Ordu University Rectorate Social and Human Sciences Research Ethics Committee to conduct the research (decision number: 2022-186, date: 06.10.2022).

### Data Collection

Data collection tools prepared with Google Forms were delivered to the participants using WhatsApp and personal e-mail addresses. Participants were asked to check the voluntary consent box before answering the questions. Since it was mandatory to respond to all statements in the questionnaire, there were no blank or invalid items.

### Population and Sample Size

The study population comprised all emergency medical workers (MDs, RNs, paramedics, emergency medical technicians, laboratory technicians, and other medical personnel) working in public and private sector emergency medical organisations in Türkiye.

The researchers were unable to find a publicly available figure on the number of people working in EMS in Türkiye. However, according to the statistics on the number of health personnel working in the ministry of health, university and private sector published by the Turkish statistical institute (TurkStat) in 2022, it was reported that there were a total of 604,654 medical workers in 2020 (9). Based on their observations, the researchers assumed that is, approximately 100,000 emergency medical workers were involved.

In scale studies, an average of 5-10 people can be taken per item to determine the sample (10) or, for a sufficient sample size in factor analysis, it is suggested that "50 is very poor, 100 is poor, 200 is moderate, 300 is good, 500 is very good, and 1000 is excellent" (11). This study was conducted with 447 emergency medical workers, indicating an adequate sample size.

### Data Collection Tools

### Emergency Medical Worker Information Form

This form, created by the researchers, contains 14 items, including demographic information about emergency medical personnel (age, gender, marital status, educational status, occupation, years of occupation, work unit and workplace, weekly working time, working status, encounters with malpractice and satisfaction with the profession).

### Malpractice Risk Assessment Scale in EMRS

The scale developed by the researchers consists of 23 items and one dimension. EMRS aims to measure malpractice risk levels by patient type, occupational group, working times, communication, physical conditions, and types of malpractice in EMS. The five-point Likert-type scale is scored as 1-strongly disagree, 2-disagree, 3-undecided, 4-agree, and 5-strongly agree. There are two reverse items in the scale (m23, m24). The arithmetic mean is used to calculate the scale score, the sum of the answers given to the item is scored between 1 and 5. The score calculation uses the formula distribution range = (maximum value-minimum value)/ number of degrees. The item's score range is categorized as "low" between 1.00 and 2.33, "medium" between 2.34 and 3.66, and "high" between 3.67 and 5.00.

### Validity and Reliability Analysis of EMRS

### Creating an Item Pool and Obtaining Expert Opinions

Researchers reviewed relevant literature (8,12-14) to structure the scale items and consulted field workers. Expert opinions were obtained from five academicians for the draft scale, which consisted of 36 items. Required revisions were made in line with the academics' opinions.

### Construct Validity

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) factor analyses were conducted to ensure the scale's construct validity. In EFA, the Kaiser-Meyer-Olkin value was calculated to understand the adequacy of the sample, which was found to be 0.931. The value, ranging from 0.7 to 1.0, showed that the sample size was sufficient for EFA (15). Bartlett's test of sphericity result was p=0.000, indicating that the data were fit for factor analysis (16). Then, 13 items having factor loadings from EFA below 0.30 were removed from the 36-item scale. According to the literature, a factor loading value between 0.30 and 0.40 is acceptable (17). The total variance explained in the scale was 41.014%. The factor number of the scale was decided based on

the scree plot and the eigenvalue >1 criterion (18). The analysis revealed that structurally, the scale consisted of 23 items and one sub-dimension (one factor) (Table 1).

CFA was conducted to confirm the scale structure formed by EFA. Modification indices were analysed to improve the model fit in the context of CFA. After the analysis, modification indices were improved for items 1-2, 2-5, 9-10, and 10-11. New covariances were created by determining the variables that reduced the fit among those with high covariance of residual values (Figure 1).

As a result, the fit indices of EMRS improved; $X^2$/standard deviation=3.05, goodness of fit index=0.88, adjusted goodness of fit index=0.85, comparative fit index=0.90, Tucker Lewis index=0.90, root mean square error of approximation=0.07 and root mean square residua=0.07 (Table 2).

These fit index values were acceptable (11,19,20). The analysis showed that the fit statistics calculated by CFA were acceptably consistent with the previously determined factor structure of the scale. When the standardised coefficients were examined, factor loadings were high, standard error values were low, and t values

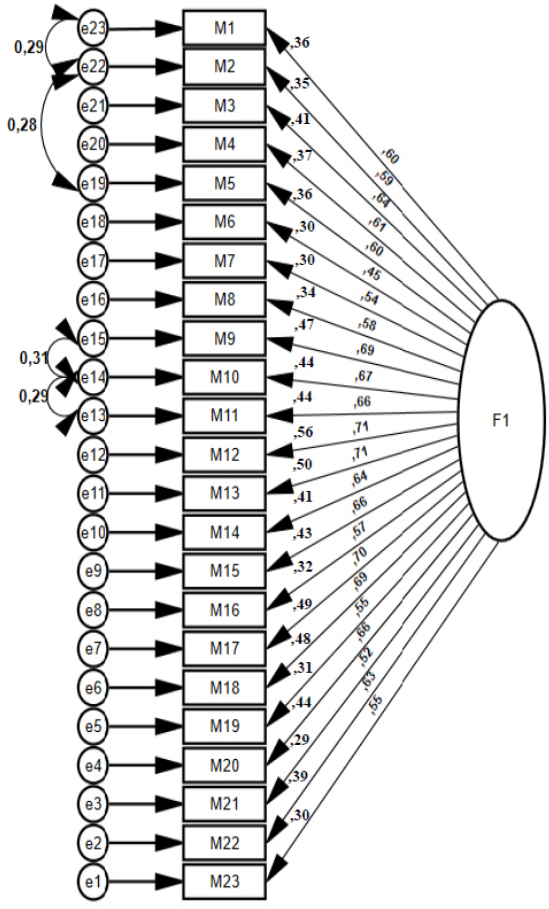


**Figure 1.** Confirmatory factor analysis validity model

**Table 1. Item factor loadings in exploratory factor analysis of the malpractice risk assessment scale in emergency medical services**

| Scale item | Factor loading |
|---|---|
| 1. There is a high risk of medical errors in infant and paediatric patients. | 0.537 |
| 2. There is a high risk of making medical errors in young and adult patients. | 0.608 |
| 3. There is a high risk of making medical errors in elderly patients. | 0.631 |
| 4. There is a high risk of making medical errors in male patients. | 0.700 |
| 5. There is a high risk of making medical errors in female patients. | 0.714 |
| 6. There is a high risk for medical physicians to make medical errors. | 0.693 |
| 7. There is a high risk for nurses to make medical errors. | 0.753 |
| 8. There is a high risk for paramedics/emergency medical technicians to make medical errors. | 0.751 |
| 9. There is a high risk for medical secretaries to make medical errors. | 0.598 |
| 10. There is a high risk for laboratory technicians to make medical errors. | 0.722 |
| 15. There is a high risk of medical error in daytime medical practices. | 0.650 |
| 16. There is a high risk of making medical errors in night medical practices. | 0.573 |
| 21. Negative attitudes or behaviours of patient relatives in emergency medical services processes increase the risk of making medical errors. | 0.368 |
| 23. Unfavourable physical conditions of emergency medical services (insufficient light, loud noises, poorly ventilated environment, insufficient stretchers, etc.) increase the risk of making medical errors. | 0.440 |
| 24. Patient density increases the risk of making medical errors. | 0.318 |
| 28. There is a high risk of making medical errors (administration site, dose, method of administration, wrong drug, etc.) in drug applications. | 0.512 |
| 30. There is a high risk of making medical errors in infected patients. | 0.652 |
| 31. There is a high risk of making medical errors in gynaecological patients. | 0.688 |
| 32. There is a high risk of making medical errors in intoxication cases. | 0.732 |
| 33. There is a high risk of making medical errors in accident response (traffic, home, work, etc.). | 0.724 |
| 34. There is a high risk of medical errors during patient/injured person transport (falls, etc.). | 0.735 |
| 35. There is a high risk of making medical errors in blood transfusion practices. | 0.680 |
| 36. There is a high risk of making medical errors in emergency medical services. | 0.696 |

**Table 2. Model fit index of the malpractice risk assessment scale in emergency medical services regarding confirmatory factor analysis**

| Index | Normal value | Acceptable value | EMRS values |
|---|---|---|---|
| $x^2$/SD | <2 | <5 | 3.05 |
| GFI | >0.95 | >0.85 | 0.88 |
| AGFI | >0.95 | >0.85 | 0.85 |
| CFI | >0.95 | >0.90 | 0.90 |
| TLI | >0.95 | >0.90 | 0.90 |
| RMSEA | <0.05 | <0.08 | 0.07 |
| RMR | <0.05 | <0.08 | 0.07 |

SD: Standard deviation, EMRS: Malpractice risk assessment scale in emergency medical services, GFI: Goodness of Fit Index, AGFI: Adjusted Goodness of Fit Index, CFI: Comparative Fit Index, TLI: Tucker Lewis index, RMSEA: Root Mean Square Error of Approximation, RMR: Root mean square residual

were significant. These results confirm the construct validity of the previously determined factor structure.

### Reliability Analysis

Cronbach's alpha coefficient was used to evaluate the scale's reliability, and the alpha value of the final 23-item scale was found to be 0.931. This value is highly reliable (11).

### Data Analysis

As part of the scale development study, EFA with the IBM SPSS 22 program and CFA with the AMOS 24.0 program were conducted for construct validity. The t-test, one-way ANOVA test, and correlation analysis were also applied to determine the links between the scale and the demographic information and professional characteristics of EMS workers. The data obtained were statistically evaluated and interpreted at a significance level of p=0.05.

## Results

J9 54% worked 41 hours or more and 40% worked in shifts. Regarding satisfaction with their profession, 30.6% stated that they were satisfied (Table 3). The mean EMRS score of emergency medical workers was 3.390±0.737 (min: 1.26, max: 5.00).

The malpractice risk assessments of participant emergency medical workers, according to the scale items, were analysed in three parts: high risk (importance range= 3.67-5.00), medium-high risk (importance range= 3.01-3.66) and medium-low risk (importance range= 2.34-2.99). Participants reported that the unfavourable physical conditions of EMS, patient density, medical procedures performed at night, negative attitudes or behaviours of patient relatives during emergency medical intervention processes, and the presence of paediatric patients were high-risk items for malpractice. Participants reported that no scale item had a low risk (Table 3).

When the demographic characteristics and malpractice risk assessments of the emergency medical workers participating in this study were compared, it was found that statistically significantly higher malpractice risk assessments were associated with those who were single (t: -3.935, p=0.000), laboratory technicians (F: 9.619, p=0.000), had 1-3 years of professional experience (F: 10.266, p=0.000), worked in private hospitals (t: -4.077, p=0.000), worked 41 hours or more per week (t: 6.428, p=0.000), and worked in a shift system (F: 7.930, p=0.000) (Table 4).

Among emergency medical workers, 28.6% stated that they had witnessed medical errors in the last year, 33.8% stated that they had heard about medical errors from their colleagues in the last year, and 22.1% stated that they had committed medical errors in their professional lives. The emergency medical workers who had committed medical errors in their professional lives had higher malpractice risk assessments than those who had not (t=-5.484, p=0.000). Finally, a statistically weak and negative relationship was found between the satisfaction levels of emergency medical workers and malpractice risk assessments (r: -0.152, p=0.001).

## Discussion

National and international literature shows that EMS involves a high level of malpractice risk (4,21,22). This study demonstrated that emergency medical workers assessed the malpractice risk in EMS as moderate, with this assessment being based on EMRS. Ferguson et al. (8) also found that the environment of the ED has a moderate risk of malpractice.

The emergency medical workers in this study noted that, particularly, the negative attitudes or behaviours of patient relatives, unfavourable physical conditions in the ED, patient density, paediatric patients, and night-time medical procedures involve a high level of malpractice risk. In ED, infants and children are at high risk of malpractice (8), and high patient density increases the likelihood of malpractice (13). Malpractice in ED has also been associated with a high risk (23). A study conducted in South Korea noted that night shifts in EDs had a high risk for musculoskeletal disorders (24). It is essential to develop strategies for malpractice risk assessment and to take measures against risks in EMS.

Furthermore, this study demonstrated that malpractice risk assessments of emergency medical workers were affected by several factors. Those who were single, had less than one year of professional experience, and worked in the private sector made higher malpractice risk assessments. Likewise, İntepeler et al. (25) found that single RNs had more malpractice tendencies. A study has shown that MDs working in the private sector engaged in more malpractice cases (26). These results suggest that the habit brought by marriage of taking on more responsibility may also affect the profession of married medical professionals.

**Table 3. Differentiation of malpractice risk assessment scale in emergency medical services scores according to demographic characteristics**

| Variable | Category (n) | Mean ± SD |
|---|---|---|
| Gender | Female (201) | 3.433±0.734 |
| | Male (246) | 3.353±0.739 |
| Test, p value | | t=1.146, >0.05 |
| Age | 18-25 (98) | 3.510±0.657 |
| | 26-30 (127) | 3.399±0.757 |
| | 31-35 (83) | 3.451±0.775 |
| | 36-40 (69) | 3.213±0.814 |
| | 41 and above (70) | 3.389±0.650 |
| Test, p value | | F=2.062, >0.05 |
| Marital status | Married (222) | 3.254±0.749 |
| | Single (225) | 3.524±0.700 |
| Test, p value | | t=-3.935, =0.000* |
| Educational status | High school/associate degree (123) | 3.427±0.732 |
| | Bachelor's degree (266) | 3.403±0.771 |
| | Postgraduate (58) | 3.248±0.564 |
| Test, p value | | F=1.274, >0.05 |
| Occupation | MDsa (100) | 3.401±0.692 |
| | RNsb (150) | 3.540±0.705 |
| | Paramedicc (81) | 2.940±0.681 |
| | EMTsd (33) | 3.453±0.838 |
| | Laboratory technicians e (30) | 3.751±0.656 |
| | Other medical personnelf (53) | 3.386±0.694 |
| Test, p value | | F=9.619, =0.000* |
| Post-hoc | | e>a, a>c, b>c, d>c, e>c, f>c, e>f |
| Years of occupation | Less than 1 yearg (64) | 3.391±0.731 |
| | 1-3h (74) | 3.591±0.668 |
| | 4-7i (107) | 3.655±0.673 |
| | 8-12j (63) | 3.264±0.799 |
| | 13 year and abovek (139) | 3.134±0.702 |
| Test, p value | | F=10.266, =0.000* |
| Post-hoc | | i>g, h>j, i>j, g>k, h>k, i>k |
| Unit | 112 emergency (87) | 3.253±0.798 |
| | Emergency departments (360) | 3.423±0.719 |
| Test, p value | | t=-1.926, >0.05 |
| Workplace | Public (385) | 3.334±0.751 |
| | Private (62) | 3.738±0.719 |
| Test, p value | | t=-4.077, =0.000* |
| Weekly working time | 1-40 hours (204) | 3.334±0.798 |
| | 41 hours or more (243) | 3.738±0.719 |
| Test, p value | | t=6.428, =0.000* |
| Working status | 8-16 shiftsl (86) | 3.226±0.826 |
| | Shift m (59) | 3.647±0.555 |
| | Night shiftn (179) | 3.268±0.749 |
| | Mixedo (123) | 3.558±0.668 |
| Test, p value | | F=7.930, =0.000* |
| Post-hoc | | m>l, o>l, m>n, o>n |

t: t Test, F: One-way ANOVA test, Post-hoc: Tukey and LSD: Least significant difference, SD: Standard deviation

**Tablo 4. Participants' participation percentages in scale statements and severity ranges**

| EMRS | Strongly disagree | | Disagree | | Undecide | | Agree | | Strongly agree | | Importance range | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In emergency health services | n | % | n | % | n | % | n | % | n | % | 1-5 | |
| 1. There is a high risk of medical errors in infant and paediatric patients. | 23 | 5.1 | 41 | 9.2 | 86 | 19.2 | 140 | 31.3 | 157 | 35.1 | 3.82 | ±1.15 |
| 2. There is a high risk of making medical errors in patients. | 49 | 11.0 | 132 | 29.5 | 158 | 35.3 | 70 | 15.7 | 38 | 8.5 | 2.81 | ±1.09 |
| 3. There is a high risk of making medical errors in elderly patients. | 28 | 6.3 | 82 | 18.3 | 128 | 28.6 | 142 | 31.8 | 67 | 15.0 | 3.30 | ±1.21 |
| 4. There is a high risk of making medical errors in male patients. | 79 | 17.7 | 133 | 29.8 | 135 | 30.2 | 64 | 14.3 | 36 | 8.1 | 2.65 | ±1.16 |
| 5. There is a high risk of making medical errors for female patients. | 64 | 14.3 | 113 | 25.3 | 133 | 29.8 | 91 | 20.4 | 46 | 10.3 | 2.87 | ±1.19 |
| 6. There is a high risk for medical physicians to make medical errors. | 44 | 9.8 | 105 | 23.5 | 116 | 26 | 112 | 25.1 | 70 | 15.7 | 3.13 | ±1.22 |
| 7. There is a high risk of nurses making medical errors. | 38 | 8.5 | 97 | 21.7 | 117 | 26.2 | 128 | 28.6 | 67 | 15.0 | 3.19 | ±1.18 |
| 8. There is a high risk for paramedics/emergency medical technicians to make medical errors. | 35 | 7.8 | 81 | 18.1 | 129 | 28.9 | 130 | 29.1 | 72 | 16.1 | 3.27 | ±1.16 |
| 9. There is a high risk of medical secretaries making medical errors. | 59 | 13.2 | 99 | 22.1 | 121 | 27.1 | 107 | 23.9 | 61 | 13.6 | 3.02 | ±1.23 |
| 10. There is a high risk that laboratory technicians will make medical errors. | 49 | 11.0 | 103 | 23.0 | 119 | 26.6 | 96 | 21.5 | 80 | 17.9 | 3.12 | ±1.26 |
| 11. There is a high risk of medical error in daytime medical practices. | 94 | 21.0 | 138 | 30.9 | 124 | 27.7 | 48 | 10.7 | 43 | 9.6 | 2.57 | ±1.20 |
| 12. There is a high risk of medical errors occurring in nighttime medical practice. | 24 | 5.4 | 51 | 11.4 | 86 | 19.2 | 140 | 31.3 | 146 | 32.7 | 3.74 | ±1.18 |
| 13. Negative attitudes or behaviours of patient relatives in emergency medical intervention processes heighten the risk of medical errors. | 7 | 1.6 | 27 | 6.0 | 57 | 12.8 | 128 | 28.6 | 228 | 51.0 | 4.21 | ±0.98 |
| 14. Unfavourable physical conditions of emergency medical services (insufficient light, loud noises, poorly ventilated environment, insufficient stretchers, etc.) increase the risk of making medical errors. | 8 | 1.8 | 18 | 4.0 | 70 | 15.7 | 139 | 31.1 | 212 | 47.4 | 4.18 | ±0.95 |
| 15. Patient density increases the risk of making medical errors. | 46 | 10.3 | 27 | 6.0 | 30 | 6.7 | 60 | 13.4 | 284 | 63.5 | 4.13 | ±1.36 |
| 16. There is a high risk of making medical errors (administration site, dose, method of administration, wrong drug, etc.) in drug applications. | 17 | 3.8 | 71 | 15.9 | 108 | 24.2 | 124 | 27.7 | 127 | 28.4 | 3.61 | ±1.16 |
| 17. There is a high risk of committing medical errors in infected patients. | 30 | 6.7 | 89 | 19.9 | 167 | 37.4 | 105 | 23.5 | 56 | 12.5 | 3.15 | ±1.08 |
| 18. There is a high risk of making medical errors in gynaecological patients. | 33 | 7.4 | 71 | 15.9 | 155 | 34.7 | 121 | 27.1 | 67 | 15.0 | 3.26 | ±1.12 |
| 19. There is a high risk of making medical errors in intoxication cases. | 29 | 6.5 | 71 | 15.9 | 130 | 29.1 | 124 | 27.7 | 93 | 20.8 | 3.40 | ±1.16 |
| 20. There is a high risk of making medical errors in accident response (traffic, home, work, etc.). | 24 | 5.4 | 67 | 15.0 | 93 | 20.8 | 148 | 33.1 | 115 | 25.7 | 3.58 | ±1.17 |
| 21. There is a high risk of medical errors during patient or injured person transport, such as falls. | 26 | 5.8 | 66 | 14.8 | 98 | 21.9 | 128 | 28.6 | 129 | 28.9 | 3.59 | ±1.21 |
| 22. There is a high risk of making medical errors in blood transfusion practices. | 29 | 6.5 | 87 | 19.5 | 108 | 24.2 | 117 | 26.2 | 106 | 23.7 | 3.41 | ±1.22 |
| 23. There is a high risk of making medical errors in emergency medical services. | 19 | 4.3 | 49 | 11.0 | 81 | 18.1 | 127 | 28.4 | 171 | 38.3 | 3.85 | ±1.16 |

SD: Standard deviation, EMRS: Malpractice risk assessment scale in emergency medical services

High risk (importance range =3.67-5.00)
Medium-high risk (importance range =3.01-3.66)
Medium-low risk (importance range =2.34-2.99)

Additionally, in private hospitals, the risks and the perception of malpractice seemed higher with a lack of professional experience and inadequate working conditions and resources. Therefore, it is recommended that medical professionals be employed in the right positions, orientation programs for inexperienced personnel be conducted, and studies be carried out to improve the provision of EMS in the private sector.

In this study, the medical workers who worked more than 41 hours per week, particularly in shifts and mixed work patterns, had higher malpractice risk assessments. Indeed, according to a previous study, longer working hours increase the risk of malpractice (27). A study has also found a higher likelihood of malpractice during night shifts for medical workers (28). As the medical sector is one where shifts and mixed work patterns are common, medical workers' biorhythms may be disrupted, which may increase malpractice incidents. Sleep disturbances, fatigue, difficulty maintaining attention, and other factors associated with shift and mixed work patterns, unlike daytime shifts, may contribute to increased malpractice risk assessments. In this context, it is crucial to make proper staffing plans for emergency medical workers in Türkiye, considering the Organisation for Economic Co-operation and Development data, and to establish appropriate work schedules per International Labour Organization standards.

Additionally, the risk assessment of laboratory technicians was higher than that of MDs, paramedics, and other medical personnel in this study. Çakmak et al. (29) also identified errors in the laboratory environment as the most reported type of malpractice. This may be due to the working conditions of laboratory technicians, which may cause errors in rapid examinations and examinations in emergency service conditions or from inadequate maintenance and calibration of the devices. In this study, MDs, RNs, EMTs, and other medical personnel had higher malpractice risk assessments than paramedics. Implementing profession-specific measures in delivering EMS which include various professional groups at different hierarchical levels, may help reduce malpractice risks. In this context, it may be useful to conduct multidisciplinary studies.

### Study Limitations

This study found that emergency medical workers were moderately satisfied with their professions. Similar conclusions were drawn in Germany's ED, where emergency medical workers were found to be moderately satisfied with their professions (30). In this study, as the level of job satisfaction increased, there was a slight decrease in malpractice risk assessment.

## Conclusion

EMRS is a valid and reliable tool that can be used to assess malpractice risks in emergency medical services. Emergency medical workers assessed EMS as moderately risky. In addition, malpractice risks are affected by the individual and professional characteristics of emergency medical workers. Consequently, we believe it is critical to carry out larger-scale studies to evaluate malpractice risks and to take necessary occupation-specific measures. It may be helpful to review health policies and develop remedial strategies regarding the measures to be taken against malpractice risks that threaten patient safety.

### Ethics

**Ethics Committee Approval:** The required ethics committee permission was obtained from the Ordu University Rectorate Social and Human Sciences Research Ethics Committee to conduct the research (decision number: 2022-186, date: 06.10.2022).

**Informed Consent:** Data collection tools prepared with Google Forms were delivered to the participants using WhatsApp and personal e-mail addresses. Participants were asked to check the voluntary consent box before answering the questions.

### Acknowledgements

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### Footnotes

### Authorship Contributions

Surgical and Medical Practices: V.K., S.B., Concept: V.K., S.B., Design: V.K., S.B., Data Collection or Processing: V.K., Analysis or Interpretation: V.K., S.B., Literature Search: V.K., S.B., Writing: V.K., S.B.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

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## REFERENCES

1. Seventy-fourth world health assembly, global patient safety action plan 2021-2030. World Health Organization: WHO. Available from: https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan
2. Slawomirski L, Klazinga N. The economics of patient safety: from analysis to action. Paris: Organisation for Economic Co-operation and Development. Available from: http://www.oecd.org/health/health-systems/Economics-of-Patient-Safety-October-2020.pdf

3. Zuccotti G, Maloney FL, Feblowitz J, Samal L, Sato L, Wright A. Reducing risk with clinical decision support: a study of closed malpractice claims. Appl Clin Inform. 2014;5:746-56.
4. Wong KE, Parikh PD, Miller KC, Zonfrillo MR. Emergency department and urgent care medical malpractice claims 2001-15. West J Emerg Med. 2021;22:333-8.
5. Bianchin C, Prevaldi C, Corradin M, Saia M. Medical malpractice claim risk in emergency departments. Emerg. Care J. 2018;14:24-7.
6. Smulowitz PB, Burke RC, Ostrovsky D, Novack V, Isbell L, Landon BE. Attitudes toward risk among emergency physicians and advanced practice clinicians in Massachusetts. J Am Coll Emerg Physicians Open. 2021;2:e12573.
7. Warren D. Decreasing malpractice risk in the emergency department. J Emerg Nurs. 2018;44:407-8.
8. Ferguson B, Geralds J, Petrey J, Huecker M. Malpractice in emergency medicine-a review of risk and mitigation practices for the emergency medicine provider. J Emerg Med. 2018;55:659-65.
9. Number of Health Personnel Statistics in 2020 (2020 Yılı Sağlık Personeli Sayısı İstatistiği). Turkish Statistical Institute. Available from: https://data.tuik.gov.tr/Kategori/GetKategori?p=Saglik-ve-Sosyal-Koruma-101
10. Erkuş A. Ölçek geliştirme ve uyarlama çalışmalarındaki sorunlar ile yazım ve değerlendirilmesi. Pegem Atıf İndeksi. 2016;1211:1224. Available from: https://www.academia.edu/85444153/%C3%96l%C3%A7ek_Geli%C5%9Ftirme_Ve_Uyarlama_%C3%87al%C4%B1%C5%9Fmalar%C4%B1ndaki_Sorunlar_Ile_Yaz%C4%B1m_Ve_De%C4%9Ferlendirilmesi
11. Çokluk Ö, Şekercioğlu G, Büyüköztürk Ş. Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları. Pegem Akademi. 2021;7:194-312.
12. Källberg AS, Ehrenberg A, Florin J, Östergren J, Göransson KE. Physicians' and nurses' perceptions of patient safety risks in the emergency department. Int Emerg Nurs. 2017;33:14-9.
13. Carlson JN, Foster KM, Pines JM, Corbit CK, Ward MJ, Hydari MZ, et al. Provider and practice factors associated with emergency physicians' being named in a malpractice claim. Ann Emerg Med. 2018;71:157-164.e4.
14. Miyagami T, Watari T, Harada T, Naito T. Medical malpractice and diagnostic errors in japanese emergency departments. West J Emerg Med. 2023;24:340-47.
15. Coşkun R, Altunışık R, Yıldırım E. Sosyal bilimlerde araştırma yöntemleri-SPSS uygulamalı. Sakarya Yayıncılık. 2019;10:99-298.
16. Goretzko D, Pham TTH, Bühner M. Exploratory factor analysis: current use, methodological developments and recommendations for good practice. Curr. Psychol. 2021;40:3510-21.
17. Alpar R. Spor, sağlık ve eğitim bilimlerinden örneklerle uygulamalı istatistik ve geçerlik-güvenirlik. Detay Yayıncılık. 2022.
18. Taherdoost H, Sahibuddin S, Jalaliyoon N. Exploratory factor analysis; concepts and theory. Adv Appl and Pure Math. 2022;27:375-82.
19. Seçer İ. Psikolojik Test Geliştirme ve Uyarlama Süreci SPSS VE LISREL Uygulamaları. 2nd ed. Ankara: Anı Yayıncılık. 2018.
20. Kline RB. Principles and practice of structural equation modeling (yapısal eşitlik modellemesinin ilkeleri ve uygulaması). Nobel Akademik Yayıncılık. 2019.
21. La Russa R, Viola RV, D'Errico S, Aromatario M, Maiese A, Anibaldi P, et al. Analysis of inadequacies in hospital care through medical liability litigation. Int J Environ Res Public Health. 2021;18:3425.
22. Tıbbi Kötü Uygulamaya İlişkin Zorunlu Mali Sorumluluk Sigortasında Kurum Katkısına İlişkin Usul ve Esaslara Dair Tebliğ. (Internet). Available from: https://www.resmigazete.gov.tr/eskiler/2010/07/20100721-17-1.htm
23. Hodkinson A, Tyler N, Ashcroft DM, Keers RN, Khan K, Phipps D, et al. Preventable medication harm across health care settings: a systematic review and meta-analysis. BMC Med. 2020;18:313.
24. Park SY, Lee HM, Kim J. The number of monthly night shift days and depression were associated with an ıncreased risk of excessive daytime sleepiness in emergency physicians in South Korea. Behav Sci (Basel). 2022;12:279.
25. İntepeler ŞS, Soydemir D, Güleç HD. Determining the tendency levels of intern nurses toward medical errors. Ege Üniversitesi Hemşirelik Fakültesi Dergisi. 2014;30:1-18.
26. Harbitz MB, Stensland PS, Abelsen B. Medical malpractice in Norway: frequency and distribution of disciplinary actions for medical doctors 2011-2018. BMC Health Services Res. 2021;21:1-9.
27. Behlül S, Bayraktar Ö. The evaluation of the perceptions of patient safety cultures of health care workers: university hospital example. Health Care Acad. J. 2017;4:202-6.
28. Kim SH, Park JM, Park J, Shin DW, Kim H, Jeon W, et al. 10-year retrospective study for complaints about medical malpractice in emergency department. J. Korean Society Emerg. Med. 2019;30:1-7.
29. Çakmak C, Konca M, Teleş M. Türkiye Ulusal güvenlik raporlama sistemi (GRS) üzerinden tıbbi hataların değerlendirilmesi. Hacettepe Saglık İdare Dergisi. 2018;21:423-48.
30. Eiche C, Birkholz T, Konrad F, Golditz T, Keunecke JG, Prottengeier J. Job satisfaction and performance orientation of paramedics in German emergency medical services-a nationwide survey. Int J Environ Res Public Health. 2021;18:12459.