RESEARCH ARTICLE/ARAŞTIRMA

Current Knowledge and Awareness Level of Health Personnel on Basic Life Support

Sağlık Personellerinin Temel Yaşam Desteği Konusunda Güncel Bilgi Ve Farkındalık Düzeyi

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Abstract

Aim	This study aimed to assess the knowledge and awareness of health personnel regarding basic life support.
Materials and Methods	A ten-question questionnaire was prepared based on the American Heart Association's Basic Life Support guidelines and the European Resuscitation Council's COVID-19 guidelines, updated in 2020, to measure participants' demographic characteristics, basic life support training, practice status, and knowledge levels. The study was completed with the participation of 421 individuals. The health personnel were grouped according to the departments in which they worked and the status of their healthcare provision, and the data were compared between the groups. The first group consisted of personnel who did not provide healthcare, and the second group consisted of those who provided healthcare services
Results	The study was completed with 158 participants in the first group and 263 participants in the second group. Approximately 70% of the participants in both groups had received basic life support training. The basic life support knowledge level was good in the second group and low in the first group. There was no statistically significant difference in gender, age, and tenure regarding basic life support scores. The total basic life support score was higher for information processing personnel and laboratory technicians in the first group and for doctors in the second group compared to other occupational groups. In both groups, knowledge of basic life support and the use of automatic external defibrillators was outdated. However, the knowledge of basic life support and personal protective equipment among patients with COVID-19 was up to date.
Conclusion	The basic life support knowledge level differs among health personnel in the department and occupation. Enhancing participation in basic life support training, updating the training, and increasing practical applications may improve the knowledge and education level of healthcare personnel.
Keywords	Resuscitation, Basic life support, Health personnel

Özet

Amaç	Bu çalışma sağlık personelinin temel yaşam desteği (TYD) konusundaki bilgi düzeyini ve farkındalığını değerlendirmeyi amaçlamıştır.
Gereç ve Yöntemler	Katılımcıların demografik özelliklerini, temel yaşam desteği eğitimlerini, uygulama durumlarını ve bilgi düzeylerini ölçmek için Amerikan Kalp Derneği'nin (AHA) TYD ve Avrupa Resüsitasyon Konseyi'nin 2020 yılında güncellenen COVID-19 kılavuzları temel alınarak hazırlanan on soruluk bir anket formu kullanılmıştır. Çalışma 421 kişinin katılımı ile tamamlanmıştır. Sağlık personeli çalıştıkları bölümlere ve sağlık hizmeti sunma durumlarına göre gruplandırılmış ve veriler karşılaştırılmıştır. Sağlık hizmeti vermeyen sağlık personeli birinci grubu, sağlık hizmeti verenler ise ikinci grubu oluşturmuştur.
Bulgular	Çalışma birinci grupta 158, ikinci grupta 263 katılımcı ile tamamlanmıştır. Her iki gruptaki katılımcıların yaklaşık %70'i temel yaşam desteği eğitimi almıştır. TYD bilgi düzeyi birinci grupta düşük ikinci grupta iyi düzeyde bulunmuştur. . TYD puanları açısından cinsiyet, yaş ve görev süresi arasında istatistiksel olarak anlamlı bir fark bulunmamıştır. Toplam TYD desteği puanı birinci grupta bilgi işlem personeli ve laboratuvar teknisyenlerinde, ikinci grupta ise doktorlarda diğer meslek gruplarına kıyasla daha yüksektir. Her iki grupta da TYD ve otomatik eksternal defibrilatörler hakkındaki bilgi durumu güncel bulunmamıştır. Ancak COVID-19 hastalarında temel yaşam desteği ve kişisel koruyucu ekipman bilgisi güncel bulunmuştur.
Sonuç	Temel yaşam desteği bilgi düzeyi sağlık personeli arasında çalışılan bölüm ve mesleğe göre farklılık göstermektedir. Temel yaşam desteği eğitimlerine daha fazla katılımın sağlanması, eğitimlerin güncellenmesi ve pratik uygulamaların artırılması sağlık personelinin bilgi ve eğitim düzeyini artırabilir.
Anahtar Kelimeler	Resüsitasyon, Temel Yaşam Desteği, Sağlık Personeli

INTRODUCTION

The primary goal of all medical interventions is to preserve life. Cardiopulmonary arrest (CPA) is the cessation of adequate heart function and respiration and results in death without reversal. The classic triad is loss of consciousness, absence of respiration, and absence of pulse. All emergency procedures used to resuscitate a patient with CPA are called cardiopulmonary resuscitation (CPR). Two levels of resuscitation are defined as basic life support (BLS) and advanced cardiac life support (ACLS). The main goals of CPR are early recognition of sudden cardiac arrest, immediate activation of the emergency response system, early chest compressions, and defibrillation with an automatic external defibrillator (AED)(1). CPR can be performed by healthcare professionals or non-healthcare professionals trained in this subject (2). The latest guidelines, updated in 2020, were published by the American Heart Association (AHA) and the European Resuscitation Council (ERC). The SARS-CoV-2 pandemic began in January 2020 and dramatically changed many aspects of life, from community interactions to patient care. Therefore, the BLS guidelines recommend various applications emphasizing rescuers' safety for COVID-19 cases and using personal protective equipment (PPE) for different transmission routes (3). BLS guidelines recommend that BLS practices include all healthcare personnel (4). However, the definition of health personnel is comprehensive and includes physicians and nurses who are responsible for the care and treatment of patients, as well as other health personnel. The ERC states that health personnel working in clinics or non-clinical units with a relatively low likelihood of encountering CPA may participate in CPR and AED courses for in-hospital resuscitation training alongside physicians and nurses (1). Although it is not expected that health personnel working in different units and occupations have the same need to follow current information about CPR, it is an important question to what extent they have current CPR information and to what extent revised information and outdated information are confused when evaluated in general terms (4). Therefore, providing CPR training in healthcare organizations and updating it regularly is essential. In the literature, numerous studies have assessed the knowledge levels of healthcare personnel, including physicians and nurses. Still, few studies evaluated the BLS knowledge level of other healthcare personnel who do not provide healthcare services. This study aimed to determine the level of knowledge of CPR among health personnel working in various units, assess the currency of their knowledge, and identify any differences in knowledge between occupational groups.

MATERIALS AND METHODS

The study was initiated with the approval of the ethics committee (Ankara Dr. Abdurrahman Yurtaslan Oncology Training and Research Hospital (2021-01/933) and was conducted in accordance with the Declaration of Helsinki.

The data were collected using a questionnaire technique, and the study was conducted between February 15, 2021, and March 15, 2021. The questionnaire form for the study consisted of two main sections. In the first part, the participants' sociodemographic characteristics (gender, age, tenure, and duties) were examined, comprising four questions regarding their BLS/AED training and practice status. The second part consisted of ten multiple-choice questions assessing the BLS knowledge level. Knowledge-level questions were based on the updated BLS guideline of the AHA and the COVID-19 guideline of the ERC. One point was awarded for a correct answer, and no points were given for incorrect answers; thus, BLS knowledge levels were evaluated on a 10-point scale. A score of 0-4 was considered a low level of knowledge, 5-7 a medium level of knowledge, and 8-10 a high level of knowledge. The questionnaire forms were directed to volunteer healthcare personnel (information processing personnel, medical secretaries, laboratory and radiology technicians, cleaning personnel, security guards, patient care personnel, physicians, nurses, health officers, and anesthesia technicians) working in different units in our hospital who volunteered to participate in the study. Four hundred fifty participants completed the study questionnaire, and the study was finalized with 421 participants who answered the questionnaire thoroughly. Participants who answered multiple-choice questions in the questionnaire and left any questions blank were excluded from the study. Participants were divided into two groups, analyzed, and their data were compared. Personnel without patient care and treatment duties (Information processing personnel, medical secretaries, laboratory and radiology technicians, cleaning personnel, security staff, and patient care personnel) constituted the first group, and health personnel who have patient care and treatment duties and frequently encounter arrest cases (specialist physicians, assistant physicians, family physicians, nurses, health officers, anesthesia technicians) constituted the second group.

Statistical Analysis

Data were analyzed with SPSS (Statistical Package for Social Sciences) version 25.0 (IBM, Armonk, NY, USA). Results were expressed as frequencies and percentages. Normality analysis was performed using the Kolmogorov-Smirnov test. The age variable, which is not normally distributed, was presented as the median and interquartile range (IQR: 25-75 percentiles).

The chi-square test was used to compare the ratio of correct answers between the groups. Spearman correlation analysis was performed to examine the variables correlated with the total score of TYD. P< 0.05 was accepted for statistical significance.

RESULTS

The data of 421 healthcare personnel, 158 in the first group and 263 in the second group, were analyzed. The median age of the health personnel in the first group was 38 years, and 53.7% were male. The median age of the healthcare personnel in the second group was 33 years, with most individuals being women (66.4%). The most frequent occupational groups in the first group were cleaning staff, security guards, and radiology technicians, while in the second group, nurses, specialists, and assistant physicians were represented, respectively. The participants' demographic characteristics and occupational groups are presented in Tables 1 and 2, respectively. Sixty-five point eight percent of the participants in the first group and 70.3% in the second group had received theoretical and practical training on a model at least once. 1.9% of the participants in the first group and 26.6% in the second group had received AED training and using an AED. 8.2% of the participants in the first group and 64.2% in the second group had performed BLS on an adult patient.

Table 1: Demographic characteristics of the participants

	1. Grup (n=158) (N/%)	2. Grup (n=263) (N/%)
Gender (n/%)		
Female	73 (46,2)	176 (66,9)
Male	85 (53,8)	87 (33,1)
Age(Median-IQR)	38.0 (32.0-45.0)	33.0 (25.0-42.0)
Task duration (n/%)		
1-5 years	22 (14.0)	119 (45.3)
6-10 years	47 (29.7)	28 (10.6)
11-15 years	46 (29.1)	29 (11.0)
16-20 years	22 (13.9)	32 (12.2)
21-25 years	9 (5.7)	24 (9.1)
> 25 years	12 (7.6)	31 (11.8)

IQR: Interquartile range

Table 2: Occupational groups of the participants

Group 1 (n=158)	N/%	Group 2 (n=263)	N/%
Information processing personnel	18 (11.4)	Specialist doctor	37 (14.1)
Medical secretary	15 (9.5)	Assistant doctor	21 (8.0)
Laboratory technician	9 (5.7)	General practitioner	14 (5.3)
Cleaning staff	45 (28.5)	Family doctor	10 (3.8)
Security staff	35 (22.2)	Nurse	157 (59.7)
Patient care staff	10 (6.3)	Health officer	18 (6.8)
Radiology technician	24 (15.1)	Anesthesia technician	6 (2.3)

58.9% of the health personnel in the first group and 7.6% in the second group declared that they would not intervene due to fear of harming the patient when encountering a CPA case and would prefer to call 112 instead. The participants' history of BLS training and practice information is shown in Table 3. The survey questions for assessing BLS knowledge level are presented in Table 4, and the correct and incorrect answer ratios are shown in Table 5.

The correct answer rates of the health personnel in the first group were above 50 for only four questions (1, 3, 8, and 10) out of the ten questions, and the median total score was 4.0. Their level of knowledge was considered low. There was no correlation between age and tenure and the BLS score (p = 0.456, p = 0.411). The BLS score was higher in male participants (p = 0.039). A significant difference was found between the BLS scores of health personnel in terms of job (p<0.01).

The highest BLS score was found in information processing personnel and laboratory technicians, while the lowest score was observed in cleaning and patient care staff within the same group. The median BLS score of the health personnel in the second group was 8. The level of knowledge was considered to be good. There was no significant difference between BLS scores regarding gender, age, and tenure (p=0.916, p=227, p=0.453, respectively).

Table 3: Questions about the basic life support training history of the participants

Questions	Group 1(n=158)	Group 2 (n=163)
1. Have you had theoretical and practical training on a model in our hospital about basic life support?		
No, I have not	54 (34.2)	78 (29.7)
Yes, I had theoretical education and practical training on a model once	62 (39.2)	100 (38.0)
Yes, I had theoretical education and practical training on a model many times	23 (14.6)	64 (24.3)
Yes, I had theoretical education once, but I had no practical training on a model	12 (7.6)	16 (6.0)
Yes, I had theoretical education many times, but I had no practical training on a model	7 (4.4)	5 (2.0)
2. Have you performed basic life support for an adult patient?		
No, I have never performed	126 (79.8)	83 (31.6)
Yes, I have performed	13 (8.2)	169 (64.2)
Yes, I have performed on a model	19 (12.0)	11 (4.2)
3. Which one do you prefer in a condition where basic life support should be done? (In an unconscious patient without respiration and circulation)		
I do not take any action due to fear of harming the patient, and I call 112	93 (58.9)	20 (7.6)
I only perform a heart message without any hesitation and call 112	15 (9.5)	26 (9.9)
I only give mouth-to-mouth resuscitation and call 112	5 (3.2)	2 (0.7)
I call 112, start the cardiac massage, ensure the airway is open, and give mouth-to-mouth resuscitation	39 (24.6)	133 (50.6)
I call 112, start the cardiac massage, ensure the airway is open, give mouth-to-mouth resuscitation, and use an AED when necessary	6 (3.8)	82 (31.2)
4. Have you had training in AED? Have you ever used it?		
No, I haven't had training, and I haven't used it	134 (84.8)	90 (34.2)
Yes, I have had training but haven't used it	21 (13.3)	103 (39.2)
Yes, I have had training and used it	3 (1.9)	70 (26.6)

AED: Automatic external defibrillator

Table 4: The survey questions for knowledge about basic life support

1. Respiratory and circulatory arrest of any person for any reason is described as cardiopulmonary arrest. Which one below matches this definition?
2. Basic life support involves non-drug interventions to open the airway and save a life, provide oxygen to the lungs through artificial respiration to a person whose heart has stopped, and ensure adequate blood flow to tissues by pumping blood from the heart with external cardiac massage. Which is the correct order of the components of basic life support?
3. What is the correct cardiac massage/respiration ratio for adults?
4. Which is correct for the cardiac massage application method in adults?
5. Which of the following is incorrect about providing airway patency and rescue breathing practices for an adult who does not breathe?
6. Which of the following is incorrect about rescue breathing practice for an adult who does not breathe?
7. Which of the following does not take part in the algorithm for public rescuers?
8. Please put in order the following basic life support applications correctly
9. What should be the minimum frequency of cardiac massage in adults?
10. Please put in order the following basic life support applications in a patient with COVID-19 for public rescuers correctly

Table 5: Correct and Incorrect Answer Rates of Basic Life Support Survey Questions

	Group 1(n=158)	Group 2 (n=263)
Questions	Correct answer (n/%)	
1.	110 (69.6)	223 (84.8)
2.	24 (15.2)	62 (23.6)
3.	85 (53.8)	230 (87.5)
4.	74 (46.8)	215 (81.7)
5.	47 (29.7)	135 (51.3)
6.	66 (41.8)	198 (75.3)
7.	20 (12.7)	53 (20.2)
8.	88 (55.7)	203 (77.2)
9.	41 (26.0)	213 (81.0)
10.	82 (51.9)	190 (72.2)

Table 6: Basic life support scores according to occupations

Group 1 (n=158)	BLS score (median; IQR)	Group 2 (n=263)	BLS score (median; IQR)
Information processing personnel	5.0 (3.8-6.3)	Specialist doctor	7.0 (6.0-8.0)
Medical secretary	4.0 (3.0-5.0)	Assistant doctor	6.0 (6.0-8.5)
Laboratory technician	5.0 (2.5-6.0)	General practitioner	7.0 (7.0-8.0)
Cleaning staff	3.0 (2.0-4.5)	Family doctor	6.0 (4.8-7.3)
Security staff	4.0 (3.0-6.0)	Nurse	6.0 (5.0-8.0)
Patient care staff	3.0 (0.8-4.3)	Health officer	7.0 (4.8-8.0)
Radiology technician	4.0 (4.0-5.0)	Anesthesia technician	6.5 (3.8-8.3)

IQR: Interquartile range

The BLS score was higher among physicians than in other healthcare personnel when participants were grouped according to occupation ($p<0.01$). The BLS scores according to occupation are given in Table 6. Correct response rates in the physician group were higher than those of other healthcare providers in the first question ($p = 0.030$), the 4th question ($p = 0.011$), and the 5th question ($p = 0.034$). The lowest correct response rates for health personnel in both groups were found in questions 2 and 7.

DISCUSSION

The knowledge and skill level of the health personnel who first encounter in-hospital CPA cases regarding CPR are the most crucial factors that enable fast and accurate intervention (5). BLS training plays a vital role in providing this knowledge and skill level. Approximately 70% of the healthcare personnel in this study had received Basic Life Support (BLS) training. In a similar study by Şener et al. (6), 79.3% of the participants had received BLS training and 71% received in-service training on BLS in the study by Çelikli et al. of training of healthcare workers are inadequate. Previously, BLS was taught to first responders such as healthcare workers, first aid workers, and rescue organizations; later, the emergence of evidence that early resuscitation interventions have a crucial role in increasing survival after cardiac arrest led to the spread of CPR training to a broader audience from children to teachers, from ordinary citizens to healthcare workers with different job descriptions (7). Research has shown that despite the prevalence of CPA witnessing, bystander administration of BLS is very infrequent (8, 9). Berdowski et al. demonstrated that early initiation of BLS by bystanders in CPA cases along with correct CPR administration, until help arrives, increases survival after arrest (9). It was estimated that approximately 50,000 lives could be saved each year with the early application of BLS (10). The proportion of participants in the first group who stated that they would apply BLS when they witnessed a CPA was 41.1% in our study. This might be because the participants in this group consisted of occupational groups without care and treatment duties, and most of them had not received Basic Life Support (BLS) training. Vorster and Beningfield found a critical lack of confidence in performing BLS among 74 imaging department staff, including radiologists, radiology assistants, nurses, and other staff, reporting that 4.8% of participants had not received BLS training and 37% had never performed BLS (10). Price et al. found that individuals who received resuscitation training were safer in their resuscitation practices in a study examining BLS training, knowledge level, and behaviors (11).

The participants' knowledge level in this study's first group was low. Yalçın et al. (12) found that the level of BLS knowledge among security and automation personnel before training was low. In a study conducted on security staff by Andsoy et al. (12), the correct response rate among participants before BLS training was 34.8%, indicating a low level of knowledge. In the first group of our study, the correct response rates were highest for questions regarding the definition of CPA (69.6%), the compression/ventilation ratio (53.8%), and BLS application steps for patients with and without COVID-19 infection (51.9% and 55.7%, respectively). Çelikli et al.(13) found that the correct response rates for the compression/ventilation ratio and BLS application steps in the group that included radiology and laboratory technicians and medical secretaries were 30% and 20%, respectively. Although the level of BLS knowledge, in general, was low in this group, it is important that they were aware of the main goals of BLS and that most of them correctly listed the steps of the BLS application. In our study, the knowledge level of the participants in the second group was rated as good. In our country, some studies reported

that the level of BLS knowledge and the frequency of training of healthcare workers are inadequate. Kavalcı et al. (14)found that only 54% of physicians working as research assistants in the Faculty of Medicine possessed an acceptable level of knowledge in a study on the BLS knowledge of healthcare workers. Bilir et al.(15) reported that physicians working in anesthesia and emergency services (ES) were more successful than those working in other departments in a study investigating the level of knowledge of BLS among physicians. Similarly, according to national and international guidelines, Galinski et al. (16) demonstrated that BLS knowledge among physicians and nurses was inadequate. On the other hand, Pourmırza et al. found that the BLS guideline awareness level among nurses working in a training and research hospital was good (17). Kaan et al.(18) found that the knowledge of basic life support and defibrillation among healthcare personnel working in a university hospital was good. In general, the data we obtained regarding the BLS knowledge level is similar to the literature. In the 2010 AHA resuscitation guidelines, the "BLS steps for adult and pediatric patients" were changed to C-A-B, and AED became a part of BLS. AEDs are administered by both healthcare personnel and non-healthcare personnel. Rescuers from the public should initiate chest massage without pulse control in the unresponsive patient (19). The recently published guideline incorporates the most up-to-date information available In this study, very few participants in both groups defined an AED within the steps of BLS in the second and seventh questions, and considered an AED an application that public rescuers can perform. The low rates of correct answers to these questions in both groups indicate that health personnel still possess knowledge from before 2010, have not updated their BLS knowledge, or have confused it with previous information. In the study conducted by Çelikli et al., 16.7% of the participants answered correctly the question of "How should the order of BLS applications be?" and 44% of the participants responded to the question " (13)Who should apply AED?" correctly, and the rate of healthcare personnel following current BLS information was found to be 34.7%. Similarly, Kallestedt et al.(20) found that 37% of healthcare workers were unaware of the current information about BLS in their 2010 study.

In the BLS algorithm for patients with COVID-19, it is stated: "The application of the maneuver of approaching the patient's face and feeling the breath, chin lift maneuver or head extension maneuver (look-listen-feel), which is normally performed to check whether the patient is breathing or not, is not recommended for checking whether the patient is breathing or not as it will put the rescuer at risk. Instead, the presence or abnormality of breathing should be assessed by observation. After the call for help, chest compressions should be initiated. However, since this may disperse aerosols, the patient's mouth should be covered with a mask or, if unavailable, with a piece of clothing to minimize the spread of the aerosol. It would be beneficial for the rescuer to wear a mask if available(3). In our study, it was observed that participants in both groups listed the steps of BLS application in patients with COVID-19 in the tenth question, which was in line with guideline recommendations, and provided correct answers at a rate above 50%. The knowledge and attitudes of healthcare professionals at high risk for COVID-19 are critical. No similar study about BLS knowledge in COVID-19 patients was found in the literature.

The following are some limitations of our study. This single-center study did not evaluate skill levels in practical applications. Since it was a questionnaire study, the participants answered the questions based on their thoughts, memories, and experiences. Including health personnel from different occupational groups and evaluating their knowledge levels may be considered a strength of the study.

The success of resuscitation is directly associated with the quality of training, training methods, and adherence to current guidelines.

CONCLUSION

In conclusion, better results can be achieved by increasing participation in BLS training, updating training materials in line with guidelines, increasing practical application, and providing materials to raise awareness and ensure that all employees have access to them. with solid knowledge and practical experience, participants can gain confidence and competence.

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