



Assessment of patient safety culture perceptions among healthcare personnel in emergency services in Türkiye: Validity and application of the EMS-SAQ

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Validity and Application of EMS-SAQ in Türkiye

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ABSTRACT

Background: Patient safety culture is a critical component of healthcare quality, particularly in emergency departments (EDs), where workload and time pressure increase the risk of adverse events. This study aimed to validate the Turkish version of the Emergency Medical Services Safety Attitudes Questionnaire (EMS-SAQ) and to assess safety culture perceptions among ED personnel in Türkiye.

Methods: A cross-sectional study was conducted with 400 ED personnel, including physicians, nurses, emergency medical technicians, and patient transport personnel. Data were collected using the EMS-SAQ, which evaluates six domains of safety culture. Ethical approval was obtained from the Human Research Ethics Committee of a selected Turkish University Faculty of Medicine (Approval number: İ2-57-19), and written informed consent was obtained from all respondents. The EMS-SAQ is publicly available for academic use and does not require specific permission.

Results: The EMS-SAQ demonstrated satisfactory reliability (overall Cronbach's alpha = 0.880; subscales = 0.604–0.828). Confirmatory factor analysis (CFA) supported the six-factor structure ($\chi^2/df = 3.33$; RMSEA = 0.078; CFI = 0.77; GFI = 0.71; TLI = 0.73). Stress recognition scores were significantly higher among physicians, while younger personnel scored higher on teamwork climate. Male respondents reported higher perceptions of safety climate than females. Less experienced personnel rated management support more positively.

Conclusion: The Turkish version of the EMS-SAQ is a valid and reliable instrument for assessing patient safety culture in EDs. Findings highlight demographic and role-based variations in safety perceptions, underscoring the need for targeted interventions such as leadership training, improved communication strategies, and strengthened reporting systems to enhance patient safety culture in Turkish emergency services.

1. Introduction

Patient safety is a fundamental component of healthcare quality and is considered a core element of modern health systems [1,2]. Studies have shown that between 1.1% and 16.6% of hospitalized patients experience adverse events, approximately half of which are preventable [3]. Establishing a strong safety culture is therefore essential for reducing preventable harm and improving patient outcomes [4,5].

Emergency departments (EDs) represent high-risk environments

where patient safety is frequently challenged by time constraints, overcrowding, and heavy workload [6–9]. International studies have highlighted that ED personnel often report low safety climate perceptions, inadequate error reporting, and challenges in teamwork and stress management [10]. Although research in several countries including Saudi Arabia, Denmark, Norway, China, and Indonesia has contributed to understanding ED safety culture, studies focusing on Türkiye are limited [6,9,11].

One of the most widely used tools to assess safety culture is the Safety

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Attitudes Questionnaire (SAQ), originally developed by Sexton et al. at the University of Texas [12]. The EMS-SAQ, an adaptation of the SAQ by Patterson et al., was designed specifically for emergency medical services and has been validated in multiple international contexts [10]. However, no prior study has validated this tool for Turkish emergency departments, creating a gap in understanding the safety culture of these high-risk environments [11,13].

2. Objective

This study aims to validate the Turkish version of the EMS-SAQ and to assess the patient safety culture perceptions of emergency healthcare personnel in Türkiye. Findings are expected to provide evidence for targeted strategies to strengthen patient safety culture in EDs and inform both national and international comparisons.

3. Methods

This cross-sectional methodological study aimed to evaluate the psychometric properties of the Turkish version of the Emergency Medical Services Safety Attitudes Questionnaire (EMS-SAQ) among emergency department (ED) personnel in Türkiye. The study was conducted in the EDs of selected university hospitals between September 2019 and March 2020. Ethical approval was obtained from the Human Research Ethics Committee of a selected Turkish University Faculty of Medicine (Approval number: İ2-57-19). Written informed consent was obtained from all respondents prior to data collection.

3.1. Ethical considerations and respondents rights

All procedures performed in this study were conducted in accordance with the ethical standards of the institutional research committee and the Declaration of Helsinki. Participation in the study was entirely voluntary. Prior to data collection, all respondents were informed about the purpose of the study, the anonymous nature of the survey, and their right to refuse participation or withdraw from the study at any time without any consequences.

Written informed consent was obtained from all respondents before participation. No personally identifiable information was collected, and all responses were analyzed anonymously.

Inclusion criteria consisted of healthcare professionals working in the emergency department during the study period who agreed to participate voluntarily. Exclusion criteria included refusal to participate, incomplete questionnaires, and personnel not directly involved in patient care.

3.2. Instrument and translation process

The EMS-SAQ, originally developed by Sexton et al. and later adapted by Patterson et al. for EMS settings, is publicly available in the academic domain and does not require specific permission for use [10,12]. It evaluates six domains of safety culture: teamwork climate, safety climate, job satisfaction, stress recognition, perception of management, and working conditions.

For the Turkish adaptation, the original questionnaire was translated into Turkish by a certified translator and reviewed by emergency medicine specialists with expertise in patient safety. It was then back-translated into English to ensure semantic and conceptual equivalence. Cultural adaptation involved expert review and pilot testing. The final version was administered to a pilot group of ED personnel to confirm clarity and cultural appropriateness.

3.3. Sampling and data collection

The sample size was determined following psychometric recommendations, with a minimum of five respondents per item. Based on a

30-item survey, at least 384 respondents were required; ultimately, 400 completed surveys were analyzed (response rate: 70.1%). Surveys were distributed in person in sealed envelopes to ensure confidentiality. To minimize selection bias, we recruited respondents from multiple university hospital emergency departments using standardized inclusion criteria. Surveys were distributed in sealed envelopes to reduce social desirability bias. Nevertheless, voluntary participation may have led to underrepresentation of individuals with lower safety culture perceptions, introducing potential response bias.

3.4. Statistical analysis

Data were analyzed using IBM SPSS version 24 and AMOS software. Normality was assessed using graphical and statistical methods. Descriptive statistics were presented, and non-parametric tests (Kruskal-Wallis, Mann-Whitney U) were applied where appropriate. Internal consistency was assessed using Cronbach's alpha, and construct validity was tested with confirmatory factor analysis (CFA). A p-value of < 0.05 was considered statistically significant. Missing data were minimal (<5% per item) and were handled using pairwise deletion. Respondents with incomplete questionnaires were excluded from the final analysis.

4. Results

This study validated the Turkish version of the EMS-SAQ in emergency departments by assessing safety culture perceptions among 400 emergency healthcare personnel. Of the 570 surveys distributed, 170 were not returned. The most commonly reported reasons for non-participation were workload constraints and lack of time during shifts. Respondents included physicians, nurses, emergency medical technicians, and patient transport personnel. The overall gender distribution was 54.3% male and 45.8% female, with a mean age of 29.5 ± 6.9 years. Most respondents (69.8%) were under 30 years of age (Table 1). Of the 570 questionnaires distributed, 400 were returned, yielding a response rate of 70.1%. The main reasons for non-response were workload and time constraints during clinical shifts.

4.1. Internal consistency and construct validity

The EMS-SAQ demonstrated strong internal consistency, with an overall Cronbach's alpha of 0.880. Subscale reliability coefficients ranged from 0.604 (working conditions) to 0.828 (job satisfaction), indicating acceptable to good reliability. Construct validity was

Table 1
Demographic data of respondents.

Educational Status	Percentage	Number of Respondents
Master's degree	38.3%	153
University degree	40.3%	161
High school degree	16.8%	67
Primary school degree	4.8%	19
Profession		
Doctors	38.3%	153
Nurses	40.7%	163
Patient transport personnel	15.7%	63
EMT's	5.3%	21
Gender		
Male	54.3%	217
Female	45.8%	183
Age		
Respondents under 30 years old	69.8%	233
Respondents aged 30 and over	30.3%	121

EMT: Emergency Medical Technicians.

confirmed with confirmatory factor analysis (CFA). Model fit indices supported the six-factor structure: $\chi^2 = 1300.4$, $df = 495$, $\chi^2/df = 3.33$, $RMSEA = 0.078$, $CFI = 0.77$, $GFI = 0.71$, $TLI = 0.73$.

4.2. Differences by demographics and professional role

Analysis of the EMS-SAQ subscales according to demographics showed that scores were largely comparable across age and gender groups, with younger respondents reporting slightly higher stress recognition. In terms of job roles, patient transport personnel had the highest job satisfaction, teamwork climate, safety climate, working conditions, and management perception scores, whereas physicians reported the lowest working conditions and management perception but the highest stress recognition scores. Nurses generally scored between these groups (Table 2).

Younger respondents (<30 years) reported higher teamwork climate and stress recognition scores ($p = 0.038$ and $p = 0.008$, respectively) (Table 3). Male respondents reported higher perceptions of safety climate ($p = 0.033$). Less experienced personnel (<48 months) rated management support more positively ($p = 0.018$) and reported higher teamwork climate ($p = 0.026$) (Table 4). When the working conditions score, a subdimension of the Emergency Medical Services Safety Attitudes Questionnaire, was compared according to job roles among emergency department staff, a statistically significant difference was observed ($p = 0.008$). Post-hoc analysis revealed that patient care assistants had significantly higher scores than physicians ($p = 0.011$) (Table 5). Similarly, comparison of the stress recognition score across job roles showed a statistically significant difference ($p < 0.001$). Post-hoc testing indicated that physicians had significantly higher scores than both nurses and patient care assistants ($p < 0.001$, $p < 0.001$) (Table 5).

A statistically significant difference was also found in the job satisfaction score among different job roles ($p < 0.001$). Post-hoc analysis demonstrated that patient care assistants scored significantly higher than both nurses and physicians ($p < 0.001$, $p < 0.001$) (Table 5). For the teamwork climate score, a significant difference was detected between job roles ($p = 0.003$). Post-hoc results showed that patient care assistants had significantly higher scores than physicians ($p = 0.002$) (Table 5). Finally, analysis of the management perception score revealed a statistically significant difference across job roles ($p < 0.001$). Post-hoc testing indicated that patient care assistants scored significantly higher than both nurses and physicians ($p < 0.001$, $p = 0.001$) (Table 5). Overall, 40.6% of respondents reported having encountered errors with potential to harm patients, underscoring significant gaps in patient safety within EDs.

5. Discussion

This study validated the Turkish version of the Emergency Medical Services Safety Attitudes Questionnaire (EMS-SAQ) and assessed the

Table 2
EMS-SAQ Subscale Mean Scores by Demographics Data.

Demographic Data	Job Satisfaction (Mean ± SD)	Teamwork Climate (Mean ± SD)	Safety climate (Mean ± SD)	Working Conditions (Mean ± SD)	Management Perception (Mean ± SD)	Stress Recognition (Mean ± SD)
18–30 years	59.4 ± 22.1	57.8 ± 17.8	60.5 ± 16.1	52.7 ± 19.6	51.0 ± 20.2	72.3 ± 22.2
31–40 years	57.8 ± 17.8	54.3 ± 17.3	59.2 ± 14.4	52.8 ± 16.6	53.4 ± 18.8	65.9 ± 20.4
41 + years	59.5 ± 21.0	54.3 ± 13.0	56.4 ± 11.5	54.5 ± 14.4	51.5 ± 12.9	69.4 ± 25.6
Male	61.3 ± 20.5	58.2 ± 17.4	61.3 ± 15.5	53.6 ± 18.0	53.1 ± 20.0	71.0 ± 21.7
Female	57.3 ± 22.8	54.9 ± 17.4	58.2 ± 15.1	52.0 ± 19.0	50.0 ± 18.4	69.9 ± 22.8
Doctor	55.6 ± 20.8	53.4 ± 16.4	59.5 ± 15.5	49.2 ± 17.6	45.3 ± 17.3	78.0 ± 19.1
Nurse	57.5 ± 21.8	57.1 ± 17.5	58.9 ± 15	54.4 ± 19.2	52.5 ± 17.9	66.5 ± 22.6
Patient transport personnel	73.3 ± 17.5	63.1 ± 17.6	65.2 ± 14.3	57.5 ± 15.9	64.2 ± 20.3	61.6 ± 24.0
EMT	64.7 ± 22.0	59.3 ± 19.2	55.1 ± 18	57.1 ± 21.6	55.6 ± 22.2	72.0 ± 17.9

*SD; standard deviation, EMT; emergency medicine technician.

Table 3
Comparison of Significant Variables by Age.

Variables	Age	n	Mean ± SD	p
Teamwork Climate Score	< 30	227	58,19 ± 17,49	0,038*
	>30	162	54,68 ± 17,19	
Stress Recognition Score	< 30	227	21,98 ± 67,41	0,008*
	>30	162	22,26 ± 70,28	
I have colleagues intending to leave this institution for another job.	< 30	227	3,16 ± 1,25	<0,001*
	>30	162	3,60 ± 1,21	
I have training to prevent patient injury during transport.	< 30	227	3,82 ± 1,04	0,011*
	>30	162	4,04 ± 1,07	
I have the necessary equipment to prevent patient injury during transport.	< 30	227	3,60 ± 1,03	0,016*
	>30	162	3,84 ± 1,00	

SD: Standard deviation, p: p value. Mann Whitney U test was used in comparisons between groups.

* Statistically significant at $p < 0.05$.

patient safety culture perceptions of healthcare personnel working in emergency departments in Türkiye. The results demonstrate that the EMS-SAQ is a valid and reliable tool for measuring patient safety culture in this high-risk setting, consistent with previous validations conducted in other countries such as Saudi Arabia, Denmark, China, and Iran [14–17]. Our findings revealed significant variations in safety culture perceptions across demographic and professional groups [18,19]. Younger personnel and those with less work experience tended to report more positive teamwork climate and management support, while physicians reported higher stress recognition compared to other professional groups [20,21]. These findings are aligned with studies indicating that professional role, workload, and hierarchical structures influence perceptions of patient safety culture [4,20,21].

5.1. Comparison with global frameworks

The results of this study correspond with the broader international literature on patient safety [1,3]. Global frameworks developed by the World Health Organization (WHO) and the Agency for Healthcare Research and Quality (AHRQ) emphasize the importance of strong

Table 4
Comparison of variables according to the length of service of health care personnel in the unit they work in.

Variables	Length of Service	n	Mean ± SD	p
Management Perception Score	0–48 month	269	53,17 ± 20,15	0,018*
	>48 months	114	48,36 ± 17,13	
Job Satisfaction Score	0–48 month	269	61,06 ± 21,53	0,027*
	>48 months	114	55,75 ± 21,59	
Teamwork Climate Score	0–48 month	269	58,87 ± 16,96	0,001*
	>48 months	114	51,86 ± 17,73	
Safety Climate Score	0–48 month	269	61,01 ± 16,01	0,013*
	>48 months	114	57,45 ± 13,82	
The workload on staff at my institution is high.	0–48 month	269	4,24 ± 1,03	0,043*
	>48 months	114	4,48 ± 0,81	
Staff often do not adhere to institutional rules or regulations.	0–48 month	269	2,64 ± 1,12	0,043*
	>48 months	114	2,91 ± 1,24	
I have colleagues intending to leave this institution for another job.	0–48 month	269	3,21 ± 1,24	0,001*
	>48 months	114	3,98 ± 1,32	

SD: Standard deviation, p: p value. Mann Whitney U test was used in comparisons between groups.

* Statistically significant at p < 0.05.

teamwork, effective communication, and leadership support in building a sustainable patient safety culture [2,22]. European regional analyses similarly highlight that workload and resource constraints are key threats to safety climate in acute care settings [18,19].

5.2. Practical implications

The results provide important insights for policymakers and healthcare managers. First, leadership training programs should be implemented to promote safety-oriented management practices. Second, structured reporting systems and feedback mechanisms need to be strengthened to encourage error reporting and organizational learning. Third, targeted interventions aimed at improving teamwork and communication among ED personnel may help mitigate the negative effects of workload and stress. Finally, incorporating patient safety culture training into emergency medicine curricula may foster sustainable improvements.

5.3. Strengths and limitations

The main strength of this study lies in being the first to validate the EMS-SAQ for use in Turkish emergency departments, providing a psychometrically robust tool for measuring patient safety culture. The large and diverse sample of ED personnel enhances the generalizability of the findings. In addition, the comprehensive translation and adaptation

Table 5
Comparison of Significant Variables by Profession.

Variables	Profession	n	Mean ± SD	p
Job Satisfaction Score	Doctor	151	55,66 ± 20,82	<0,001*
	Nurse	156	57,53 ± 21,83	
	Patient transport personnel	56	73,30 ± 17,54	
	EMT	20	64,75 ± 22,30	
Teamwork Climate Score	Doctor	151	53,40 ± 16,41	0,003*
	Nurse	156	57,18 ± 63,13	
	Patient transport personnel	56	63,13 ± 17,62	
	EMT	20	59,33 ± 19,27	
Working Conditions Score	Doctor	151	49,21 ± 16,41	0,008*
	Nurse	156	57,18 ± 17,57	
	Patient transport personnel	56	57,55 ± 15,90	
	EMT	20	57,14 ± 21,68	
Management Perception Score	Doctor	151	45,31 ± 16,41	<0,001*
	Nurse	156	52,55 ± 17,96	
	Patient transport personnel	56	57,55 ± 15,90	
	EMT	20	57,14 ± 21,68	
Stress Recognition Score	Doctor	151	78,02 ± 19,17	<0,001*
	Nurse	156	66,55 ± 22,66	
	Patient transport personnel	56	61,69 ± 24,02	
	EMT	20	72,02 ± 17,96	

EMT: Emergency medical technicians, SD: Standard deviation, p: p value. Kruskal Wallis test was used in comparisons between groups.

* Statistically significant at p < 0.05.

process strengthens the validity of the Turkish version of the instrument.

Limitations include the cross-sectional design, which prevents causal inference, and the fact that the study was conducted only in university hospital EDs, potentially limiting generalizability to other settings. Furthermore, while the CFA and internal consistency analyses support the construct validity of the instrument, future studies may benefit from longitudinal or multi-center validation across different regions of Türkiye. Sensitivity analyses were not performed, which may limit the robustness of subgroup comparisons. Future studies incorporating sensitivity testing are warranted to confirm the stability of these findings. Additionally, although confirmatory factor analysis (CFA) was conducted and model fit indices were reported, factor loadings were not presented in detail. This omission limits the ability to assess the contribution of individual items to each factor and should be considered as a limitation of this study.

6. Conclusion

This study demonstrated that the Turkish version of the Emergency

Medical Services Safety Attitudes Questionnaire (EMS-SAQ) is a valid and reliable tool for assessing patient safety culture among emergency department personnel. The instrument showed good internal consistency and acceptable construct validity, supporting its use in both research and practice.

The findings revealed important differences in safety culture perceptions across professional roles, gender, and levels of experience, underscoring the need for tailored interventions. Notably, high stress recognition among physicians and limited perceptions of management support among more experienced staff highlight priority areas for organizational improvement. These results have practical implications for healthcare leaders and policymakers in Türkiye. Strengthening leadership support, enhancing error reporting systems, and improving teamwork and communication are critical strategies for cultivating a stronger patient safety culture in emergency services. Integrating safety culture training into emergency medicine education may further contribute to sustainable improvements in patient outcomes.

In conclusion, by validating the EMS-SAQ in the Turkish context, this study provides a psychometrically robust instrument for evaluating patient safety culture in emergency departments and offers actionable insights for advancing safety and quality of care.

7. Availability of data and material

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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CRedit authorship contribution statement

Ziya Aygun: Writing – original draft, Supervision, Project administration, Methodology, Data curation. **Omer Yusuf Erdurmus:** Writing – review & editing, Writing – original draft, Resources, Methodology, Formal analysis. **Sinan Genc:** Writing – review & editing, Visualization, Supervision, Project administration. **Ayca Koca:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **Muge Gunalp Eneyli:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Formal analysis, Conceptualization. **Onur Polat:** Writing – review & editing, Supervision, Project administration, Investigation.

Ethics Approval

Scientific Research Ethics Committee of Ankara University Faculty of Medicine (Approval No: İ2-57-19, dated 18/07/2019). Written informed consent was obtained from all participants.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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