**International Journal of Evaluation and Research in Education (IJERE)**
Vol. 10, No. 3, September 2021, pp. 871~877
ISSN: 2252-8822, DOI: 10.11591/ijere.v10i3.21703 

# Students' knowledge and attitudes toward basic life support

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**Article Info**

***Article history:***

Received Feb 7, 2021
Revised Jun 20, 2021
Accepted Jul 16, 2021

***Keywords:***

Basic life support
Nursing students
Saudi Arabia
Training

**ABSTRACT**

Students spend a significant proportion of their day in colleges and healthcare facilities where they might experience medical emergencies, or unexpected accidents, that occur in these places. Nursing students are required to perform critical life support in a significant way. The aim of this research was to assess knowledge, attitudes, and training status regarding basic life support (BLS). In Taif University, Saudi Arabia conducted an online cross-sectional survey. The questions used in the questionnaire were prepared according to 2015 American Heart Association (AHA) guidelines. Most subjects (52.9%) reported that they had attended a BLS course. The average age of the participants in the sample was 21.64 years. The right responses were significantly affected by previous cardiopulmonary resuscitation (CPR) training (P=0.01). The students in this study found substantial differences between them: students with previous BLS training (58.3%) felt capable of offering CPR to their fellow college students, compared to (42.7%) in the community without previous training (P=0.01). Importantly, over all subjects the attitude to learning on a BLS training course was positive. This study concluded that the knowledge, skills and attitudes of trained students are better than those of untrained students.



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## 1. INTRODUCTION

Understanding basic life support (BLS) and cardiopulmonary resuscitation (CPR) is crucial for ensuring that individuals can provide life-saving care in an emergency [1], [2]. This can happen within one hour. Either the heartbeat is insufficient to keep the person alive or the heart stops functioning altogether [3]. Out-of-hospital cardiac arrest is a form of sudden cardiac arrest that occurs outside of a hospital (OHCA). Every year, approximately 60,000 out-of-hospital cardiac arrests (OHCA) occur in the United Kingdom, making it one of the countries with the highest rates of cardiovascular disease (CVD) in the world, with the emergency services attending to half of them [4]. Furthermore, studies suggest that cases in the Middle Eastern and North African (MENA) populations, including Saudi Arabia, will rise dramatically in the coming decades [5]. There will be an increase in the prevalence of cardiovascular diseases as people live longer [6]. In Saudi Arabia, the total number of CVD deaths in 2015 was 25,845, with a CVD death rate of 231.6 per 100,000. As a result, CVD accounted for more than 40% of all non-communicable disease-related deaths in Saudi Arabia [7].

The European Resuscitation Council has advocated for a policy that has been endorsed by the World Health Organization: encourage resuscitation education in schoolchildren starting at the age of 12, for 2 hours per year, in all European countries [8]. If even schoolchildren can perform CPR, a young doctor should be

able to handle a cardiac arrest as well. However, there is a significant lack of awareness about lifesaving techniques among students approaching graduation [9]. The aim of the current study is intended to evaluate the basic life support (BLS) knowledge, training status and attitudes among applied medical science students. It will evaluate their willingness to attend BLS training programmes and compare the knowledge and ability to provide cardiopulmonary resuscitation (CPR) between trained and untrained students.

## 2. MATERIAL AND METHODS

### 2.1. Study design and sample selection

The analysis was conducted between November and December 2020, with a cross-sectional research template and an online web survey tool. The Medical Ethics Research Committee at Taif University in Taif accepted the study protocol with application number 42-0046. Laboratory Science, Physical Therapy, Radiology Science, and General Nursing make up the College of Applied Medical Sciences' fourth department. Data was collected using a self-administered questionnaire to assess students' skills, training status, and attitudes toward BLS. The questionnaire's questions were written in accordance with the 2015 American Heart Association (AHA) guidelines [10]. The participants were chosen using a convenience random sampling process, and 170 students completed the questionnaire.

### 2.2. Questionnaires and data collection

The data were collected by means of questionnaire forms using an online web survey tool which was filled in by the students. A 28-point multiple choice questionnaire was developed specifically for this study. The survey was divided into three sections: 1) Demographics: five questions (gender, age, department, academic level, and marital status); 2) BLS knowledge level: five questions (gender, age, department, two questions about prior training and 15 theoretical or ability questions about familiarity with existing BLS guidelines were included in the survey, including one scenario of cardiac arrest depicting a real-life situation); 3) Attitudes to BLS: five questions were asked, including whether students should be mandated to have BLS training, an investigation of their willingness to learn, their confidence and the barriers to performing BLS.

The main dependent variables in this study are the student's knowledge and skills level, and attitudes to BLS. The main independent variables are the student age, gender, department, academic level, marital status, BLS training status, and the student capability to provide BLS.

Participants were also asked whether they had previously undergone BLS training, and the study population was split into two groups: those who had received training and those who had not. Students were informed about the study's intent, and the questionnaire was completed using an online web survey tool. The AHA and the European Resuscitation Council (ERC) 2015 guidelines were used to assess the proper cardiac arrest signs and BLS procedures. A scoring system was devised, with each correct answer receiving one point and no negative marking. Each participant received a total score.

### 2.3. Data analysis

The study was carried out using the statistical program SPSS 16.0. The t test for normally distributed quantities, the Mann-Whitney U test for non-parametrical variables, and the chi-square test for comparing percentages were used to investigate the differences between qualified and untrained students. Because of the large number of comparisons, we decided to use a 1% significance level ($p=0.01$). For each answer variable, a linear regression model was developed. The standardized coefficients were calculated by taking into account the following factors as independent variables: students' confidence about performing BLS for a victim status (conference or un-conference) age, gender, department, academic level, marital status, BLS course attendance and location of BLS course.

## 3. RESULTS

Table 1 shows the features of the student classes. There were 80 men and 90 women in attendance (7 married vs. 163 single). The average age of the study participants was 21.64 years, with a standard deviation of 2.16 years. There were four department categories: general nursing (55.3%) provided the most subjects for the study.

Table 1. Demographic characteristics and basic life support training status among students

| Characteristics | | N=170 | % |
|---|---|---|---|
| Age | Mean=21.64 | | |
| | SD=2.16 | | |
| Gender | Male | 80 | 47.1 |
| | Female | 90 | 52.9 |
| Department | Laboratory science | 19 | 11.2 |
| | Physical therapy | 36 | 21.2 |
| | Radiology science | 21 | 12.4 |
| | General nursing | 94 | 55.3 |
| Academic level | Pre-clinical level | 97 | 57.1 |
| | Clinical level | 73 | 42.9 |
| Marital status | Single | 163 | 95.9 |
| | Married | 7 | 4.1 |
| BLS course attendance | Yes | 90 | 52.9 |
| | No | 80 | 47.1 |
| Location of BLS course | Ministry of Health | 21 | 12.4 |
| | University | 44 | 25.9 |
| | School | 8 | 4.7 |
| | Others | 17 | 10 |
| | Nowhere, I didn't attend | 79 | 46.5 |
| Feel capable to provide BLS to | Student | 36 | 21.2 |
| | Co-worker | 6 | 3.5 |
| | Family Member | 15 | 8.8 |
| | Stranger in a supermarket | 0 | 0 |
| | Anybody | 68 | 40 |
| | Nobody | 45 | 26.5 |

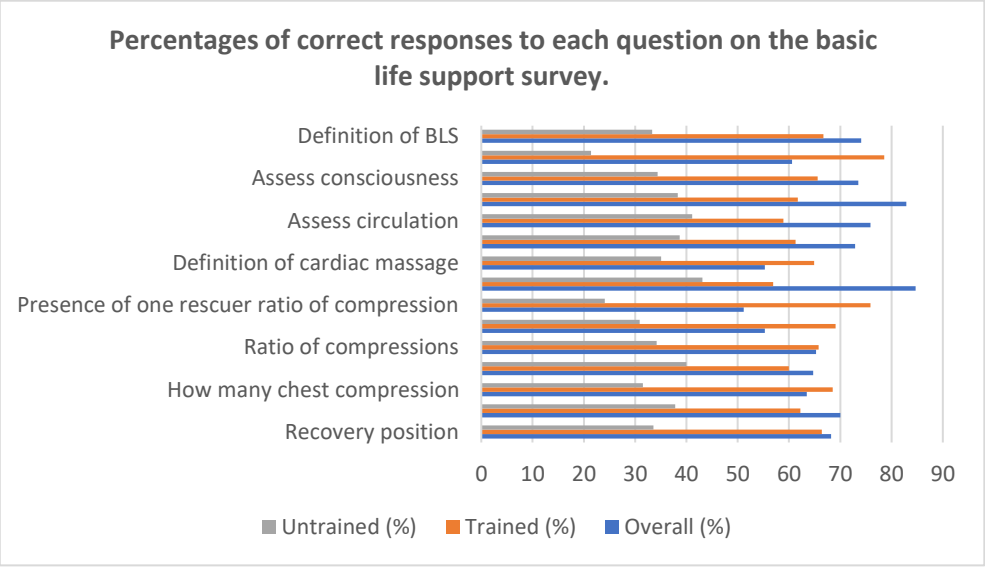
### 3.1. BLS training status

More than half of the respondents reported having previously taken a BLS course (52.9%). Most of the trained respondents had obtained their BLS training course in their university (25.9%).

### 3.2. Evaluation of CPR knowledge and skills

Figure 1 shows the percentage of correct answers for skills questions and ability demonstration. No student achieved full marks in the questionnaire and only 26 students (4.8%) answered over 70% (10/15) of the questions correctly. Students' performance on the knowledge and skills assessment (15 questions) was low.

The median for the correct response for the study population was 5/15 (4/15-7/15). For trained students, it was 6/15 (4/15-8/15) and for untrained students, it was 5/15 (3/15-7/15). Previous CPR training had a significant effect on the correct responses (P<0.01).




∗p<0.01

Figure 1. Percentages of correct responses to each question on the basic life support survey in trained and untrained groups

### 3.3. Attitude to BLS

Our study found strong and significant differences between students: 58.3% of students with previous BLS training felt capable of providing BLS to their college students compared to 42.7% in the group without previous training (P<0.01) as shown in Table 2. Importantly, overall, the willingness to have BLS training was positive. There were 86% students eager to attend a BLS course. Furthermore, trained students had a more positive attitude than untrained students and there were significant differences between trained and untrained students regarding their willingness to learn BLS training (p<0.01). Moreover, 61% of students reported that BLS training was not mandatory for students at their college.

Table 2. Training status and feeling capable of providing BLS

| Question Title | Trained (percentage) | Untrained (percentage) | *P* value |
|---|---|---|---|
| Feel capable to provide BLS to | | | *< 0.01** |
| Student | 21/91 (58.3%) | 15/79 (41.7%) | |
| Co-worker | 4/91 (66.7%) | 2/79 (33.3%) | |
| Family member | 9/91 (60%) | 6/79 (7.6%) | |
| Anybody | 56/91 (82.4%) | 12/79 (17.6%) | |
| Nobody | 1/91 (2.2%) | 44/79 (97.8%) | |

∗p<.001

There were significant differences between trained and untrained students regarding their confidence about performing BLS for a victim (59.8% trained, 40.2% untrained, p<0.05). Overall, 28.2% of students reported that they did not feel confident about performing BLS for a victim. Participants were asked about the barriers to performing BLS: 44.6% trained and 55.4% untrained students reported that conducting CPR incorrectly was a barrier likely to prevent them from performing BLS (p>0.01) as shown in Table 3.

Table 3. Training status, scenario, attitude and barriers to performing BLS

| | | Overall (%) | Trained (%) | Untrained (%) | *P* |
|---|---|---|---|---|---|
| A student develops cardiac arrest due to respiratory failure when no one is there except you, what would you do? (Scenario) n=170 | You would call Emergency Medical Services (EMS) and then start to resuscitate the victim | 68.8 | 53.0 | 47.0 | 0.983 |
| | You would start to resuscitation and then call EMS | 14.1 | 58.3 | 41.7 | |
| | You did not know what to do in such a situation | 6.5 | 27.3 | 72.7 | |
| | You would call EMS and would not start to resuscitation | 2.4 | 50.0 | 50.0 | |
| | You would notify the college principal and would not start resuscitation | 4.7 | 50.0 | 50.0 | |
| | You would notify the school headmaster and start to resuscitation | 3.5 | 83.3 | 16.7 | |
| Did your college mandated you to have BLS training? N=170 | Yes | 38.8 | 59.1 | 40.9 | 0.202 |
| | No | 61.2 | 49.0 | 51 | |
| Are you willing to learn BLS training? N=170 | Yes | 86.5 | 56.3 | 43.5 | 0.020 |
| | No | 13.5 | 30.4 | 69.6 | |
| Are you confidence to perform BLS for a victim? N=170 | Yes | 71.8 | 59.8 | 40.2 | <.01∗ |
| | No | 28.2 | 35.4 | 64.6 | |
| what the barriers to perform BLS? N=170 | Conducting CPR incorrectly | 32.9 | 44.6 | 55.4 | 0.374 |
| | In confidence to perform CPR | 16.5 | 60.7 | 39.3 | |
| | Fear | 25.9 | 59.1 | 40.9 | |
| | Afraid of consequence of CPR | 24.7 | 52.4 | 47.6 | |

∗p<.01

One cardiac arrest scenario was presented: a fellow student develops cardiac arrest due to respiratory failure when no one is there except the respondent. The results were as: 14% responded correctly that they would start resuscitation and then call EMS. About, (58.3%) vs (41.7%) of trained and untrained students, respectively, responded correctly to the scenario.

After taking into account other sociodemographic and educational factors, the multiple linear regression analyses overall model summary showed $R^2$=.60; the predictors age, gender, department, academic level, marital status and BLS course attendance account for 60% of the variance in student confidence about performing BLS for a victim, next, ANOVA table (alpha=.05 in the test). F (3, 168)=8.51, P.001 R2=.60 was a significant regression model overall. Moreover, only department and BLS course

attendance significant remained. The correlations of variables predicting students' confidence in performing BLS for a victim are shown in Table 4, which shows the correlates of variables predicting students' confidence in performing BLS for a victim department; (β=0.231, p 0.01). Participants who had previously completed BLS training were more secure in performing BLS on a victim (β=0.282, p 0.01). Age (β=-0.033, p=.720), gender (β=0.023, p=0.771), academic level (β=0.056, p 0.520), and marital status (β=-0.060, p=0.442) were all non-significant sociodemographic and educational variables.

Table 4. Results of multiple linear regression tests of variables that predict confidence about performing BLS for a victim

| | β | 95% Confidence interval | | *p* |
|---|---|---|---|---|
| Age | -0.033 | -0.045 | 0.031 | 0.720 |
| Gender | 0.023 | -0.119 | 0.160 | 0.771 |
| Department | 0.231 | 0.027 | 0.163 | < 0.01* |
| Academic level | 0.056 | -0.104 | 0.205 | 0.520 |
| Marital Status | -0.060 | -0.390 | 0.171 | 0.442 |
| BLS course attendance | 0.282 | 0.111 | 0.408 | < 0.01* |

*p<.01

## 4. DISCUSSION

To boost BLS training in the pre-graduation level, it may be appropriate to make BLS training a requirement for medical students to graduate. The aim of this study was to assess basic life support (BLS) skills, training, and attitudes among students at Taif University (TU) in Saudi Arabia's college of applied medical sciences. Out of 170 understudies who took part in this study, more than half of the respondents detailed already having taken a BLS course (52.9%). None of the participants replied all the questions correctly. The middle for the right reaction for the study population was 5/15 (4/15-7/15). For trained understudies, it was 6/15 (4/15-8/15) and for untrained understudies, it was 5/15 (3/15-7/15). Past CPR preparing had a critical impact on the right reactions (P<0.01), proving the study by Yousef, *et al.* [11]. Out of 370 medical students who participated in this study, 41% had received BLS training more than once, while 59% had received only a mandatory BLS course during their second academic year. None of the participants answered all the questions correctly. Although students who had received more than one BLS training scored higher (41.5% correct answers) than the students who had only had the mandatory class (39.5% mean correct answers), the difference in the scores was narrow and both showed a mean less than 50%, which was unsatisfactory these results are consistent with previous Saudi Arabian study, which has consistently found low BLS awareness [12], [13]. Furthermore, several countries have recorded low BLS awareness scores among health students [14]-[16].

Studies show that poorly performed and inefficient chest compressions and rescue breaths prevent successful CPR, while high-quality standard CPR produces 25–33% of normal cardiac production and oxygen delivery; as a result, competency in these two basic skills is essential [17], [18]. The research also revealed major differences between students: students with previous BLS training (58.3%) felt capable of delivering BLS to their peers, compared to students without previous BLS training (42.7%) (P=0.01). Other international studies have found that As BLS training is critical for improving knowledge and self-confidence in performing BLS when needed [19]-[21]. This may indicate that prior CPR experience is linked to greater CPR awareness. In our research, the most common obstacle to performing BLS when it was required was performing CPR incorrectly due to fear of the effects of CPR and a lack of confidence. Other research, on the other hand, found that the most common obstacle to conducting BLS was a lack of knowledge of the procedure. Training has been shown in studies to increase the ability to perform BLS [22].

Most of the subjects in this study were willing to attend a BLS training course. Some 86% of the students were eager to do so. Furthermore, trained students had a more positive attitude than untrained students, and there were significant differences between trained and untrained students regarding their willingness to learn BLS training (p<0.01). Moreover, (61%) of students reported that BLS training was not mandatory for students at their college. This result indicated that they had a strong belief in the value of BLS preparation. In contrast to this result, a study of health interns from different Saudi Arabian universities found that up to 70% of students believe BLS training should be included in college curricula [23]. A study has suggested that a BLS training course be included in the college curriculum to provide early exposure to BLS knowledge [20].

Moreover, our current study demonstrated a relationship between the department and BLS course attendance having an impact on confidence about performing BLS for a victim. The participants who had previous BLS training felt more confident about performing BLS for a victim (β=0.282, p<0.01). We did not find a correlation between confidence about performing BLS for a victim and students' age, gender and

academic level, in contrast to the study by Khalid, *et al.* [24] Training had an effect on general understanding and knowledge of CPR, according to the report. When one's educational level rose, so did their awareness. It has been recorded that individual who are older, less qualified, and have a lower income have a lower likelihood of CPR trust [25]-[29].

Finally, our current study revealed that many students (n=68/170, 40%) did not correctly identify cardiac arrest. In the case of cardiac arrest, another important aspect is the early activation of the emergency medical service. Rescuers should learn how and when to call the EMS. In this study, participants were presented a scenario in which a student develops cardiac arrest due to respiratory failure. However, in their responses, 68.8% of the participants said that they would call for help before trying to resuscitate the victim. This indicates that most of the participants do not know exactly when to call the EMS for help. This finding agreed with another study carried out in Turkey by Dursun, *et al.* [30], which observed almost the same result. Most teachers (n=330, 61%) did not correctly identify cardiac arrest. In the case of cardiac arrest, another important aspect is the early activation of the emergency medical service. Rescuers should learn how and when to call the EMS. In this study, participants were presented with a scenario in which a student develops cardiac arrest due to respiratory failure. However, in their responses, 81% of the participants said that they would call for help before trying to resuscitate the victim.

Students understand the value of BLS and are eager to participate in a BLS training course to further their awareness and skills. Despite the fact that qualified students' expertise was found to be superior to that of untrained students.

## 5. CONCLUSION

This study found that over all respondents, the attitude to learning on a basic life support (BLS) training course was positive. The study concluded that the knowledge, skills and attitudes of trained students are better than those of untrained students.

Our findings suggested that efficient and consistent cardiopulmonary resuscitation (CPR) preparation is important. Both health-care agencies and individual providers should be involved in ensuring that certain courses are attempted and completed, in order to increase trust in CPR success and potentially save lives. Future research is needed to assess the effects of different BLS preparation frequencies and groups on success in crisis situations.

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