



Evaluation of University Students' Knowledge Levels Regarding Basic First Aid and Basic Life Support

Ömer Damar¹, Mahmut Yaman²

1 Mardin Artuklu University Faculty of Medicine, Department of Emergency Medicine, Mardin, Türkiye

2 Dicle University Faculty of Medicine, Department of Emergency Medicine, Diyarbakır, Türkiye

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Abstract

Background: Basic first aid and basic life support (BLS) constitute essential life-saving interventions in cases of sudden illness and trauma. Although university students are frequently exposed to emergency situations through social and academic activities, their knowledge levels regarding first aid and BLS remain insufficiently investigated. This study aimed to evaluate university students' knowledge levels regarding basic first aid and BLS.

Methods: This nationwide, multi-university, cross-sectional analytical survey included 852 students enrolled in multiple universities and faculties across Türkiye. Data were collected using a structured online questionnaire. Knowledge was assessed using a 28-item questionnaire covering basic first aid and BLS topics. Correct answers were scored as +1, incorrect answers as -1, and "I do not know" responses as 0. Statistical analyses were performed using the Mann-Whitney U and Kruskal-Wallis H tests.

Results: The mean knowledge score of the participants was 13.92 ± 6.56 . Medical school students achieved significantly higher scores compared with students from health sciences and non-health-related faculties ($p < 0.001$). Participants with certified first aid training demonstrated significantly higher knowledge scores ($p < 0.001$). Correct response rates were below 50% for several critical topics, including drowning, frostbite, epileptic seizure management, and chemical poisoning. Higher self-efficacy perceptions and greater willingness to attend training programs were significantly associated with higher knowledge scores.

Conclusion: University students demonstrated moderate levels of knowledge regarding basic first aid and BLS, with substantial deficiencies particularly among students from non-health-related faculties. Expanding standardized and mandatory first aid education programs at the university level may improve community-based emergency response capacity.

Keywords: First aid, basic life support, university students, cardiopulmonary resuscitation, knowledge level

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Correspondence / Yazışma Adresi: Ömer Damar, Mardin Artuklu University Faculty of Medicine, Department of Emergency Medicine, Zip code: 47200, Artuklu / Mardin, Türkiye e-mail: omerdamar@artuklu.edu.tr

Üniversite Öğrencilerinin Temel İlk Yardım ve Temel Yaşam Desteği Konusundaki Bilgi Düzeylerinin Değerlendirilmesi

Öz

Amaç: Temel ilk yardım ve temel yaşam desteği (TYD), ani hastalıklar ve travmatik olaylarda yaşam kurtarıcı erken müdahalelerin temelini oluşturmaktadır. Üniversite öğrencileri sosyal ve akademik yaşamları nedeniyle acil durumlarla karşılaşma açısından risk altında olmalarına rağmen, bu konudaki bilgi düzeyleri yeterince bilinmemektedir. Bu çalışmanın amacı, üniversite öğrencilerinin temel ilk yardım ve TYD konusundaki bilgi düzeylerini değerlendirmektir.

Yöntemler: Türkiye genelindeki farklı üniversite ve fakültelerde öğrenim gören 852 öğrencinin dahil edildiği çok üniversiteli, kesitsel ve analitik bir çevrim içi anket çalışması yürütüldü. Veriler yapılandırılmış çevrim içi anket formu ile toplandı. Bilgi düzeyi, temel ilk yardım ve TYD konularını kapsayan 28 soruluk bilgi testi ile değerlendirildi. Her doğru cevap +1, yanlış cevap -1 ve “bilmiyorum” yanıtı 0 puan olarak değerlendirildi. İstatistiksel analizlerde Mann-Whitney U ve Kruskal-Wallis H testleri kullanıldı.

Bulgular: Katılımcıların ortalama bilgi puanı 13.92 ± 6.56 olarak bulundu. Tıp fakültesi öğrencileri, sağlık bilimleri ve diğer fakülte öğrencilerine göre anlamlı derecede daha yüksek puan aldı ($p < 0.001$). Sertifikalı ilk yardım eğitimi alan öğrencilerin bilgi puanları anlamlı olarak daha yüksekti ($p < 0.001$). Boğulma, donma, epileptik nöbet yönetimi ve kimyasal zehirlenmeler gibi kritik konularda doğru cevap oranlarının %50'nin altında olduğu saptandı. İlk yardım öz-yeterliliği ve eğitime katılma istekliliği arttıkça bilgi puanlarının da anlamlı şekilde arttığı görüldü.

Sonuç: Üniversite öğrencilerinin temel ilk yardım ve TYD bilgi düzeyleri genel olarak orta düzeydedir ve özellikle sağlık dışı bölümlerde belirgin bilgi eksiklikleri bulunmaktadır. Üniversite düzeyinde standartlaştırılmış ve zorunlu ilk yardım eğitim programlarının yaygınlaştırılması toplum temelli acil müdahale kapasitesini artırabilir.

Anahtar kelimeler: İlk yardım, temel yaşam desteği, üniversite öğrencileri, kardiyopulmoner resüsitasyon, bilgi düzeyi.

INTRODUCTION

Basic first aid and basic life support (BLS) encompass critical interventions aimed at sustaining life until professional healthcare teams arrive in cases of sudden illness, trauma, cardiac arrest, drowning, airway obstruction, and various environmental emergencies. The World Health Organization reports that trauma and sudden cardiovascular events remain among the leading causes of mortality and morbidity, particularly in young adults¹. In cases of cardiac arrest, early recognition, prompt activation of emergency medical services, and effective cardiopulmonary resuscitation have been shown to significantly improve survival outcomes². Similarly, appropriate first aid practices performed at the scene in emergencies such as airway obstruction, severe bleeding, burns, electrical injuries, and poisoning may directly influence patient prognosis³. University students constitute a population with a high likelihood of encountering emergency situations due to crowded social environments, sports activities, laboratory

settings, and active participation in community events. Nevertheless, existing studies indicate that university students' knowledge levels regarding first aid and BLS are often inadequate, with more pronounced deficiencies observed among students enrolled in non-health-related departments^{4,5}. Factors such as educational level, studying in a healthcare-related field, and previous first aid training have been reported to influence knowledge levels⁶.

Evaluating university students' knowledge and awareness regarding first aid is considered an important public health issue in terms of improving community-based emergency response capacity. Appropriate interventions performed before professional medical teams arrive at the scene may reduce mortality, particularly in trauma and cardiovascular emergencies⁷. Current guidelines published by the European Resuscitation Council and the American Heart Association emphasize that educating the public in basic life support strengthens the early links in the chain of

survival^{2,8}. Studies conducted among university students have demonstrated that individuals who received first aid training possess significantly higher knowledge levels and greater willingness to intervene during emergencies^{1,9}. In addition, some studies have reported that students may hesitate to perform practical interventions despite having theoretical knowledge because of a lack of self-confidence¹⁰. This finding highlights the importance of evaluating not only knowledge levels but also self-efficacy perceptions and motivation toward training. Identifying knowledge deficiencies, particularly among students outside the healthcare field, may contribute to the planning of standardized first aid education programs at the university level. Furthermore, determining the specific areas in which knowledge gaps are more pronounced is important for the development of targeted educational strategies.

The aim of this study was to evaluate university students' knowledge of basic first aid and basic life support. The findings may help identify educational needs among university students and inform policies intended to strengthen community-based emergency response capacity.

METHODS

Study Design and Setting

This study was designed as a nationwide, multi-university, cross-sectional analytical online survey to evaluate university students' knowledge of basic first aid and basic life support (BLS). The study population comprised students enrolled in multiple universities and faculties across Türkiye. Data were collected using a standardized, structured online questionnaire. The survey link was disseminated online, and participants were recruited through voluntary convenience sampling.

Study Population and Participant Selection

Students aged 18 years or older who were actively enrolled at a university and provided voluntary informed consent were included. Participants who did not complete the questionnaire, did not

provide informed consent, or submitted inconsistent data were excluded. Inconsistent data were defined as multiple responses to the same question or logically incompatible response patterns. Participants were categorized into three groups: medical students; students enrolled in health-related programs, such as nursing, midwifery, pharmacy, and dentistry; and students enrolled in non-health-related programs. Data on sex, academic year, certified first aid training, previous emergency response experience, self-perceived first aid self-efficacy, and willingness to participate in university-organized first aid training were also recorded. Academic year was categorized as first, second, third, fourth, or fifth year and above.

Data Collection Tool and Measurements

Data were collected using a structured questionnaire consisting of three main sections. The first section included questions regarding sociodemographic and educational characteristics such as age, sex, faculty, academic year, history of certified first aid training, and previous experience in responding to emergency situations. The second section evaluated participants' self-perceived first aid self-efficacy and their willingness to participate in first aid training programs organized at the university. The third section consisted of 28 knowledge-based questions covering topics related to basic first aid and basic life support. The questionnaire content was prepared in accordance with the current basic life support recommendations of the European Resuscitation Council and the American Heart Association. The knowledge questionnaire included core topics such as the purpose of first aid, activation of emergency medical services, basic life support, airway obstruction, bleeding control, burns, fractures and dislocations, spinal injuries, myocardial infarction, stroke, hypoglycemia, drowning, electrical injuries, epileptic seizures, poisoning, animal bites and stings, and environmental emergencies.

Participants' knowledge levels were evaluated using a predefined scoring system. Participants received +1 point for each correct answer, 0

points for “I do not know” responses, and –1 point for incorrect answers. This scoring method was intended not only to measure the level of correct knowledge but also to evaluate the impact of misinformation on the overall knowledge score.

For each participant, the scores obtained from all questions were summed to calculate the total knowledge score. Higher total scores indicated greater knowledge regarding basic first aid and basic life support, whereas lower or negative scores indicated insufficient knowledge or a higher level of misinformation. The study was conducted solely based on questionnaire data.

Outcome Measures

The primary outcome measure of the study was the total knowledge score obtained from the basic first aid and basic life support knowledge questionnaire. Secondary outcome measures included the evaluation of the relationship between knowledge scores and variables such as sex, faculty type, academic year, history of certified first aid training, previous emergency intervention experience, self-efficacy perception, and willingness to participate in educational programs.

Data Management

Questionnaire responses were transferred to an electronic database. Before analysis, the data were checked for missing, duplicate, and inconsistent records. Incomplete questionnaires were excluded. No personally identifying information was used in the analysis, and all data were evaluated anonymously. Access to the electronic dataset was restricted to the researchers.

Ethics committee approval for the study was obtained from the Scientific Research Ethics Committee of Mardin Training and Research Hospital (Approval date: March 27, 2026; Approval number: 2026/03-08). Participation in the study was voluntary, and electronic informed consent was obtained from all participants before completion of the questionnaire form. No

interventional procedures were performed in the study, and all data were analyzed anonymously.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean $\pm$ standard deviation and median (interquartile range), whereas categorical variables were expressed as numbers and percentages. The normality of continuous variables was assessed using visual methods and appropriate normality tests. Since knowledge scores did not demonstrate a normal distribution, non-parametric tests were used for intergroup comparisons. The Mann–Whitney U test was applied for comparisons between two independent groups, while the Kruskal–Wallis H test was used for comparisons among three or more independent groups. For variables with statistically significant differences in the Kruskal–Wallis analysis, pairwise post-hoc comparisons were performed using the Mann–Whitney U test. The p-values obtained from post-hoc analyses were interpreted within the scope of exploratory analyses. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 852 university students were included in the study. The mean age of the participants was 21.6 ± 3.8 years (range: 18–46); 52.1% were female ($n = 444$) and 47.9% were male ($n = 408$). Of the participants, 26.8% were enrolled in a Faculty of Medicine, 18.8% in a Faculty of Health Sciences, and 54.5% in other faculties. First-year (29.3%) and second-year (31.0%) students constituted most of the sample, whereas students in the fifth year or above represented only 4.7%. Overall, 84.5% had not previously received certified first aid training, and 78.9% had never intervened in an emergency. Regarding first aid self-efficacy, 82.6% reported feeling either “slightly” or “moderately” competent, whereas only 3.8% considered themselves “highly” competent. If first aid training programs were organized at their university, 63.8% stated that

they would or definitely would participate (Table I).

Table I: Demographic Characteristics, First Aid Training Status, and Self-Efficacy of Participants (N = 852)

Variable	n	%	Mean $\pm$ SD / Range
Age (years)	852	—	21.6 $\pm$ 3.8 (18–46)
Sex			
Female	444	52.1	
Male	408	47.9	
Faculty			
Faculty of Medicine	228	26.8	
Faculty of Health Sciences	160	18.8	
Other Faculties	464	54.5	
Year of Study			
1st year	250	29.3	
2nd year	264	31.0	
3rd year	178	20.9	
4th year	120	14.1	
$\geq$ 5th year	40	4.7	
Certified First Aid Training			
Yes	132	15.5	
No	720	84.5	
Prior Emergency Response Experience			
Yes	180	21.1	
No	672	78.9	
First Aid Self-Efficacy			
None	116	13.6	
Low	352	41.3	
Moderate	352	41.3	
High	32	3.8	
Willingness to Attend University First Aid Training			
Definitely Would Not	84	9.9	
Undecided	224	26.3	
Would	386	45.3	
Definitely Would	158	18.5	
Total	852	100.0	

SD = standard deviation; data are presented as n (%) or mean $\pm$ SD [range].

The overall mean knowledge test score was calculated as 13.92 ± 6.56 (median: 15.0; IQR: 10–19). Comparison according to sex demonstrated no statistically significant difference between female (14.05 ± 6.66) and male (13.78 ± 6.45) students ($U = 93,120$, $p = 0.478$). According to faculty type, medical school students ($18.09 \pm$

4.48) achieved significantly higher scores compared with students from the Faculty of Health Sciences (14.54 ± 6.54) and students from other faculties (11.66 ± 6.37) ($H = 160.88$, $p < 0.001$). A statistically significant difference was also observed according to academic year ($H = 24.60$, $p < 0.001$), with the highest scores recorded among students in the fifth year or above (16.75 ± 6.36) and the lowest scores among fourth-year students (12.14 ± 6.99). Participants who had received certified first aid training (15.73 ± 6.64) demonstrated significantly higher scores compared with those without prior training (13.59 ± 6.49) ($U = 37,396$, $p < 0.001$). Previous emergency intervention experience did not have a statistically significant effect on knowledge scores ($U = 60,545$, $p = 0.982$) (Table II).

Table II: Comparison of First Aid Knowledge Scores by Sociodemographic and Educational Characteristics

Variable	n	Mean	SD	Median (IQR)	p value
Overall	852	13.92	6.56	15.0(10–19)	—
Sex					0.478
Female	444	14.05	6.66	15.0(10–19)	
Male	408	13.78	6.45	15.0 (9–19)	
Faculty					< 0.001
Faculty of Medicine	228	18.09	4.48	19.0(15–22)	
Faculty of Health Sciences	160	14.54	6.54	15.0(10–19)	
Other Faculties	464	11.66	6.37	13.0 (8–16)	
Year of Study					< 0.001
1st year	250	13.57	6.07	14.0(10–18)	
2nd year	264	14.95	6.14	15.0(11–19)	
3rd year	178	13.45	7.15	14.0 (8–19)	
4th year	120	12.14	6.99	13.0 (7–17)	
$\geq$ 5th year	40	16.75	6.36	17.5(13–21)	
Certified First Aid Training					< 0.001
Yes	132	15.73	6.64	17.0(12–21)	
No	720	13.59	6.49	14.0 (9–18)	
Prior Emergency Response Experience					0.982
Yes	180	13.75	6.98	15.0 (9–19)	
No	672	13.97	6.44	15.0(10–19)	

Scores range from –28 to +28 (correct = +1, incorrect = –1, don't know = 0). Mann–Whitney U test was used for two-group comparisons; Kruskal–Wallis H test was used for comparisons involving three or

more groups. IQR = interquartile range; SD = standard deviation; BLS = basic life support.

Analysis of the questionnaire items revealed that the highest correct response rates were observed for calling the emergency number 112 (94.1%), the chain of basic life support (88.1%), and the Heimlich maneuver (82.6%). Questions with correct response rates below 50% included drowning (25.7%), frostbite (26.9%),

epileptic seizure management (29.8%), chemical poisoning (33.5%), and scorpion/snake bites (40.1%). Of the 28 questions, 10 items (35.7%) had correct response rates exceeding the 70% threshold, whereas 9 questions (32.1%) had correct response rates below 50% (Table III).

Table III: Distribution of Responses to First Aid and Basic Life Support Knowledge Items (N = 852)

Item	Correct n (%)	Incorrect n (%)	Don't Know n (%)
Primary objective of first aid	566 (66.4%)	212 (24.9%)	74 (8.7%)
Information to provide when calling emergency services (112)	802 (94.1%)	24 (2.8%)	26 (3.1%)
The Protect–Alert–Rescue (PAR) chain in first aid	751 (88.1%)	23 (2.7%)	78 (9.2%)
Relationship between first aid and medication use	720 (84.5%)	78 (9.2%)	54 (6.3%)
How to perform a consciousness check	461 (54.1%)	235 (27.6%)	156 (18.3%)
Look–Listen–Feel method and its duration	590 (69.2%)	50 (5.9%)	212 (24.9%)
Chest compression rate and correct hand placement	524 (61.5%)	77 (9.0%)	251 (29.5%)
Compression-to-ventilation ratio in BLS	559 (65.6%)	45 (5.3%)	248 (29.1%)
Correct management of drowning	219 (25.7%)	306 (35.9%)	327 (38.4%)
Application of the Heimlich Maneuver for complete airway obstruction	704 (82.6%)	26 (3.1%)	122 (14.3%)
Initial management of severe bleeding	673 (79.0%)	37 (4.3%)	142 (16.7%)
Indications for tourniquet use	423 (49.6%)	135 (15.8%)	294 (34.5%)
Correct positioning for nosebleed	520 (61.0%)	106 (12.4%)	226 (26.5%)
Application of the shock position	521 (61.2%)	54 (6.3%)	277 (32.5%)
Management of chemical eye exposure	565 (66.3%)	79 (9.3%)	208 (24.4%)
Management of impaled foreign objects	630 (73.9%)	111 (13.0%)	111 (13.0%)
Immobilization technique for fractures/dislocations	690 (81.0%)	32 (3.8%)	130 (15.3%)
Patient immobilization in suspected spinal injury	676 (79.3%)	28 (3.3%)	148 (17.4%)
Management of suspected myocardial infarction	610 (71.6%)	21 (2.5%)	221 (25.9%)
Recognition of stroke signs	634 (74.4%)	22 (2.6%)	196 (23.0%)
Management of conscious hypoglycemic patient	493 (57.9%)	99 (11.6%)	260 (30.5%)
Incorrect folk remedies for burns	443 (52.0%)	187 (21.9%)	222 (26.1%)
Correct management of frostbite	229 (26.9%)	281 (33.0%)	342 (40.1%)
First action in electrocution	657 (77.1%)	42 (4.9%)	153 (18.0%)
Actions to avoid during epileptic seizure	254 (29.8%)	291 (34.2%)	307 (36.0%)
Correct management of scorpion/snake bites	342 (40.1%)	224 (26.3%)	286 (33.6%)
Management of heat stroke	458 (53.8%)	76 (8.9%)	318 (37.3%)
Management of chemical poisoning	285 (33.5%)	238 (27.9%)	329 (38.6%)

Scoring: +1 = correct answer, -1 = incorrect answer, 0 = don't know. Items are listed in the order they appeared in the questionnaire. BLS = basic life support; PAR = Protect-Alert-Rescue.

When the relationship between first aid self-efficacy and knowledge scores was evaluated, a statistically highly significant difference was observed among the groups ($H = 44.27$, $p < 0.001$). The lowest scores were found in participants who reported feeling “not at all” competent (11.36 ± 6.82), whereas the highest scores were observed in those who felt “moderately” competent (15.46 ± 6.22). Interestingly, participants who reported feeling “highly” competent had lower scores (13.75 ± 10.03) than the “moderately” competent group. A statistically significant difference was also identified between willingness to participate in university-based training programs and knowledge scores ($H = 8.92$, $p = 0.030$), with the “definitely willing to participate” group demonstrating the highest mean score (15.08 ± 6.30) (Table IV).

Table IV: Comparison of First Aid Knowledge Scores by Self-Efficacy and Willingness to Attend Training

Variable	n	Mean	SD	Median (IQR)	p value
First Aid Self-Efficacy					< 0.001
None	116	11.36	6.82	12.0(6–17)	
Low	352	13.24	6.03	14.0(9–17)	
Moderate	352	15.46	6.22	16.0(11–20)	
High	32	13.75	10.03	15.0(7–21)	
Willingness to Attend University First Aid Training					0.030
Definitely Would Not	84	13.26	8.61	15.0(8–20)	
Undecided	224	13.25	6.38	14.0(9–17)	
Would	386	13.98	6.19	15.0(10–18)	
Definitely Would	158	15.08	6.30	16.0(11–20)	

Note. Comparisons were performed using the Kruskal-Wallis H test. IQR = interquartile range; SD = standard deviation.

Pairwise post-hoc comparisons using the Mann-Whitney U test for faculty type and academic year variables demonstrated statistically highly significant differences between all faculty pairs (all $p < 0.001$). Medical school students scored significantly higher than

both Faculty of Health Sciences students ($U = 23,810$, $p < 0.001$) and students from other faculties ($U = 84,070$, $p < 0.001$). In addition, Faculty of Health Sciences students achieved significantly higher scores than students from other faculties ($U = 47,196$, $p < 0.001$). In academic year comparisons, second-year students scored significantly higher than first-year ($p = 0.002$), third-year ($p = 0.045$), and fourth-year students ($p < 0.001$), whereas students in the fifth year or above scored significantly higher than first-year ($p = 0.002$), third-year ($p = 0.013$), and fourth-year students ($p < 0.001$). No statistically significant differences were observed in comparisons between first- and third-year students, first- and fourth-year students, second-year and fifth-year-or-above students, or third- and fourth-year students ($p > 0.05$) (Table V).

Table V: Post-hoc Pairwise Comparisons of First Aid Knowledge Scores by Faculty and Year of Study

Comparison	U statistic	p value
Faculty (Kruskal-Wallis $H = 160.88$, $p < 0.001$)		
Faculty of Medicine – Faculty of Health Sciences	23,810	< 0.001
Faculty of Medicine – Other Faculties	84,070	< 0.001
Faculty of Health Sciences – Other Faculties	47,196	< 0.001
Year of Study (Kruskal-Wallis $H = 24.60$, $p < 0.001$)		
1st year – 2nd year	27,666	0.002
1st year – 3rd year	21,705	0.666
1st year – 4th year	16,235	0.199
1st year – ≥ 5 th year	3,483	0.002
2nd year – 3rd year	26,132	0.045
2nd year – 4th year	19,725	< 0.001
2nd year – ≥ 5 th year	4,524	0.144
3rd year – 4th year	11,840	0.111
3rd year – ≥ 5 th year	2,668	0.013
4th year – ≥ 5 th year	1,482	< 0.001

Post-hoc pairwise comparisons were performed using the Mann-Whitney U test. No correction for multiple comparisons was applied. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

DISCUSSION

In this nationwide, multi-university cross-sectional study, we evaluated the knowledge of 852 university students regarding basic first aid and basic life support (BLS). The overall mean knowledge score was moderate (13.92 ± 6.56), faculty type was the factor most strongly associated with knowledge, and certified training was associated with significantly higher scores. However, 84.5% of participants had never received certified first aid training, and correct response rates for several critical topics were below 30%, underscoring the need for structured educational programs.

The overall mean knowledge score observed in our study reflects a moderate level when compared with international studies conducted in similar populations. Roshana Amatya and colleagues reported inadequate BLS knowledge levels among both healthcare and non-healthcare professionals in Nepal and demonstrated that non-healthcare participants had particularly low rates of correctly identifying CPR steps¹¹. Similarly, Cruz and Lito, in a study involving 427 university students in Portugal, showed that although 57.6% of students from healthcare-related departments had received BLS training, access to training remained substantially limited among non-healthcare students, resulting in a marked knowledge gap between the two groups¹². These findings are consistent with the relatively low mean scores observed among students from non-health-related faculties in our study (11.66 ± 6.37) and suggest that the knowledge deficiency within this student group may represent a structural educational problem.

Comparisons according to faculty type constituted the strongest finding of our study. Medical school students (18.09 ± 4.48) scored significantly higher than both Faculty of Health Sciences students (14.54 ± 6.54) and students from other faculties (11.66 ± 6.37) ($H = 160.88$, $p < 0.001$). Baklola and colleagues, in a cross-

sectional study involving 1,165 students from six different faculties in Egypt, similarly reported that medical students had significantly higher BLS knowledge scores compared with students from non-health-related departments¹³. In the same study, previous CPR training was emphasized as a factor simultaneously improving both knowledge and self-confidence, demonstrating a pattern parallel to our findings. Furthermore, the significantly higher scores achieved by Faculty of Health Sciences students compared with students from other faculties ($U = 47,196$, $p < 0.001$) may be attributed to the educational advantage provided by practical first aid content included in programs such as nursing, midwifery, and emergency medical technician training.

The positive effect of certified first aid training on knowledge scores (trained: 15.73 ± 6.64 vs. untrained: 13.59 ± 6.49 ; $U = 37,396$, $p < 0.001$) is consistent with strong evidence reported in the international literature. In the European Resuscitation Council educational guidelines, Greif and colleagues emphasized that curriculum-integrated BLS education improves knowledge retention in both laypersons and healthcare professionals while strengthening the early links in the chain of survival¹⁴. Likewise, Böttiger et al., in their ERC position statement published within the framework of the 'Kids Save Lives' initiative, demonstrated that structured BLS education beginning at school age may significantly improve survival rates at the societal level¹⁵. Nevertheless, the observation that only 15.5% of participants in our study had received certified training suggests that integrating mandatory first aid education into university curricula in Türkiye should become a priority educational policy objective.

Previous emergency intervention experience was not found to have a statistically significant effect on knowledge scores ($U = 60,545$, $p =$

0.982). This finding is in line with studies demonstrating that real-life experience alone cannot substitute for structured education. Indeed, Mpotos and colleagues, in a large-scale study involving 4,273 teachers, showed that even individuals with prior emergency experience could still exhibit deficiencies in knowledge and practical skills independent of structured BLS training, emphasizing that the quality of education is a much stronger determinant than experiential continuity¹⁶. Regarding sex differences, no statistically significant difference was observed between female and male students ($p = 0.478$), a finding similarly reported in studies conducted among primary and secondary school teachers in Türkiye^{17,18}.

The relationship between academic year and knowledge scores demonstrated a non-linear pattern ($H = 24.60$, $p < 0.001$). The highest mean score was observed among students in the fifth year or above (16.75 ± 6.36), whereas the lowest mean score was recorded among fourth-year students (12.14 ± 6.99). A possible explanation for this fluctuating pattern is that the fourth academic year corresponds to an intensive transition period between preclinical and clinical education, during which students are exposed to a substantial theoretical workload. In the study conducted by Baklola et al., students in advanced academic years were also reported to possess stronger BLS knowledge; however, the authors emphasized that this relationship should be interpreted independently from faculty type¹³.

Item-level analysis revealed several critical knowledge gaps. Correct response rates remained markedly below the 50% threshold for drowning (25.7%), frostbite (26.9%), inappropriate interventions during epileptic seizures (29.8%), chemical poisoning (33.5%), and scorpion/snake bites (40.1%). These deficiencies may be associated with deeply

rooted, non-evidence-based misconceptions commonly encountered in the community, such as applying abdominal pressure in drowning victims, rubbing frostbitten tissue, restraining convulsions during seizures, and cutting or sucking snakebite wounds. Cruz and Lito reported that similar misconceptions were particularly prevalent among non-healthcare students and emphasized that such beliefs could be corrected more effectively through structured education rather than awareness campaigns alone¹². In contrast, the high correct response rates observed for calling the emergency number 112 (94.1%), the chain of survival (88.1%), and the Heimlich maneuver (82.6%) suggest that public awareness campaigns delivered through mass media have achieved effective message dissemination in these areas.

The positive association between first aid self-efficacy and knowledge scores ($H = 44.27$, $p < 0.001$), as well as the significant relationship between willingness to participate in training programs and knowledge level ($H = 8.92$, $p = 0.030$), represent notable findings of the present study. The highest mean score observed in the “definitely willing to participate” group (15.08 ± 6.30) may indicate that greater knowledge enhances motivation toward training or that highly motivated individuals make greater efforts to expand their knowledge. The educational guidelines published by Greif et al. also emphasized the contribution of self-confidence and motivation to knowledge acquisition and highlighted that these variables should be evaluated together with objective knowledge assessments¹⁴. Furthermore, the finding that 63.8% of participants expressed willingness to attend university-based first aid training programs suggests a strong readiness for education within this population and provides a favorable foundation for future educational intervention programs.

LIMITATIONS

This study has several important limitations. First, only theoretical knowledge was assessed, and practical skill performance could not be evaluated; therefore, a high knowledge score does not necessarily indicate the ability to intervene appropriately in a real-life emergency. Second, although participants were recruited from multiple universities across Türkiye, the online convenience-sampling approach and voluntary participation may have introduced selection bias, and the sample may not fully represent all university students in the country. Third, the content, duration, and timing of previously received certified first aid training were not investigated, preventing identification of the specific educational components associated with knowledge scores.

CONCLUSION

University students had moderate first aid and BLS knowledge, with the greatest deficiencies among students in non-health-related faculties and in critical topics such as drowning, frostbite, seizure management, and chemical poisoning. Higher scores among medical students and participants with certified training support the expansion of standardized first aid and BLS education across university curricula, particularly for students outside health-related programs. Improving these competencies may strengthen community preparedness for emergencies and contribute to reducing preventable morbidity and mortality through earlier and more appropriate bystander intervention.

Ethical Approval: Ethics committee approval for the study was obtained from the Scientific Research Ethics Committee of Mardin Training and Research Hospital (Approval date: March 27, 2026; Approval number: 2026/03-08).

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