

Knowledge and practices related to burn first aid among Saudi population

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ABSTRACT

Background: Burn is a breakdown of skin continuity which is considered a major problem worldwide. The best approach to manage burns is to start with first aid. Numerous studies conducted in several regions revealed a widespread lack of understanding about first aid for burns. To assess the general knowledge and practices related to burn first aid treatment among the population in Saudi Arabia. **Methods:** We conducted a cross-sectional study with a representative random sample of 449 Saudi residents in the Kingdom of Saudi Arabia using a self-administered questionnaire that was distributed through social media sites. For data analysis, we used Statistical Package of Social Science Software (SPSS) version 24. **Results:** Out of 449 participants that met our inclusion criteria, most study participants were females, 371 (82.6%) and 203 (45.2%) aged between 18-29 years old. Also 239 (53.2%) didn't believe that cold water could be poured if hot oil spills on the hands and only 95 (21.1%) agreed that all burn injuries must be treated in the hospital. **Conclusion:** The results of the research suggest that the general community of Saudi Arabia has a significant lack of awareness about burn wound treatment. This survey also showed a number of gaps in awareness and practices that will need to be corrected in the near future. Various media platforms should be used to create public programs aimed at increasing community knowledge.

Keywords: Burn First Aid, Burns management, Knowledge, Practice, Saudi Arabia.

1. INTRODUCTION

Burns are breakdowns in the skin continuity resulting from many causes, including exposure to hot objects, hot liquids, chemicals, electricity, or the sun. Classification of burns can be done depending on depth (McLure et al., 2021). With first-degree burns, there is the involvement of only the outer layer of the skin. The skin presents with dryness, pain and increased density to touch. In second-degree burns, there is the involvement of several layers of the skin. Second-degree burns present with blisters, swollen or puffy skin. All layers of tissues and other tissues such as muscles, organs and bones are involved in third-degree burns. The skin presents with paleness and is charred, dark and

dry. In some cases, the skin is completely broken.

First aid management of the burns depends on the degree of the burns (Greenhalgh, 2019). Severe burns like third-degree burns may require immediate medical interventions. These kinds of burns are to be covered with a sterile dressing to avoid getting infections. Injury from burns is a critical issue in the current world which comes with significant consequences to the community. It is considered at the top of the list among the leading causes of death and morbidity globally (Mortada et al., 2020). Annually, approximately one million individuals are directly affected by burns injuries globally. After burns, first aid can play an essential role in determining the outcome of the injury (Jagnoor et al., 2018). Practices of improper first aid management on victims can have detrimental effects (AlQahtani et al., 2019). For instance, applying ice to a large area of the burn is known to lead to hypothermia. Common misconceptions exist in the community that applying substances such as cream and toothpaste to the burn area provides remedies (Shrestha & Gurung, 2018). Elimination of such traditional techniques will require the dispensation of valuable knowledge to the community concerning the management of burns (Griffin et al., 2020).

A study of first aid knowledge among teachers in Palestine showed that teachers had gained much first aid skills concerning fractures, convulsions and burns due to high levels of experience (Amro and Qtait, 2017). Another survey conducted in Pakistan involved assessing burns management among university students. The overall knowledge concerning the management of burns among the two groups of students was to be studied. The finding showed that medical students have a better knowledge of first aid burns than their colleague students from other fields in the same facility. The study's overall results indicated that over two-thirds of the students scored poorly concerning their knowledge on the management of burns (Amro and Qtait, 2017). The results were the same as those of other studies conducted in European and American countries (Siddiqui et al., 2018). First aid management to burns is a secondary intervention skill essential in saving the lives of the burn's victims. It, therefore, necessitates the urge to provide quality education on first aid management concerning various kinds of emergency conditions among the community members (Burgess et al., 2018). The various research reports reviewed show that a significant percentage of the community believes in misconceptions hence lacks appropriate knowledge on immediate intervention to burn patients (Griffin et al., 2020).

Several studies worldwide have investigated the knowledge of first aid burn. However, there is insufficient information regarding the knowledge and practice toward first aid burn management among the Saudi population. Therefore, we aim to assess the overall knowledge and burn-first aid practice.

2. MATERIALS AND METHODS

Study design

This is a cross-sectional study that was conducted during the period of November 2021 - November 2022 among the Saudi population of different age groups (18-65 years). The data was collected by using a self-administered questionnaire. A study done in Majmaah in Saudi Arabia was used as a reference to develop our questionnaire (AlQahtani et al., 2019).

Sample size

The sample size of 449 was estimated using the Qualtrics calculator with a confidence level of 95%. The Sample size was estimated using the formula: $n = P(1-P) * Z\alpha^2 / d^2$ with a confidence level of 95%;

n: Calculated sample size

Z: The z-value for the selected level of confidence (1- α) = 1.96.

P: An estimated prevalence of knowledge

Q: (1 - 0.50) = 50%, i.e., 0.50

D: The maximum acceptable error = 0.05.

So, the calculated minimum sample size was:

$$n = (1.96)^2 \times 0.50 \times 0.50 / (0.05)^2 = 384.$$

Inclusion and Exclusion criteria

The inclusion criteria of this study were all Saudi males and females between 18-65 years with or without a history of burn. Those aged more than 65 or less than 18 years old and who refused to participate in the study we excluded them.

Method for data collection and instrument (Data collection Technique and tools)

Data collection include: Demographic (age, gender, level of education, monthly income). Burn history and first aid burn knowledge and practice (prior knowledge of applying first aid to burn victims, previous history of burn injuries and attitude toward common

community practices (apply of egg, herb, or water in the burn, removing clothes, wrap burn with clothes, seek of medical assistance).

Ethical approval was obtained from the research ethics committee of Taif University (application number: HAO-02-T-105). An informed-consent was gained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for the research purposes only.

Pilot test

The questionnaire was distributed on 20 individuals and asked to fill it. This was done to test the simplicity of the questionnaire and the feasibility of the study. Data of the pilot study was excluded from the final data of the study.

Analyzes and entry method

The Data was entered on the computer using the “Microsoft Office Excel Software” program (2016) for windows. Then the data was transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed. All categorical variables were described as frequencies and percentages. Pearson's-Chi-square-test was used to define the relationship of categorical variables. P-value of <0.05 was considered statistically significant.

3. RESULTS

Our analysis included responses from 449 participants that fulfilled our inclusion criteria. The sociodemographic-characteristics of the contributors showed that 203 (45.2%) belonged to the age group of 18-29 years, 371 (82.6%) were females, 343 (76.4%) had a university level of education, 150 (33.4%) were students, 244 (54.3%) had a monthly income of less than 10,000 Saudi riyals, 326 (72.6%) were living with children/adolescents/teenagers at home, 251 (55.9%) reported that they have prior knowledge of applying first aid to burn victim and 318 (70.8%) had a history of exposure to burn injury (self or family member) (Table 1).

Table 1 Socio demographic characteristics of the participants

Parameter		N	%
Age (Years)	18-29	203	45.2
	30-49	162	36.1
	>=50	84	18.7
Gender	Male	78	17.4
	Female	371	82.6
Educational level	Primary school	6	1.3
	Middle school	12	2.7
	Secondary school	88	19.6
	University	343	76.4
Employment	Unemployed	73	16.3
	Student	150	33.4
	Teacher	114	25.4
	Military sector employee	4	.9
	Health sector employee	6	1.3
	Retired	32	7.1
	Other	70	15.6
Family Income (Saudi riyals)	<10,000	244	54.3
	10,000 to 20,000	169	37.6
	21,000 to 30,000	27	6.0
	>30,000	9	2.0
With children/adolescents/teenagers (under 18 years) living at home	Yes	326	72.6
	No	123	27.4
Prior knowledge of applying first aid to burn victims	Yes	251	55.9
	No	198	44.1

Past of exposure to burn-injury (self or family member)	Yes	318	70.8
	No	131	29.2

Participants' responses to items related to knowledge related to burn wound management are given in Table 2. More than half (53.2%) didn't believe that cold water could be poured if hot oil spills on the hands and only 21.1% agreed that all burn injuries must be treated in the hospital. About 70.4% of the participants agreed that eggs or herbs could be applied to burn wounds. It was agreed by 89.8% of the participants that one should stop, drop and droll when the clothes catch fire. More than 50% of the contributors (51.4%) believed that water should be applied for only less than 5 minutes, whereas only 5.8% mentioned it as more than 15 minutes (Table 2).

Table 2 Knowledge related to burn wound management

		N	%
Cold water can be poured if hot oil spills on the hands	Yes*	210	46.8
	No	239	53.2
All burn injuries must be treated in the hospital	Yes	95	21.2
	No*	354	78.8
Eggs or herbs can be applied to the burn wounds	Yes*	316	70.4
	No	133	29.6
When the clothes catch fire, you should Stop, drop, and roll	Yes*	403	89.8
	No	46	10.2
The duration of applying water to the burn	<5 minutes	231	51.4
	5-10 minutes	126	28.1
	11-15 minutes	42	9.4
	>15 minutes*	26	5.8
	I don't know	24	5.3

As shown in Figure 1 the total knowledge scores for each participant were calculated by adding the scores of each knowledge item, where the correct response was given a score of 1 and for the wrong response, no scores were given. The total scores were converted into percentages and based on these percentages, the knowledge levels were categorized as 'good' (>75%), fair (60-75%), and poor (<60%). The analysis showed that 57% of the participants had 'poor knowledge' and only 7.3% had 'good knowledge' related to burn wound management.

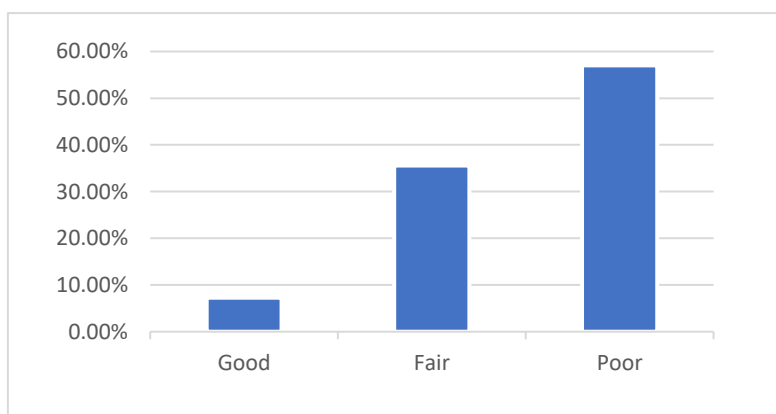


Figure 1 Knowledge level of participants.

Table 3 shows the relationship of the knowledge levels of the participants was compared with various socio demographic characteristics. We observed no statistically significant association between knowledge level and different age groups even though participants of age group ≥ 50 years had comparatively more good knowledge ($p=0.716$). However, male participants had significantly demonstrated more 'good knowledge' (19.2%) than females (4.9%) ($p<0.001$). There was no statistically significant

association observed between knowledge level and education (p=0.411), employment (p=0.186) and monthly income (p=0.939). It was found that participants with a previous history of burn-injuries (self or family member) had statistically significantly more 'good knowledge' (17.3%) than those who didn't have such history (6.1%), (p=0.003).

Table 3 Relationship of knowledge level and sociodemographic characteristics

		Knowledge level			P value*
		Good	Fair	Poor	
Age	18-29	14 (6.9%)	71 (35.0%)	118 (58.1%)	0.716
	30-49	10 (6.2%)	58 (35.8%)	94 (58.0%)	
	>=50	9 (10.7%)	31 (36.9%)	44 (52.4%)	
Gender	Male	15 (19.2%)	25 (32.1%)	38 (48.7%)	<0.001
	Female	18 (4.9%)	135 (36.4%)	2(58.8%)	
Education	Primary	0 (0.0%)	4 (66.7%)	2 (33.3%)	0.411
	Middle school	1 (8.3%)	6 (50.0%)	5 (41.7%)	
	Secondary school	8 (9.1%)	25 (28.4%)	55 (62.5%)	
	University	24 (4.9%)	125 (36.4%)	194 (58.8%)	
Employment	Unemployed	4 (5.5%)	30 (41.1%)	39 (53.4%)	0.186
	Student	11 (7.3%)	47 (31.3%)	92 (61.3%)	
	Teacher	7 (6.1%)	50 (43.9%)	57 (50.0%)	
	Military sector employee	0 (0.0%)	2 (50.0%)	2 (50.0%)	
	Health sector employee	2 (33.3%)	2 (33.3%)	2 (33.3%)	
	Retired	4 (12.5%)	10 (31.3%)	18 (56.3%)	
	Other	5 (7.1%)	19 (27.1%)	46 (65.7%)	
Monthly family income (SAR)	<10,000	16 (6.6%)	87 (35.7%)	141 (57.8%)	0.939
	10,000 to 20,000	15 (8.9%)	61 (36.1%)	93 (55.0%)	
	21,000 to 30,000	2 (7.4%)	9 (33.3%)	16 (59.3%)	
	>30,000	0 (0.0%)	3 (33.3%)	6 (66.7%)	
History of exposure to burn injury (self or family member)	Yes	55 (17.3%)	102 (32.1%)	161 (50.6%)	0.003
	No	8 (6.1%)	39 (29.8%)	84 (64.1%)	

*a p value <0.05 is considered statistically significant

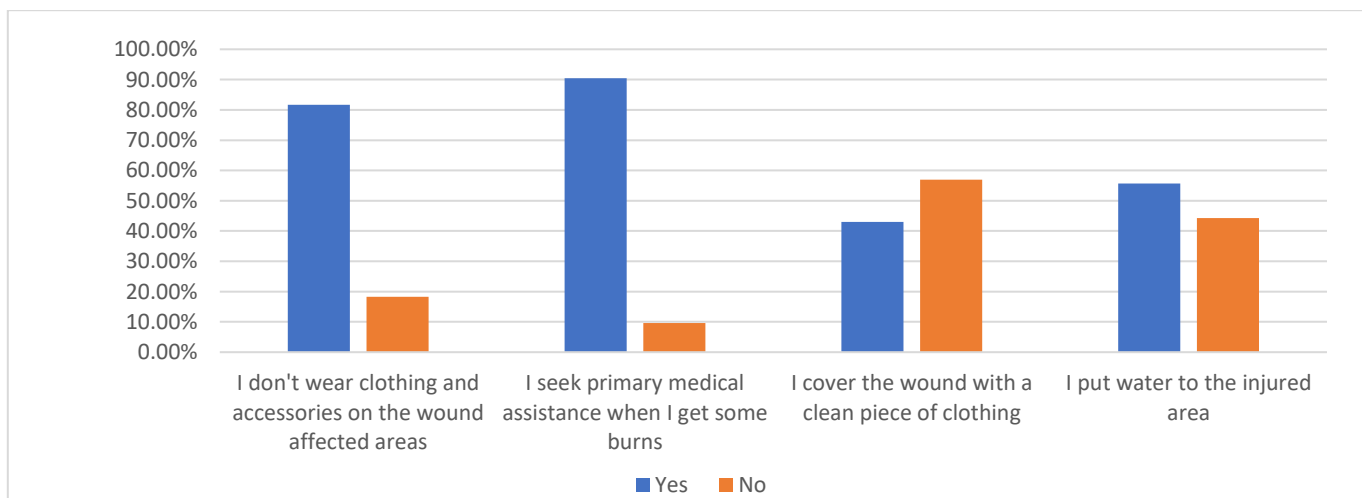


Figure 2 Practices related to burn injury

The assessment of practices related to burn injury showed that 81.7% don't wear clothing and accessories in the wound-affected areas and 90.4% sought primary medical assistance when they got some burns. Only 43% of the participants reported that they covered the wound with a clean piece of clothing and 55.7% mentioned that they put water on the injured area (Figure 2).

4. DISCUSSION

An individual's degree of education and literacy is a critical consideration for properly implementing first aid practices for burns wounds. A meta-analysis found that the incidence of burn-injuries in the East-Mediterranean-region ranged from an annual fatality rate from burn injuries ranging from 0.2 to 5.6 per 100,000 people, with residences accounting for the commonest location for these injuries (Othman & Kendrick, 2010). It is widely known that earlier intervention with evidence-based treatments for burn injuries leads to better results and lower complication and fatality rates. The current study findings showed that the knowledge related to burn wound management was inadequate among the majority of the participants, where only 7.3% had only good knowledge. In our study majority (76.4%) had a university level of education and the prior acquisition knowledge of applying first aid to burn victims. This is higher than a previous study done in 2016 among the Saudi population that reported a previous knowledge acquisition to be 43.6% (Kattan et al., 2016). In the event of mass casualty events, community awareness of first aid for burn injuries is essential to ensure self-rescue and help each other lessen severity and mortality (Quinn et al., 2009). The current study findings showed that participants who had a previous history of burn-injuries (self or family member) were 70.8% and the knowledge level regarding burn injury management was significantly higher among these participants.

More than 2/3 of the contributors in our study believed that all burn injuries needn't be treated at the hospital as some of the burns could be managed at home or the place of the incident. A burn can cause a large systemic response in the body and there is an excessive release of systemic-inflammatory-mediators and cytokines that leads to greater capillary permeability and wide-scale-extravasation of liquid & proteins (Chi et al., 2021). In order to maintain homeostasis, the skin performs a different function, including controlling body temperature and fluid balance. It also functions as a physical barrier against infection and as a sensory organ for interpreting our surroundings (Chuong et al., 2002; Segre, 2006). Management of burn injuries depends on the severity of the injury. Severe burn injury management is a long-term process that looks at everything from the burn wound to how the injury affects a person's body, mental well-being and social relationships. The main four main goals for first aid include a) stopping the burning process, b) cooling the burn, c) providing pain relief and d) covering up the burn (Hudspith & Rayatt, 2004). In situations where resources are scarce (mass casualty, natural disaster), triage, stabilization and transfer are the best ways to get the best successful outcomes. Children and the elderly who are severely burned and cannot be transported to a burn care facility have poor outcomes (Nguyen et al., 1996). Hence, it is important to know the basic principles of burn wound management.

In our study, only 46.8% of the participants believed that cold water could be poured if hot oil spills on the hands and only a few proportions of them knew the appropriate duration of applying water to the burn. To provide 'effective' first aid for burns, the (Emergency-Management of Severe-Burns) guidelines recommend that cool running water should be applied for at least 20 minutes within the first three hours following injury (Maitz et al., 2014). In human patients, the optimal duration of water-cooling is uncertain. However, studies on animals have validated similar findings, revealing that the rapid application of cool running water was associated with faster re-epithelialization and less scarring (Cuttle et al., 2009). Excessive cooling of burn victims, which results in hypothermia, has been linked to serious complications such as abnormal clotting and higher mortality (Singer et al., 2010). It is reported that first aid may help reduce the quantity of surgical intervention necessary and the length of hospital stay in burn victims (Skinner & Peat, 2002). They conducted a telephone study of 7320 people in New South Wales and found that 82% of respondents would-cool a burn with water; however, only 9.4 percent would do so for the recommended 20 minutes; and only 1% of the participants used first aid techniques for burn injury (Harvey et al., 2011).

Our study found that 81.7% of the participants didn't wear clothing and accessories in the wound-affected areas. A similar study done in Saudi Arabia reported that 72.1% of the respondents noted that they removed-clothing and accessories from the injured-zone (Kattan et al., 2016). About 43.0% of the participants in our study reported that wrap injuries with a clean piece of cloth. This practice is lesser in percentage compared to another study done in Saudi Arabia, which reported that 61.3% of the participants wrapped the burn injury with a clean piece of cloth (AlQahtani et al., 2019). Dressings should completely cover the burn area and maintain the patient's temperature. Cling film (polyvinyl chloride) is an excellent choice for first aid cover. It was also reported that honey and toothpaste were the commonly used home remedies for burn wound management among the Saudi population (Kattan et al., 2016). Similar findings of excessive usage of toothpaste for burn injury have been reported in many other countries such as Pakistan (Mishra et al., 2019), Turkey (Hsiao et al., 2007), Cambodia (Karaoz, 2010) and the U.K (Khan et al., 2007). Toothpaste has been widely utilized despite a lack of scientific support and this could be due to anecdotal evidence that it relieves the burning

feeling and agony associated with a burn. Additionally, peppermint oil, which is found in many commercial toothpastes, has a cooling effect on a raw, fresh burn that has been exposed to the air.

Despite current progress in injury management and prevention, burn injuries continue to be the most overlooked and fatal disease of the present world. Due to a scarcity of specialized burn care institutions in Saudi Arabia, burn injury has traditionally been an under estimated and under-researched subject. Our study was a cross-sectional one that used an online self-administered questionnaire. Thus, there is a high possibility of social desirability and recall bias. Secondly, the sample size was small because of the restricted resources and limited time available for this investigation. Additionally, the participants were not questioned where they got their information regarding first-aid for burns and thus, a community-based study with high sample size is strongly recommended in this regard.

5. CONCLUSION

The findings of this study show that there is a big gap in knowledge regarding burn wound management among the general population of Saudi Arabia. This study has also revealed a number of short comings in the awareness and practices that will require attention in the near future. Public programs aimed at enhancing community knowledge should be launched using various media platforms. The basic first aid principles related to burn management and their guidelines should be included in the school curriculum. Regular training programs for burn injury management should be held on a regular basis, especially among high-risk groups.

Recommendations

We recommend that further educational campaigns should be inaugurated to raise awareness and knowledge regarding burn wound management among the general population of Saudi Arabia.

Ethical approval

Ethical approval was obtained from the research ethics committee of Taif University (application number: HAO-02-T-105). An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for the research purposes only.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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