Medical Science

pISSN 2321–7359; eISSN 2321–7367

Knowledge, attitude, and practices of burn first aid and its preventive measures among undergraduate medical students of Umm Al-Qura University: A cross-sectional study

Omar Safran Alhothali[1*], **Reem Abdullah Alharthi**[1], **Ammar Safran Alhothali**[1], **Lujain Ahmad Alzahrani**[1], **Aroob Mohmmed Amin Abdulhalim**[1], **Mohammed Amro Fouda**[1], **Fares Alaa Sultan**[2], **Alaa A Sultan**[3]

To Cite:
Alhothali OS, Alharthi RA, Alhothali AS, Alzahrani LA, Abdulhalim AMA, Fouda MA, Sultan FA, Sultan AA. Knowledge, attitude, and practices of burn first aid and its preventive measures among undergraduate medical students of Umm Al-Qura University: A cross-sectional study. Medical Science 2022; 26:ms325e2397.
doi: https://doi.org/10.54905/disssi/v26i126/ms325e2397

Authors' Affiliation:
[1]Medical student, Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia
[2]Medical intern, Faculty of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia
[3]Assistant Professor of Plastic Surgery, Faculty of Medicine, Umm Alqura University, Makkah, Saudi Arabia

[*]**Corresponding Author**
Medical student, Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia
Email: omar.safran11@gmail.com

Peer-Review History
Received: 09 July 2022
Reviewed & Revised: 11/July/2022 to 01/August/2022
Accepted: 02 August 2022
Published: 05 August 2022

Peer-review Method
External peer-review was done through double-blind method.

URL: https://www.discoveryjournals.org/medicalscience

ABSTRACT

Background: Burns are common and highly preventable injuries and affect people worldwide. Burn first aid could speed up the healing process and reduce healthcare costs. The main objective from this study is to evaluate medical students' perceptions of burn first aid in the Makkah city, Saudi Arabia. *Materials and Methods:* A cross-sectional survey was conducted among medical students at Umm Al-Qura University in Makkah city. For data collection, an online questionnaire created and Google Forms was used. The data were collected online between December 2021 and January 2022. The questionnaire included 13 questions on the demographic, the participants' academic criteria and evaluated participants' awareness level on burn first aid. *Results:* The study included 378 students from the preclinical and clinical levels. Approximately 92% of participants achieved a poor knowledge score. Female students had a significantly higher percentage of those who had good knowledge about burn first aid compared to male students ($p < 0.05$). In addition, the internet and social media (50.4%) were the primary sources of information regarding the prevention of burn injuries among participants, followed by the college curriculum (45.8%). *Conclusion:* The level of burn first aid awareness was poor among most medical students at Umm Al-Qura University. The use of social media to raise health awareness looks promising.

Keywords; Burn, First aid, Knowledge, Medical students

1. INTRODUCTION

Burn injuries occur when the hot liquids (scalds), hot particles, or flames damage the skin's outer layers. Burns are a worldwide public health problem. According to the most recent World Health Organization (WHO) data from 2018, burns result in approximately 180,000 deaths per year. In addition, non-fatal burns are a significant source of morbidity, resulting in extended hospitalization, deformity, and impairment. A recent study conducted in Saudi Arabia found that, younger children account for approximately 52% of all burns, 83% of burns happen at home, and the total death rate for patients of all ages is 6.9% (Almarghoub et al., 2020).

Burn injuries treated within the first hour have the most significant impact on morbidity and mortality (Cuttle et al., 2010; Ghmaird et al., 2021). Tissue damage, scarring, and wound re-epithelialization time can all be significantly reduced with proper first aid management (Cuttle et al., 2008). Therefore, knowing how to treat burns effectively is critical in saving a patient's life. Poor knowledge and the handling of first aid, on the other hand, can not only alter the result of an injury, but also disturb the normal recovery process and, in the worst-case scenario, increase the damage caused by the initial injury (Riaz et al., 2020).

The examination of healthcare personnel's awareness particularly that of medical students, is critical for establishing stringent guidelines for burn injuries. However, studies have revealed that medical students poorly understand burn first aid and prevention strategies (Al-Musa et al., 2017; Siddiqui et al., 2018). The goal of our study is to analyze the knowledge, behaviors, attitudes, and preventive strategies of burn first aid among undergraduate medical students at Umm Al-Qura University (UQU) in Saudi Arabia.

2. MATERIALS AND METHODS

Study population and sampling

This cross-sectional study was conducted at UQU, Makkah Al-Mukarramah, Kingdom of Saudi Arabia. A total of 378 medical students from the 2nd to the 6th academic year of 2021 were asked to fill out a self-administered electronic questionnaire. The data were collected online between December 2021 and January 2022. The sample size was determined by the number of medical students attending UQU. During the academic year 2021, the average number of medical students was 1250. According to the Sample Size Calculator, the minimum recommended sample size for this study was calculated to be 295 with a confidence level of 95%, margin of error of 5%, and response distribution of 50%. (Raosoft, Inc., Seattle, WA, USA). All undergraduate medical students in the 2nd to the 6th academic year of 2021 who were willing to participate were included. The study was conducted after obtaining ethical approval from the ethics committee of the Faculty of Medicine, UQU, Saudi Arabia.

Study instruments

A semi-structured, self-administered electronic questionnaire was used for data collection. The questionnaire gathered general demographic information about the participants, such as sex, academic year level, parents' education, and occupation. It also asked if the participant or family member had ever experienced a burn injury and if they had ever provided burn first aid. The subsequent section included a validated questionnaire assessing knowledge (Siddiqui et al., 2018). For knowledge items, we gave a score of "1" for every correct answer, and a score of "0" for every wrong one. The level of knowledge in burn first aid was reported as good if the study participant correctly responded to ≥80% of the 23 questions in knowledge assessment; level of knowledge was reported as poor for correctly answering <80% of the questions (Kasemy et al., 2020). Furthermore, the questionnaire assessed the participants' attitudes regarding fire prevention and control practices and to know whether they had attended any training workshop on burn management and the sources that contributed to their current knowledge of burns.

Statistical methods and variables

SPSS version 26 was used for statistical analysis. The chi-square test (2) was used to test the relationship between variables, and qualitative data were expressed as numbers and percentages. Quantitative data were expressed as mean and standard deviation (mean SD) to assess the relationships between variables, and the Mann–Whitney and Kruskal–Wallis tests were used. Statistical significance was set at $P < 0.05$.

3. RESULTS

In total, 378 students were included in this study. Of the participants, 54.5% were male, with 27% in their 2nd academic year. 50.8% of participants' fathers and 51.6% of participants' mothers had a bachelor's degree. 8.2% of the participants' fathers and 6.9% of the participants' mothers were doctors. 72.2% of our study participants had a family member younger than 18 years, 73% experienced a burn injury, and 35.7% provided burn first aid (Table 1).

Table 1 Distribution of studied medical students according to their demographic characters, having a family member younger than 18 years, ever experienced a burn injury or provided burn first aid (No.:378)

Variable	No. (%)
Gender	
Female	172 (45.5)
Male	206 (54.5)
Academic year	
2nd	102 (27)
3rd	74 (19.6)
4th	61 (16.1)
5th	81 (21.4)
6th	60 (15.9)
Father's educational level	
Bachelors/Diploma	192 (50.8)
Did not attend school	6 (1.6)
High school	83 (22)
Post graduate	52 (13.8)
Primary school	17 (4.5)
Secondary school	28 (7.4)
Father's occupation	
Doctor	31 (8.2)
Other	223 (59)
Teacher	124 (32.8)
Mother's educational level	
Bachelors/Diploma	195 (51.6)
Did not attend school	11 (2.9)
High school	65 (17.2)
Post graduate	51 (13.5)
Primary school	21 (5.6)
Secondary school	35 (9.3)
Mother's occupation	
Doctor	26 (6.9)
Other	203 (53.7)
Teacher	149 (39.4)
Are there family member younger than 18 years old?	
No	105 (27.8)
Yes	273 (72.2)
Have you or someone near you ever experienced a burn injury before?	
No	102 (27)
Yes	276 (73)
Have you ever provided burn first aid ?	
No	243 (64.3)
Yes	135 (35.7)

Table 2 shows how study participants were distributed according to their responses to burn first aid facts. Most participants correctly knew that If the burn is larger than 2–3 cm in diameter, seek medical attention (73.5% of participants) and if the victim's age is < 4 years or > 60 years (71.2% of participants). Most participants correctly knew to seek medical attention if your face, hands, feet, buttocks or a major joint have been burned (74.1% of participants) and if the burn was a chemical or electrical burn (86.5% of participants). Almost one-third of participants disagreed with keeping the blowing/fanning on the burn, and 37.8% disagreed with placing burns in cold water if involve a large area or an internal tissue can be seen. Most participants correctly agreed to remove all clothes and accessories from the affected area. Only 37.3% and 32.5% of participants correctly agreed to remove burned clothing that has become stuck to the skin and not give water/milk by mouth if there were large or very deep burns. After removing the surrounding dressing, 46% of the participants knew to cover the affected areas with clean clothes. Approximately 51.6% of participants correctly agreed to put cold water on burned areas, but only 3.2% correctly knew to pour water on the affected area for approximately 20 min.

Table 2 Distribution of medical students according to their response to knowledge items about burn injury (No.:378)

Variable	Agree	Disagree	Don't know
Always seek medical help if size of burn is larger than 2-3cm and skin is burnt through.	278 (73.5)*	45 (11.9)	55 (14.9)
Always seek medical help if age of victim is <4yrs or >60 yrs.	269 (71.2)*	63 (16.7)	46 (12.2)
Always seek medical help if hands, feet, face, groin, buttocks, or a major joint are burnt.	280 (74.1)*	47 (12.4)	51 (13.5)
Always seek medical help if it is a chemical or electrical burn	327 (86.5)*	26 (6.9)	25 (6.6)
Keep blowing/fanning on the burn	142 (37.6)	126 (33.3)*	110 (29.1)
Place burn in cold water if it involves a large area and internal tissue can be seen.	127 (33.6)	143 (37.8)*	108 (28.6)
One should take off clothes and accessories from affected area.	266 (70.4)*	64 (16.6)	48 (12.7)
If someone catches fire and is in flames, wrap the person in thick material; such as a wool or cotton coat, rug, or blanket	237 (62.7)*	70 (18.5)	71 (18.8)
Remove burned clothing that is stuck to the skin.	141 (37.3)*	154 (40.7)	83 (22)
If there are large areas or very deep burn, give water/milk by mouth.	111 (29.4)	123 (32.5)*	144 (38.1)
Cover the affected areas with clean cotton cloth after removing surrounding dress?	174 (46)*	92 (24.3)	112 (29.6)
Should pour cold water on burned areas. If you agree with previous statement, for how long should you pour water on affected area? (No.:195) Less than 10 minutes* Around 20 minutes Half an hour I don't know	195 (51.6) 85 (43.5) 6 (3.2) 48 (24.6) 56 (28.7)	 88 (23.3)*	 95 (25.2)

N.B.: *= the correct answer

Table 3 shows additional results from the questionnaire. 41.8% of the participants correctly knew that if a child's chest is splattered with boiling oil in the kitchen, the child's shirt should be removed and the affected area to be placed under running water. Most participants (63.2%) correctly knew that if someone's clothes catch fire during a picnic, one should ask that they stop moving, lie down, and roll around on the floor. Nearly half of the study participants were aware that if boiling water spilled on someone's hand, the affected area should be placed under cold water for 10-20 min. Only 28.8% of the participants received information regarding the prevention of burn injuries. The Internet was the most popular source of information on burn first aid, (50.4%), followed by college curriculum (45.8%) and workshops (42.2%). Only 26.2% of participants reported having adequate

knowledge of burn first aid, and most of them (96%) thought incorporating burn first aid education as part of the curriculum was important.

Table 3 Distribution of studied participants according to their knowledge regarding to situations of burn first aid, receiving information regarding prevention of burn injuries, having adequate knowledge about and the need to incorporate burn first aid education in curriculum (No.:378)

Variable	No. (%)
Hot boiling oil spills on chest of a child in the kitchen:	
Keep the child's clothes and call for help	102 (27)
Pour water on the child's body	34 (9)
Take off the child's shirt then put affected area under running water *	158 (41.8)
I don't know	84 (22.2)
Someone's clothes catch fire during picnic	
Ask him to stop moving, lie down and roll over the ground	239 (63.2)
Ask him to take off his clothes and put ice cubes on affected area *	44 (11.6)
Look for water then pour it on victim	35 (9.3)
I don't know	60 (15.9)
During a social meeting, boiling water spills on someone's hand	
Cover the affected area with clean cloth and ask for medical help	57 (15.1)
Put ice cubes on affected area	50 (13.2)
Put the affected area under cold water for 10-20 minutes *	202 (53.4)
I don't know	69 (18.3)
Have you ever received information regarding prevention of burn injuries?	
No	269 (71.2)
Yes	109 (28.8)
If yes, what is your source of information (No.:109)	
Television	18 (16.5)
Internet	55 (50.4)
Workshops	46 (42.2)
Peers/colleagues/family members	26 (23.8)
As part of college curriculum	50 (45.8)
Books	7 (6.4)
Do you think you have an adequate knowledge about burn first aid ?	
No	279 (73.8)
Yes	99 (26.2)
Do you think first aid education is needed as a part of your curriculum?	
No	15 (4)
Yes	363 (96)

B.: *= the correct answer

Figure 1 shows that only 7.9% of participants had good knowledge of burn first aid. Table 4 shows that when compared to male students, female participants had a significantly higher percentage of those who had good knowledge of burn first aid ($p<0.05$). on the other hand, Knowledge level was found to have a non-significant relationship with the participants' other demographic characteristics, as follows: a family member younger than 18 years, burn injury in the past, burn first aid experience, the receiving of information on the prevention of burn injuries, prior adequate knowledge or belief in the importance of including burn first aid education in the curriculum ($p> 0.05$).

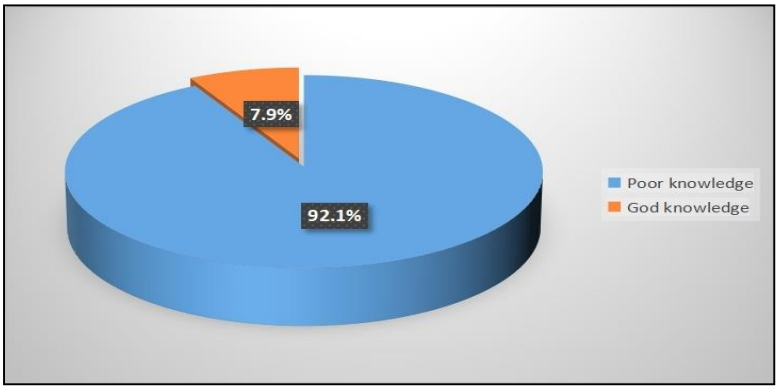

Figure 1 Percentage distribution of the participants according to their level of knowledge about burns first aid

Table 4 Relationship between participants' level of knowledge of burn first aid and their demographic characters, having a family member younger than 18 years, ever experienced a burn injury or provided burn first aid, receiving information regarding prevention of burn injuries, having adequate knowledge about and the need to incorporate burn first aid education in curriculum (No.:378)

Variable	Knowledge level		$\chi 2$	p-value
	Poor No. (%)	Good No. (%)		
Gender				
Female	153 (69)	19 (11)	4.17	**0.041**
Male	195 (94.7)	11 (5.3)		
Academic year				
2nd	95 (93.1)	7 (6.9)	1.59	0.81
3rd	69 (93.2)	5 (6.8)		
4th	57 (93.4)	4 (6.6)		
5th	72 (88.9)	9 (11.1)		
6th	55 (91.7)	5 (8.3)		
Father's educational level				
Bachelors/Diploma	177 (92.2)	15 (7.8)	10.6	0.06
Did not attend school	4 (66.7)	2 (33.3)		
High school	73 (88)	10 (12)		
Post graduate	50 (96.2)	2 (3.8)		
Primary school	17 (100)	0 (0.0)		
Secondary school	27 (96.4)	1 (3.6)		
Father's occupation				
Doctor	30 (96.8)	1 (3.2)	1.04	0.592
Other	204 (91.5)	19 (8.5)		
Teacher	114 (91.9)	10 (8.1)		
Mother's educational level				
Bachelors/Diploma	172 (88.2)	23 (11.8)	12.97	**0.024**
Did not attend school	9 (81.8)	2 (18.2)		
High school	62 (95.4)	3 (4.6)		
Post graduate	51 (100)	0 (0.0)		
Primary school	21 (100)	0 (0.0)		
Secondary school	33 (94.3)	2 (5.7)		
Mother's occupation				
Doctor	25 (96.2)	1 (3.8)	1.11	0.574
Other	188 (92.6)	15 (7.4)		

Teacher	135 (90.6)	14 (9.4)		
Are there family member younger than 18 years old? No Yes	 97 (92.4) 251 (91.9)	 8 (7.6) 22 (8.1)	0.02	0.887
Have you or someone near you ever experienced a burn injury before? No Yes	 93 (91.2) 255 (92.4)	 9 (8.8) 21 (7.6)	0.15	0.698
Have you ever provided burn first aid ? No Yes	 221 (90.9) 127 (94.1)	 22 (9.1) 8 (5.9)	1.16	0.281
Have you ever received information regarding prevention of burn injuries? No Yes	 246 (91.4) 102 (93.6)	 23 (8.6) 7 (6.4)	0.48	0.488
Do you think you have an adequate knowledge about burn first aid ? No Yes	 254 (91) 94 994.9)	 25 (9) 5 (5.1)	1.52	0.216
Do you think first aid education is needed as a part of your curriculum? No Yes	 15 (100) 333 (91.7)	 0 (0.0) 30 (8.3)	1.34	0.246

4. DISCUSSION

Burn first aid starts with awareness, which is a crucial first step in determining burn-related outcomes and morbidity (Skinner et al., 2003). As future health care professionals, the perceptions of medical students on burn first aid management could affect appropriate burn care management. Therefore, this study aimed to analyze knowledge, attitudes, and behaviors on burn first aid among medical students of Umm Al Qura University in Saudi Arabia. Surprisingly, our findings revealed that 92 percent (348) of participants lacked basic perception of burn first aid management. This prevalence is very high compared to a survey conducted in the Qassim region; 82.5% of participants had an average level of knowledge on burn first aid management (with 50%–75% of the questions answered correctly) (Al-Batanony et al., 2021).

Regarding the necessary first aid actions, different studies have found that water between 12–18°C is the best temperature for cooling a burn injury (Cuttle et al., 2008). The optimal duration for cooling the site of burns under the water is 20 min (Cuttle et al., 2010; Venter et al., 2007). In our study, approximately half of the students agreed that the best first aid measure was to pour water on the burn. This finding is comparable to that obtained in a survey conducted among medical students at King Khalid University in Saudi Arabia; more than half of the medical students correctly stated that they would place their hands in cool water. In contrast, Less than one-third of medical students in Pakistan correctly agree that burned areas should be immersed in cold water (Bartlett et al., 2008).

Multiple previous studies have shown that there is a poor knowledge regarding the time required to cool the burn area. The majority of participants in our study did not know how long water should be applied to burns. Only a few participants chose 20 minutes as the optimum duration for flushing water over a burn injury (Siddiqui et al., 2018; Venter et al., 2007). The findings of the Wales survey were similar to our findings, with less than 10% of participants correctly identifying the appropriate time to cool the burn (Abbas et al., 2011). For questions based on scenarios that necessitate decision-making, many participants did not answer

correctly. When asked what they would do if hot boiling oil spilled on a child, around 42% of participants correctly stated that they would take off the clothes and pour water on the body. In addition, nearly half of the medical students correctly stated that they would place the injured area under cold water for 10-20 min if boiling water spilled on their hands. The majority of participants correctly agree that when someone's clothes catch fire during a picnic, they would instruct them to stop moving, lie down, and roll around on the floor. In a Nigerian study, more than half of those did not know that to stop, drop, and roll if their clothes caught fire or to use cold water if hot oil was spilled on their hands (Harvey et al., 2011). In a Cambodian study, few participants knew to roll on the ground to put out a fire if their clothes caught fire (Ibrahim et al., 2011).

Our study revealed that 94.7% of male participants had poor knowledge and 69% of female participants had poor knowledge. In other studies, Female participants were also more knowledgeable about first aid management than male participants. Regarding parental education level and its association with knowledge level, this study showed a significant association with the mother's educational level ($p=0.024$). In contrast, the King Khalid University study did not show any significance ($p = 0.66$) (Siddiqui et al., 2018). The mean knowledge score of participants and their academic year were found to have a non-significant relationship. This finding contradicted previous study, which have suggested that senior students are significantly more knowledgeable about first aid management than junior students (Al-Batanony et al., 2021; Khan et al., 2010).

In the current study, only 28.8% of participants received information regarding burn injuries. This finding contrasts with findings from Pakistan and Peru, where nearly half of participants reported prior knowledge (Bartlett et al., 2008; Mejia et al., 2011). Their primary source of information about burn first aid was the Internet. First aid training can greatly improve the general public's information of burn first aid. A study conducted in the UAE and Turkey found that including a first aid training in the early stages of a medical curriculum program provides students with solid basic knowledge and adequate practical skills (Das and Elzubeir, 2001; Altintas et al., 2005). These results emphasize motivation of medical students to attend training courses and workshops regarding first aid management and have first aid education as part of their curriculum.

The study had some limitations, despite highlighting some significant findings. Participants' perceptions may have been overestimated because we used an online questionnaire with no open-ended questions. Furthermore, only one medical school was surveyed, so the findings cannot be generalized to all medical students in Saudi Arabia.

5. CONCLUSIONS

Medical students at UQU demonstrated a lack of knowledge about burn first aid, highlighting the need to encourage students to attend first aid management training courses and workshops, including those on burns. Modern teaching methods, such as simulation using computerized mannequins, have become an ethical requirement and are an acceptable and effective method of increasing students' abilities, particularly during clinical practice.

Acknowledgement

We thank the participants who were all contributed samples to the study.

Author's contributions

All the authors contributed in the selection of the idea, proposal writing, data collection, data entry and analysis, results and discussion writing and final revision of the article

Ethical approval

The study was approved by the Medical Ethics Committee of Umm Al-Qura University (ethical approval code NTLN261121).

Funding

This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. 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. J Pak Med Assoc 2011; 61(6):613-6. PMID: 22204227
2. Al-Batanony MA, Alwutayd O, Albriki MO, Balobaid RS, Alseleem HY, Omar W, Balabaid A, Alhamili SM. Medical students' perception about Burns First Aid Management: A cross-sectional study. IJMDC 2021; 287–93.
3. Almarghoub MA, Alotaibi AS, Alyamani A, Alfaqeeh FA, Almehaid FF, Al-Qattan MM, Kattan AE. The epidemiology of burn injuries in Saudi Arabia: A systematic review. J Burn Care Res 2020; 41(5):1122–7.
4. Al-Musa HM, Bharti RK, Alsamghan AS, Asiri M, Alqahtani MS, Al-qahtani D, Al-Malwi F. Knowledge of First Aid Skills among Medical Students in King Khalid University, Abha, Saudi Arabia. people's J Sci Res 2017. Available from: https://www.pjsr.org/Mar2017R/1.pdf
5. Altintas KH, Aslan D, Yildiz AN, Subasi N, Elçin M, Odabasi O, Bilir N, Sayek I. The evaluation of First Aid and Basic Life Support training for the first year university students. Tohoku J Exp Med 2005; 205(2):157–69.
6. Bartlett N, Yuan J, Holland AJ, Harvey JG, Martin HC, La Hei ER, Arbuckle S, Godfrey C. Optimal duration of cooling for an acute scald contact burn injury in a porcine model. J Burn Care Res 2008; 29(5):828–34.
7. Cuttle L, Kempf M, Kravchuk O, Phillips GE, Mill J, Wang XQ, Kimble RM. The optimal temperature of first aid treatment for partial thickness burn injuries. Wound Repair Regen 2008; 16(5):626–34.
8. Cuttle L, Kempf M, Liu PY, Kravchuk O, Kimble RM. The optimal duration and delay of first aid treatment for deep partial thickness burn injuries. Burns 2010; 36(5):673–9.
9. Das M, Elzubeir M. First aid and basic life support skills training early in the medical curriculum: Curriculum issues, outcomes, and confidence of students. Teach Learn Med 2001; 13(4):240–6.
10. Ghmaird A, Alabdullah W, Alquayr S, Alhejaili M, Alshomrani S, Alsofyani N. Saudi mothers' awareness and first aid management of unintentional injuries to children in the home 2021. Medical Science 2021; 25(117):3054-3063
11. Harvey LA, Barr ML, Poulos RG, Finch CF, Sherker S, Harvey JG. A population-based survey of knowledge of first aid for Burns in New South Wales. Med J Australia 2011; 195(8):465–8.
12. Hsiao M, Tsai B, Uk P, Jo H, Gomez M, Gollogly JG, Beveridge M. "What do kids know": A survey of 420 grade 5 students in Cambodia on their knowledge of burn prevention and first-aid treatment. Burns 2007; 33(3):347–51.
13. Ibrahim A, Asuku ME, Dahiru T. Burn prevention and first aid knowledge: A focus on adolescents in Zaria. Afr J Trauma 2014; 3(1):11.
14. Kasemy ZA, Bahbah WA, Zewain SK, Haggag MG, Alkalash SH, Zahran E, Desouky DE. Knowledge, attitude and practice toward covid-19 among Egyptians. J Epidemiol Glob Health 2020; 10(4):378.
15. Khan A, Shaikh S, Shuaib F, Sattar A, Samani SA, Shabbir Q, Rasheed AZ. Knowledge attitude and practices of undergraduate students regarding first aid measures. J Pak Med Assoc 2010; 60(1):68-72. PMID: 20055288
16. Mejia CR, Quezada-Osoria C, Moras-Ventocilla C, Quinto-Porras K, Ascencios-Oyarce C. Nivel de conocimientos sobre emergencias médicas en estudiantes de medicina de universidades peruanas [Level of knowledge in medical emergencies among medical students of Peruvian universities]. Rev Peru Med Exp Salud Publica. 2011; 28(2):202-9. Spanish. doi: 10.1590/s1726-46342011000200006. PMID: 21845299.
17. 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? [Internet]. Cureus 2020. Available from: https://www.cureus.com/articles/26165-survey-on-knowledge-of-first-aid-management-of-burns-amongst-medical-and-non-medical-students-in-karachi-pakistan-need-for-an-educational-intervention
18. Siddiqui AF, Qahtani SQ, Qahtani AM, Barkout SA, AlAamri AK. Knowledge, attitudes and practice of Burns Prevention and first aid among medical students of King Khalid University, Saudi Arabia. Bangladesh J Medical Sci 2018; 17(4):537–44.
19. Skinner AM, Brown TL, Peat BG, Muller MJ. Reduced hospitalisation of Burns patients following a multi-media campaign that increased adequacy of first aid treatment. Burns 2003; 30(1):82–5.
20. Venter THJ, Karpelowsky JS, Rode H. Cooling of the burn wound: The ideal temperature of the coolant. Burns 2007; 33(7):917–22.