

# Knowledge, Attitude and Practices of First Aid among Non-medical Students of Karachi University

Zaeema Ahmer<sup>1\*</sup>, Dua Moin<sup>2</sup>, Aroosa Khalil<sup>2</sup>, Areeba Akram<sup>2</sup>, Eisha Obaid<sup>2</sup> and Hafsa Jawaid<sup>2</sup>

<sup>1</sup>APPNA Institute of Public Health, JSMU, Karachi, Pakistan

<sup>2</sup>JSMU, Karachi, Pakistan

## ABSTRACT

**Objective:** To assess knowledge, attitude and practices regarding commonly encountered first aid scenarios among non-medical undergraduate students of Karachi University (KU).

**Methods:** A cross-sectional study was conducted in KU. Institutional Review Board approval was taken from Jinnah Sindh Medical University. At KU, permission was taken from concerned authorities for data collection, sample comprised of 386 students. Students were selected on convenience and availability from various departments of Arts, Business, Social Sciences, Islamic Studies and Pharmacy. Written consent was obtained from the students. Data was analyzed on SPSS 20.

**Results:** Out of 386 participants, the majority of students (67.1%) were willing to attend sessions on first aid. Those who had correct knowledge were more willing to attend the sessions ( $p < 0.001$ ), but were found to be reluctant in providing first aid to victims ( $p < 0.042$ ). Significant difference in frequency of self-assume knowledge among actual knowledge groups was only found for management of boiling water ( $p = 0.021$ ). Majority of the participants with self-assumption of correct knowledge ( $n = 210$ , 65.2%) had no accurate knowledge for providing first aid management of burns with boiling water.

**Conclusion:** Knowledge regarding commonly encountered first aid incidents among KU students was found to be low. However, they showed interest in acquiring this knowledge. It is suggested that first aid training programs should be made part of academic curriculum of schools, colleges and universities and overall awareness regarding its acquisition should be spread among communities.

**Keywords:** First aid, choking, hypoglycemia, burns, heat stroke.

## INTRODUCTION

Accident and injuries are commonly observed incidents that cannot be omitted from someone's life. These injuries are usually handled by inexperienced bystander at the accident site. These injuries can result in serious medical complications if first aid is not administered properly and timely. Whenever a casualty of any nature occurs, victim needs immediate assistance until proper medical help arrives at the scene. Therefore, implementation of first aid is meaningful to victim in emergency [1].

First aid is defined by the National First Aid Advisory Board as "management and manifestations performed by a layman person or by a victim with minimal or no medical equipment [2].

In a study done at Kuwait University, only 16.5% out of 562 students between age groups 18 to 23 year reported knowledge regarding unconscious pulse. Whereas knowledge regarding choking, collapse with chest pain, convulsions, triage in bleeding and fracture was reported as 53.9%, 83.3%, 24.2% and 66.7% respectively [3].

A study done in Greece on industrial workers, with sample size of 236 out of which 40 workers (Group A) were trained and 196 (Group B) were untrained with mean

value of 62.7 and 50.4 respectively. Group A was trained on first aid by a team of doctors. Answers of normal values of pulse, blood pressure, breaths, definition of cardio pulmonary resuscitation (CPR), number of chest compression, mouth-to-mouth ventilation, vital signs and CPR practice were at 67.5%, 35%, 47.5%, 95%, 25%, 32.5%, and 5% of group A and at 32.8%, 18.4%, 30.6%, 72.4%, 26%, 36.7%, and 1% respectively [4].

In an epidemiological prospective study in Vienna to determine the provided first aid measures in pre-hospital trauma settings and the quality of first aid, a total of 2812 cases were documented in which bystander were present in 57% of the cases. The commonly required first aid measures were application of a dressing and positioning of the patient. Mostly bystander had no training in first aid or only attended first aid course to have a driving license [5].

First aid is considered as a basic practice that should be universal irrespective of profession and age as it may prove to be lifesaving [6]. One study done in Turkey indicated that chances of death increased from 35% in first five minutes to 54% in 30 minutes of injury [7]. The bystander or nearby person if having adequate knowledge of first aid can prove to be a tool that alters the possibility from death to life, from permanent to temporary or no disability and from long hospitalization to a rapid recovery [8]. A study was conducted in Australia on 112 people who died during pre-hospital traumatic

\*Corresponding Author: Zaeema Ahmer, APPNA Institute of Public Health, Jinnah Sindh Medical University, Karachi, Pakistan;

Email: zaeema.ahmer@jsmu.edu.pk

Received: April 08, 2020; Revised: April 29, 2020; Accepted: May 18, 2020

DOI: <https://doi.org/10.37184/lnjpc.2707-3521.1.23>

cardiac arrest. Out of them, 4.5% died due to lack of first aid and delayed ambulance service at that time [9].

Burns are commonly observed traumatic injury. But its significant knowledge and timely management can remarkably bring good outcomes for patients [10]. A KAP study was done in Aga Khan University which showed that non-medical students had insufficient knowledge about first aid. A total of 446 students were asked to fill a questionnaire. The mean number of correct answers of students who took first aid training was 10.3 and the mean number of correct answers by students without first aid knowledge was 7.84. Similarly, the mean number of correct answers of medical students with first aid training was 11.2 whereas mean of non-medical student's answer was 7.2 [11].

The level of knowledge of first aid and basic life support in trained and untrained medical students was done in three private medical colleges of Karachi. Comparison between trained and untrained students was found to be non-significant. Only the mean number of correct answers for trained students was  $6.13 \pm 2.1$  while  $4.94 \pm 2.06$  out of the total 13 questions for untrained students. The results of trained students were better than the untrained but the mean of trained was less than 50% which was not significant [12].

First aid providers possess critical position in natural disasters such as earthquake, flood and emergency situations like heat stroke. An investigation was done among undergraduate medical students to study the awareness of basic life support (BLS) and cardio pulmonary resuscitation through questionnaire by the students of Jinnah Medical and Dental College and Dow International Medical College in 2009. The results indicated that half of the undergraduate medical students had a general idea of BLS but on the contrary, 18% of students gave incorrect answers to the questions on skills involved in BLS. There were 36.6% students who were unaware of both about the general concept of BLS and its skills [13].

In Pakistan, people face daily accidental injuries due to burns, traffic accidents and more recently heatstroke related emergencies which is an emerging serious condition in Karachi for the past two years. First aid appears to be beneficial in such conditions. But unfortunately, first aid courses are much less provided in developing countries [14]. The main purpose of our study is primarily to evaluate the general first aid knowledge, attitude and practices among the undergraduate non-medical students of Karachi.

## METHODS

A cross-sectional study was conducted between June 2018 to January 2019 with IRB approval being taken from Jinnah Sindh Medical University. At Karachi University permission was taken from concerned authorities for data collection. The sample size of 385

was calculated by WHO calculator with confidence level of 95%, margin of error 5% and assuming 50% prevalence. 50% prevalence was used as no previous study was found which assessed the KAP of non-medical students of Karachi regarding first aid. Students were selected on convenience and availability from various departments of Arts, Social Sciences, Business, Islamic Studies and Pharmacy. Written consent was obtained from the students who volunteered for participation. Research topic was briefly explained to make it easy for students to comprehend the questions properly. The questionnaire was developed based on extensive literature search. Face validity of the questionnaire was done by subject experts. It consisted of three sections. First section enquired information on demographic variables like age, gender, faculties study participants were studying in *etc.* Section two consisted of questions related to knowledge, attitude and practices regarding first aid which evaluated their responses to acquiring first aid knowledge and if any sessions were arranged by their educational institutes. Self-assessment of correct knowledge was assessed by a question on whether study participant knew about first aid, by answering a 'yes' or 'no' item, while marking a wrong response on scenario-based BCQ questions in the next section. Attitude was assessed by an item with responses like 'I will attend the session', 'I will not attend the session', 'I might or might not attend the session' and 'I have attended already enough sessions and have enough knowledge on 'First Aid'. Practice was operationalized by a question on whether study participant had provided first aid ever to anyone or not by a 'yes' or 'no' scale. Last section comprised of seventeen questions, each with three incorrect and one correct response to knowledge regarding different first aid scenarios like heat exhaustion, heat stroke, different types of burns, hypoglycemia and bleeding cuts *etc.* Researchers had the key with them. Correct knowledge was gauged when study participant answered the correct response on the provided BCQ-type questionnaire whereas incorrect knowledge was marked for a study participant who answered the wrong response to the provided BCQ-type questionnaire. Pre-testing of the questionnaire was done and after that the questionnaires were distributed among students. It took approximately 30 minutes for students to fill each form. The data was then analyzed and subjected to statistical inference by Statistical Package for the Social Sciences (SPSS) software, version 20. Categorical variables were expressed as frequencies and percentages. The Chi-square test was applied to assess between categorical variables. P-value  $< 0.05$  was taken as statistically significant.

## RESULTS

Table 1 displays the sociodemographic characteristics, attitudes and practices of the undergraduate non-medical students of Karachi University and its association with their self-assumed knowledge regarding first aid.

**Table 1:** Socio-demographic characteristics, attitude and practice regarding first aid and its association with self-assumption of correct knowledge in study participants (n=386).

-	Total n (%)	Self-assumption of Correct Knowledge n (%)	Self-assumption of Incorrect Knowledge n (%)	p-value
<b>Socio-demographic Variables:</b>				
<b>Age (in years)</b>				
17-21	208 (54)	181 (87.1)	27 (12.9)	0.426
22-34	178 (46)	141 (79.2)	37 (20.7)	
<b>Gender</b>				
Male	101 (26.2)	83 (82.2)	18 (17.8)	0.696
female	285 (73.8)	239 (83.9)	46 (16.1)	
<b>Faculty</b>				
Arts	201 (52.1)	168 (83.6)	33 (16.4)	0.695
Business	23 (6.0)	17 (73.9)	6 (26.1)	
Social Sciences	138 (35.8)	116 (84.1)	22 (15.9)	
Pharmacy	3 (0.8)	3 (100)	0 (0)	
Islamic Studies	21 (5.4)	18 (85.7)	3 (14.3)	
<b>Attitude:</b>				
<b>Willingness to attend first aid session if given opportunity</b>				
I will attend the session	259 (67.1)	225 (86.9)	34 (13.1)	<0.001
I will not attend the session	27 (7.0)	14 (51.9)	13 (48.1)	
I might or might not attend the session	81 (21.0)	65 (80.2)	16 (19.8)	
I have already attended session and I have enough skills regarding first aid	19 (4.9)	18 (94.7)	1 (5.3)	
<b>Practice:</b>				
<b>Have you provided any sort of first aid to someone?</b>				
Yes	122 (31.6)	108 (88.5)	14 (11.5)	0.042
No	264 (68.4)	214 (81.1)	50 (18.9)	

**Table 2:** Relationship between correct knowledge and self-assumption of correct knowledge of non-medical students of University of Karachi (n=386).

Self-assumption of Correct Knowledge	Had Correct Knowledge n (%)	Had Incorrect Knowledge n (%)	p-value
<b>Heart attack</b>			
yes	153 (47.5)	169 (52.5)	0.893
no	31 (48.4)	33 (51.6)	
<b>Severe burn from chemical</b>			
yes	154 (47.8)	168 (52.2)	0.713
no	29 (45.3)	35 (54.7)	
<b>Bleeding severely</b>			
yes	80 (24.8)	242 (75.2)	0.439
no	13 (20.3)	51 (79.7)	
<b>Choking (Heimlich Maneuver)</b>			
yes	33 (10.2)	289 (89.8)	0.053
no	12 (18.8)	52 (81.3)	
<b>Chest compression</b>			
yes	67 (20.8)	255 (79.2)	0.709
no	12 (18.75)	52 (81.3)	
<b>Unconscious due to hypoglycemia</b>			
yes	156 (48.4)	166 (51.6)	0.649
no	33 (51.6)	31 (48.4)	
<b>Electric current</b>			
yes	196 (60.9)	126 (39.1)	0.166
no	33 (51.6)	31 (48.4)	
<b>Insulin dose /Diabetes</b>			
yes	152 (47.2)	170 (52.8)	0.613
no	28 (43.8)	36 (56.3)	

Self-assumption of Correct Knowledge	Had Correct Knowledge n (%)	Had Incorrect Knowledge n (%)	p-value
<b>Heat wave</b>			
yes	159 (49.4)	163 (50.6)	0.131
no	25 (39.6)	39 (60.9)	
<b>Intense burn</b>			
yes	66 (20.5)	256 (79.5)	0.751
no	12 (18.8)	52 (81.3)	
<b>Burn with boiling water</b>			
yes	112 (34.8)	210 (65.2)	0.021
no	32 (50)	32 (50)	
<b>Electric shock</b>			
yes	59 (18.3)	263 (81.7)	0.830
no	11 (17.2)	53 (82.8)	
<b>Excessive sweating</b>			
yes	103 (31.9)	219 (68.1)	0.504
no	25 (39.6)	39 (60.9)	
<b>Muscle cramps</b>			
yes	70 (21.7)	252 (78.3)	0.266
no	18 (28.1)	46 (71.9)	
<b>Dizziness</b>			
yes	163 (50.6)	159 (49.4)	0.928
no	32 (50)	32 (50)	
<b>Stab wound</b>			
yes	111 (34.5)	211 (65.5)	0.643
no	24 (37.5)	40 (62.5)	
<b>Gunshot injury</b>			
yes	126 (39.1)	196 (60.9)	0.823
no	26 (40.6)	38 (59.4)	

**Table 3:** Distribution of study participants according to practices and knowledge of First Aid(n=386).

Provided First Aid According to Different Medical Situations	Had Correct Knowledge According to Different Medical Situations	Had Incorrect Knowledge According to Different Medical Situations	p-value
<b>Heart attack</b>			
yes	49 (40.2%)	73 (59.8%)	0.084
no	128 (48.5%)	136 (51.5%)	
<b>Severe burn from chemical</b>			
yes	64 (52.5%)	58 (47.5%)	0.267
no	119 (45.1%)	145 (54.9%)	
<b>Bleeding severely</b>			
yes	34 (27.9%)	88 (72.1%)	0.056
no	59 (22.3%)	205 (77.6%)	
<b>Choking</b>			
yes	14 (11.4%)	108 (88.6%)	0.05
no	31 (11.7%)	233 (88.3%)	
<b>Chest compression</b>			
yes	21 (17.2%)	101 (82.8%)	0.127
no	58 (21.6%)	206 (78.4%)	
<b>Unconscious due to hypoglycemia</b>			
yes	70 (57.37%)	52 (42.63%)	0.086
no	120 (45.5%)	144 (54.5%)	
<b>Insulin dose/Diabetes</b>			
yes	61 (50%)	61 (50%)	0.385
no	119 (45.1%)	145 (54.9%)	
<b>Heat wave</b>			
yes	63 (51.6%)	59 (48.4%)	0.404
no	121 (45.8%)	143 (54.2%)	

<b>Intense burn</b>			
yes	26 (21.3%)	96 (78.7%)	0.218
no	52 (19.7%)	212 (80.3%)	
<b>Burn with boiling water</b>			
yes	44 (36.1%)	76 (63.9%)	0.731
no	100 (37.9%)	164 (62.1%)	
<b>Electric shock</b>			
yes	21 (17.2%)	101 (82.8%)	0.911
no	49 (17.4%)	215 (88.6%)	
<b>Excessive sweating</b>			
yes	37 (30.3%)	85 (69.7%)	0.661
no	92 (34.8%)	172 (65.2%)	
<b>Muscle cramps</b>			
yes	23 (18.9%)	99 (81.2%)	0.546
no	65 (24.6%)	199 (75.4%)	
<b>Dizziness</b>			
yes	63 (51.6%)	59 (48.4%)	0.565
no	132 (50%)	132 (50%)	
<b>Stab wound</b>			
yes	48 (39.3%)	74 (60.7%)	0.244
no	87 (32.9%)	177 (67.1%)	
<b>Gunshot injury</b>			
yes	60 (49.2%)	62 (50.8%)	0.018
no	92 (34.8%)	172 (65.2%)	

Total 386 participants were enrolled into the study. The mean age of the students was 21.33±2.46 years. Out of them, 208(54%) belonged to the age group 17-21 years, whereas 46% (n=178) belonged to the age group 22-34 years. Among the study participants, 26.2% (n=101) were males whereas 73.8% (n=285) were females.

The majority of the participants belonged to the Faculty of Arts (n=201, 52.1%), whereas 138(35.8%) belonged to the Faculty of Social Sciences. Remaining belonged to the Faculty of Business, Islamic Studies and Pharmacy as 23(6%), 21(5.4%) and 3(0.8%) respectively.

Regarding their attitude, majority, *i.e.* 67.1% (n=259) were willing to attend the session. Those who had knowledge regarding first aid were more willing to attend the session ( $p<0.001$ ). But, as far as practice was concerned, in spite of having first aid knowledge most of the students were reluctant to provide first aid to the victim ( $p<0.042$ ).

Table 2 shows relationship between correct and incorrect knowledge and self-assumption of correct knowledge of these students. Study participants with incorrect knowledge, 65.2% (n=210) regarding providing first aid in burns with boiling water thought that they had the correct knowledge as compared to 50% (n=32) participants ( $p=0.021$ ). There was no significant relationship between self-assumed correct knowledge of other first aid conditions with having the correct knowledge.

Table 3 indicates distribution of study participants according to practices and knowledge of first aid. Participants who had incorrect knowledge (n=172,

65.15%,) regarding gunshot injury were also reluctant to provide first aid to such victims ( $p=0.018$ ). There was no significant relationship among knowledge regarding other first aid situations and providing first aid.

## DISCUSSION

Our study found that correct knowledge among non-medical students was very low. However, proportion of students who considered themselves as knowledgeable was high 83.4% (n=322). Very few students had previously attended sessions on the basis of which they considered themselves capable enough to cope with any such situation 4.9% (n=19). This is in line with a study conducted in parents and caregivers about first aid where 64.5% thought they knew about first aid, however only 37.6% were ever trained in first aid [15]. The reason for this low score may be lack of knowledge about first aid, lacking a sense of confidence, or they had never encountered any such situation or it may also be because this basic skill is not emphasized upon in our institutions. Similar results were found in a study conducted at Agha Khan Hospital, Karachi in which most of the students did not know about places where these courses are offered [11]. It was found however that the majority of students, 67.1% (n=259) were interested in attending first aid training sessions. First aid training can bring good outcomes. A study conducted in Pakistan in 2011 among medical students found that knowledge of students who were trained in First Aid-BLS, was better than those who were untrained [12]. In our study, knowledge regarding following first aid situations was assessed: bleeding, gunshot injury, stab wound injury, choking, heart attack, CPR, burns, electrocution, hypoglycemia.

Control of bleeding is one of important and basic first aid skill through which first aid provider can significantly influence outcome of injury. It is therefore important to know about measures to stop bleeding at site of injury before medical help is sought like applying direct pressure on wound or putting a gauze piece on bleeding site if it does not get controlled by applying pressure. In our study it was found that only few participants had self-assumed and also correct knowledge about it 24.1% (n=80).

Results found for frequency of self-assumed and also correct knowledge regarding gunshot wounds was 39.1% (n=126) and for stab wound injury was 34.5% (n=111). Awareness regarding its prevention and maneuver to deal with it in case of incident can significantly decrease number of deaths. In our study few participants responded correctly about choking and Heimlich maneuver 10.2% (n=33). Participants with correct and self-assumed correct knowledge for heart attack emergency pre hospital management were 47.5% (n=153) and for a number of compressions, in one cycle of CPR were 27.8% (n=67). This result is comparable to a study conducted in Taiwan for assessing self-efficacy of first aid in home accidents in parents of children 0-4 years of age in which parents' knowledge about choking and CPR was found to be lowest [16].

Burns is a common emergency seen in hospital settings. Adequate knowledge and its timely implementation can decrease the extent and severity of injury as reflected in a study conducted in Baltimore Regional Burn Centre from July 1976 to June 1980. This study showed that those burns patients who had received appropriate first aid at site of incident showed significantly less full-thickness of dermal injury as compared to those who didn't receive it [17]. But, it was found in our study that the majority of the participants, 52.6% (n=203) didn't know the correct management of burns from chemicals and 79.8% (n=308) didn't know the correct management of intense burns. Adequate knowledge regarding burns management and its practices can prevent serious complications. In our study, significant difference between self-assumed and actual knowledge for burns management with boiling water was found (p value=0.021). There were 65.2% (n=210) students who didn't know the management of a person burnt with boiling water, yet were practically applying their own management, as compared to 34.8% (n=112) students. This finding is comparable to a study conducted in Mangalore City, India, in 2011 among students of a medical college which showed that only 13.8% students knew correctly the management of burns [18]. Another study conducted in 2020 at Karachi among medical and non-medical students regarding the knowledge of first aid management of burns, it was found that majority of participants had insufficient knowledge regarding it. However, medical students had better knowledge score than non-medical students [19].

Another aspect which we assessed was knowledge and management regarding electric shock. Electric burns cause severe damage to tissues and cardiac arrest by interrupting conduction through the myocardium. If someone suffers from electric shock, proper knowledge and its implementation can save the life of the victim and can decrease the severity of injury. But it was found in our study that the majority of the participants of our study, 81.2% (n=316) didn't know how to manage a person with electric shock. Medical researches and experiences show that a significant number of mortalities can be prevented if proper CPR is applied at accident place [19].

Drastic climate changes and accompanied heat waves are now considered an emerging global concern as reflected by the high mortality and morbidity rates associated with it [19, 20]. There were 52.3% (n=202) students, who had incorrect knowledge regarding managing patients of heat waves, which is similar to other studies [21, 22]. This maybe because study participants are not properly guided through organized and repeated sessions aimed at developing skills and necessitating people with awareness programs stressing on what to do if one's body gets overheated and dehydrated. Also, because our target population was of a significantly lower age group, and not as such vulnerable to heat related illnesses compared to extremes of age population hence not as concerned as shown by other studies [23].

When assessing knowledge of hypoglycemic conditions, 53.3% (n=206) students were unaware of what to do if a diabetic person is hypoglycemic the results were similar to other studies [11, 22]. This can be due to be unable to identify the sign and symptoms of this condition, since these can overlap with other normal physiological phenomenon especially in old age population. Similarly, in conditions of fainting due to hypoglycemia, there were 51.1% (n=197) students who did not know how to help because they were either oblivious to the ways to help or not confident enough to act upon their instincts due to their decreased understanding of the matter as they are not provided with sessions that can increase and help retain their knowledge and confidence regarding such problems [12].

### **STRENGTHS AND LIMITATIONS OF THE STUDY**

This study was conducted in Karachi University because of numerous students and diversity among them. However, since it was a cross-sectional study, results cannot be generalized to entire non-medical undergraduates of the city. Also, the possibility of response bias cannot be ruled out.

### **CONCLUSION**

Overall, correct knowledge regarding first aid among Karachi University students was found to be low. They did however show interest in acquiring first aid knowledge. It

is recommended that first aid training programs regarding frequently occurring medical conditions should be made part of academic curriculum of schools, colleges and universities.

### CONFLICT OF INTEREST

Authors declare no conflict of interest.

### ACKNOWLEDGEMENTS

Declared none.

### REFERENCES

- Khatatbeh M. First aid knowledge among university students in Jordan. *Int J Prev Med* 2016; 7: 24.
- Yurumez Y, Yavuz Y, Saglam H, Köken R, Tunay K. Evaluation of the level of knowledge of first aid and basic life support of the educators working in preschools. *Acad Emerg Med* 2007; 5(3): 17-20.
- Al-Khamees N. A field study of first aid knowledge and attitudes of college students in Kuwait University. *Coll Stud J* 2006; 40(4): 916-26.
- Hatzakis KD, Kritsotakis EI, Angelaki HP, Tzanoudaki IK, Androulaki ZD. First aid knowledge among industry workers in Greece. *Ind Health* 2005; 43(2): 327-32.
- Mauritz W, Pelinka LE, Kaff A, Segall B, Fridrich P. First aid measures by bystanders at the place of accident. A prospective, epidemiologic study in the Vienna area. *Wien Klin Wochenschr* 2003; 115(19-20): 698-704.
- Metin I, Mutlu C. Level of knowledge about first aid of the university students. *Trakia J Sci* 2010; 8(2): 262-5.
- Bildik F, Kılıçaslan İ, Doğru C, Keleş A, Demircan A. The need for first aid awareness among candidate teachers. *Turk J Emerg Med* 2011; 11(4): 166-70.
- Tomruk O, Soysal S, Gunay T, Cimrin AH. First aid: level of knowledge of relatives and bystanders in emergency situations. *Adv Ther* 2007; 24(4): 691.
- Ashour A, Cameron P, Bernard S, Fitzgerald M, Smith K, Walker T. Could bystander first aid prevent trauma deaths at the scene of injury? *Emerg Med Australas* 2007; 19(2): 163-8.
- Riaz R, Riaz L, Khan J, Baloch M. Survey on knowledge of first aid management of burns amongst medical and non-medical students in Karachi, Pakistan: need for an educational intervention. *Cureus* 2020; 12(1): e6674.
- Khan A, Shaikh S, Shuaib F, Sattar A, Samani SA, Shabbir Q, *et al.* Knowledge attitude and practices of undergraduate students regarding first aid measures. *JPMA* 2010; 60(1): 68.
- Abbas A, Bukhari SI, Ahmad F. Knowledge of first aid and basic life support amongst medical students: a comparison between trained and un-trained students. *JPMA* 2011; 61(6): 613-6.
- Zaheer H, Haque Z. Students' corner-awareness about BLS (CPR) among medical students: status and requirements. *JPMA* 2009; 59(1): 57.
- Santos SV, Margarido MRRA, Caires IS, Santos RAN, Souza SG, Souza JMA, *et al.* Basic life support knowledge of first year university students from Brazil. *Braz J Med Biol Res* 2015; 48(12): 1151-5.
- Wanot J, Lubon D, Kurczabinska D, Nowicka M, Goj K. Parents' and caregivers' theoretical and practical knowledge of first aid in case of accidents and minor injuries in children. *Wiad Lek* 2004; 57 Suppl 1: 323-6.
- Wei YL, Chen LL, Li TC, Ma WF, Peng NH, Huang LC. Self-efficacy of first aid for home accidents among parents with 0- to 4-year-old children at a metropolitan community health center in Taiwan. *Accid Anal Prev* 2013; 52: 182-7.
- Leonard LG, Scheulen JJ, Munster AM. Chemical burns: effect of prompt first aid. *J Trauma* 1982; 22(5): 420-3.
- Joseph N, Kumar G, Babu Y, Nelliyanil M, Bhaskaran U. Knowledge of first aid skills among students of a medical college in mangalore city of South India. *Ann Med Health Sci Res* 2014; 4(2): 162-6.
- Goduhan AK, Kshirsagar AY, Zagade TB. A study to determine the effectiveness of basic life support training on knowledge of life saving skills among college students in selected colleges at Jaipur for degree students. *IJSR* 2017; 6(6): 2712-22.
- Fouillet A, Rey G, Laurent F, Pavillon G, Bellec S, Guihenneuc-Jouyau C, *et al.* Excess mortality related to the August 2003 heat wave in France. *Int Arch Occup Environ Health* 2006; 80(1): 16-24.
- Haider K, Anis K. Heat wave death toll rises to 2,000 in Pakistan's financial hub. Available from: <https://www.bloomberg.com/news/articles/2015-06-24/heat-wave-death-toll-rises-to-2-000-in-pakistan-s-financial-hub>.
- Mathew S, Salman P, Khurshid S, Luke AM. Awareness of first aid among undergraduate students in Ajman, UAE. *IOSR J Dental Med Sci* 2016; 15(6): 30-8.
- Rauf S, Bakhsh K, Abbas A, Hassan S, Ali A, Kächele H. How hard they hit? Perception, adaptation and public health implications of heat waves in urban and peri-urban Pakistan. *Environ Sci Pollut Res* 2017; 24(11): 10630-9.