

## **Knowledge and practices related to burn first aid among general population in Saudi Arabia**

### **Abstract**

**Background:** Burn injuries represent a common type of traumatic injuries. They may cause morbidity, mortality, or psychological and cosmetic problems. About 265 000 individuals die secondary to burns according to the WHO results. Simple first aids following a burn injury have been shown to improve the outcome. **Objectives:** Evaluation of first aid knowledge about the management of burns among the general population in Saudi Arabia. **Subjects and Methods:** This is a cross-sectional study that assesses awareness regarding burn injury first aids among the general population in Saudi Arabia. Data was collected using a questionnaire formed of 18 questions about demographic data, burn first aid knowledge and practice. Burn first aid knowledge and practice parts of the survey assessed participants' knowledge regarding basics of burn first aid and when to seek medical assistance. **Results:** 70.6% of the sample study have previous knowledge of applying first aid for burns. 62.8% of the sample study think it's wrong to put raw eggs or herbs on the wound. 51.04% of the sample study use honey while 30.73% of them use toothpaste to treat burns. 76.3% of the sample study think that jewelry and clothing should be removed from the affected area of burn. **Conclusion:** 70.6% of Saudi population had basic knowledge regarding the first aid of burn, however, there are wrong beliefs about the benefit of using honey, toothpaste, and raw egg in case of burns. Raising awareness of community members about the benefits of first aids for burns is recommended.

**Keywords:** burns, first aid, Knowledge and practice, KSA

## Introduction

Burn injuries represent common type of traumatic injuries. According to the degree of burn, it may cause morbidity, mortality, or psychological and cosmetic problems (Brusselaers et al, 2010). About 265000 individuals die from burns every year mostly due fire, electrical burns, and scald burns according to the WHO results. Many people may have permanent disabilities and deformities secondary to burns. Recent studies detected that the rate of deaths due to burns is higher in females than in males. Most of the fire-related burns occur in the poor or the developing countries representing more than 96% (WHO, 2018). A study performed in 2010 in the Mediterranean region, showed that the incidence of burns ranges from 112 to 518 per 100,000 per year, the mortality rate resulting from it ranges between 0.2 and 5.6 per 100,000 per year, and that the hospital mortality rate ranges between 5 and 37% but it is usually above 20% (Othman et al, 2010). Many studies have reported the epidemiology of burns in Saudi Arabia, which showed that flame, scald, and electrical burns are the most common causes (AlQahtani et al, 2019). The costs spent for treatment of injuries resulting from burns represent a big load on the healthcare systems and governments. The costs spent for treatment of children having burn injuries in the United States of America within the year 2000 were more than US\$ 211 million. In Norway. Moreover, the costs spent by a hospital of burn management in 2007 exceeded €10.5 million (WHO, 2018) First aids represent the first line of treatment before getting the medical aid. Any intervention during the first aid care should be effective and simple (Harish et al, 2019). Simple first aids following a burn injury have been shown to improve outcome. Adequate first aids are associated with improved outcomes by decreasing wound depth and grafting requirements and also decrease the time of healing. Conversely, the cultural beliefs and traditions can make the condition worse (AlQahtani et al, 2019). We can prevent the hazards of specific burn injuries by improving the awareness regarding the first aids of burn. The WHO recommendations for flame burn first aid management include putting out the flames by asking the patient to roll on the ground or by covering him with a blanket. They also include removal of patient's clothes and irrigation of the burns by using cool running water to reduce the temperature of the burn. However, in case of chemical injury, you should remove the chemical agent first then irrigate the lesion by water (WHO, 2018). A study performed within the year of 2009 showed that usage of water with temperatures of 15°C and 2°C for treatment of the burn wounds results in better results regarding the shape, structure, and regeneration of scar tissues. Ice, however, should not be used for management of burn injuries (Graham et al, 2012). A study conducted

by Fadeyibi et al, in Nigeria about the Practice of first aid in burn related injuries which revealed that 23.8% of the burn patients did not receive any form of first aid at their first presentation, 29.2% of cases received irrigation of their wounds by water, and 12.5% used raw eggs on the burn wound. The rate of wound complication was higher in those who did not receive water irrigation as a first aid (35.3%) in comparison with those received it (18.4%) (Fadeyibi et al, 2015). This survey aims to evaluate first aid knowledge for the management of burns among the general population in the kingdom of Saudi Arabia.

### **Subjects and methods**

This is a cross-sectional descriptive study conducted to assess awareness and practice of Saudi general population with regard to first aid and traditional remedies for burn injuries. The study population included members of general population above 15 years of age.

#### *Instrument:*

Data was collected from the participants using a questionnaire. This questionnaire is formed of 18 questions translated into Arabic language to make it easier for the public to read and understand. It included three departments which are demographic data, burn first aid knowledge and burn first aid practice. Demographic data included items such as age, gender, nationality, place of residence, educational level, financial level and job. Burn first aid knowledge and practice parts of the survey assessed participants' knowledge regarding the basics of burn first aid and when to seek medical assistance.

#### *Validity and reliability of the questionnaire:*

The items of the questionnaire were obtained from the validated questionnaire in previous studies<sup>[6,7]</sup> and validity was completed by reviewing it by 3 expert professors.

To ensure of the reality of questionnaire, we used Cronbach's Alpha test as shown in

the following table:

**Table 1: Cronbach's Alpha coefficient for the questionnaire items:**

Cronbach's Alpha	Number of Items
.876	11

From the data presented in table 1, we conclude that the reality coefficient value was (.876) which is high value and approaching the correct one and it refers to the validity of the questionnaire for the application and the reliability of its results.

*Sample size:*

The study included members of general population above 15 years of age in Saudi Arabia. A random sample of 384 individuals was selected according to Morgan's rule as the following:

$$n = \frac{p(1-p)}{\left[\frac{p(1-p)}{N} + \frac{E^2}{SD^2}\right]}$$

The size of the community is 33,413,660

$$n = \frac{0.5(1-0.5)}{\frac{0.5(1-0.5)}{33,413,660} + \frac{(0.05)^2}{(1.96)^2}} = 384$$

*Data Collection:*

The questionnaire was distributed among the general population in Saudi Arabia electronically through Google forms and different social media platforms 4-weeks period where the participants were notified about the purpose of data collection, anonymity and confidentiality of data and that they have the right to refuse completion of the questionnaire. Data collected was in the form of the responses of the participants to the questions of the survey in addition to data related to basic demographics of the study participants such as gender and age.

*Data Analysis:*

All the collected data were coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 21.0 (SPSS, Chicago, IL, USA).

*Pilot study:*

Before the start of the study, the questionnaire was pre-tested on 10 participants to explore if there is any ambiguity or items that lead to misunderstanding in it in order to reach to its current final form. These 10 participants will not be included in the main survey.

**Results:**

This study was conducted to assess awareness regarding burn injury first aid among general population in Saudi Arabia.

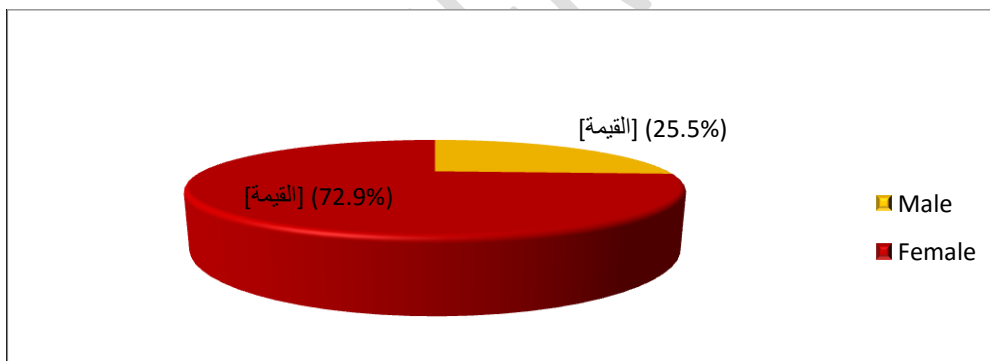
Before starting the survey, the participants were asked about if they understand the purpose and nature of this study and agree to participate to fill this questionnaire or not. 378 (98.4%) of the participants said they understand the purpose of the study and agree to fill in the questionnaire, while 6 (1.6%) did not agree.

**Table 2: Distribution of participating individuals according to their age**

Age	Frequency	Percent (%)
15-18	24	6.2
18-29	267	69.5
30-49	78	20.3
>50	9	2.3

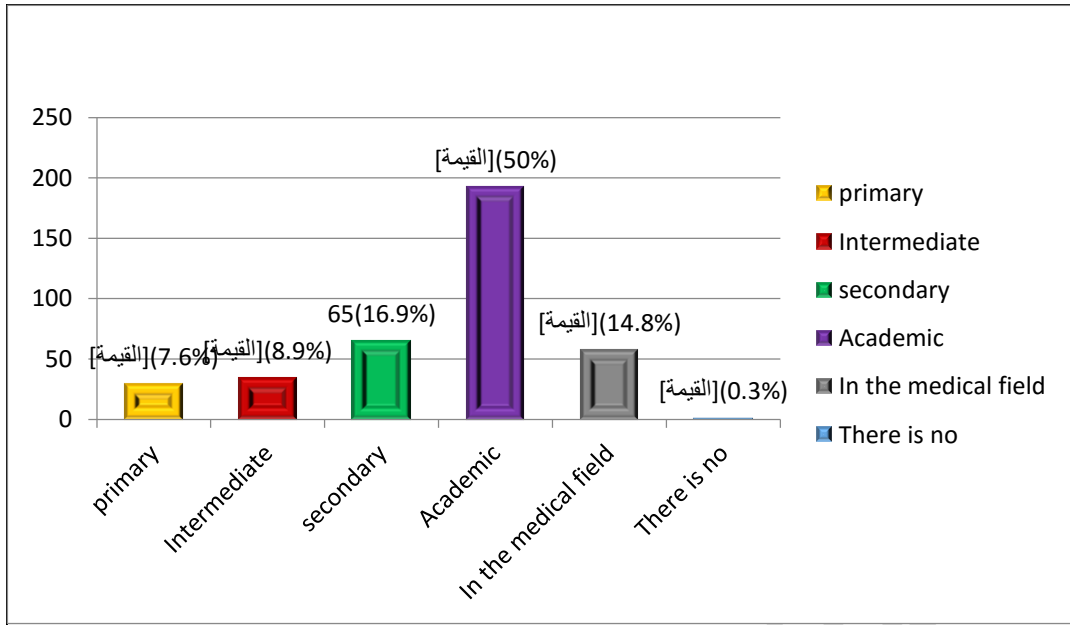
The results showed that the age of most of participants ranges between 18-29 years representing 69.5% while only 2.3% are more than 50 years old as detected in **table 3**.

**Figure 1: distribution of the participating individuals according to their gender**



The results of this study showed that the education level of half of participating individuals is Academic and that 14.8% of them are in the medical field as shown in **figure 2**.

**Figure 2: Distribution of participating individuals according to their education level**



**Table 3: Distribution of the participating individuals according to their job**

job	Frequency	Percent (%)
Unemployed	72	18.8
Student	115	29.9
Office work	48	12.5
Teacher	75	19.5
In the medical field	59	15.4
Other	9	2.3

The results showed that 29.9% of the sample study students and 19.5% of them are teachers, while 18.8% are unemployed as shown in **table 3**.

**Table 4: Summary of the questions answers related to knowledge and practice by the participating individuals:**

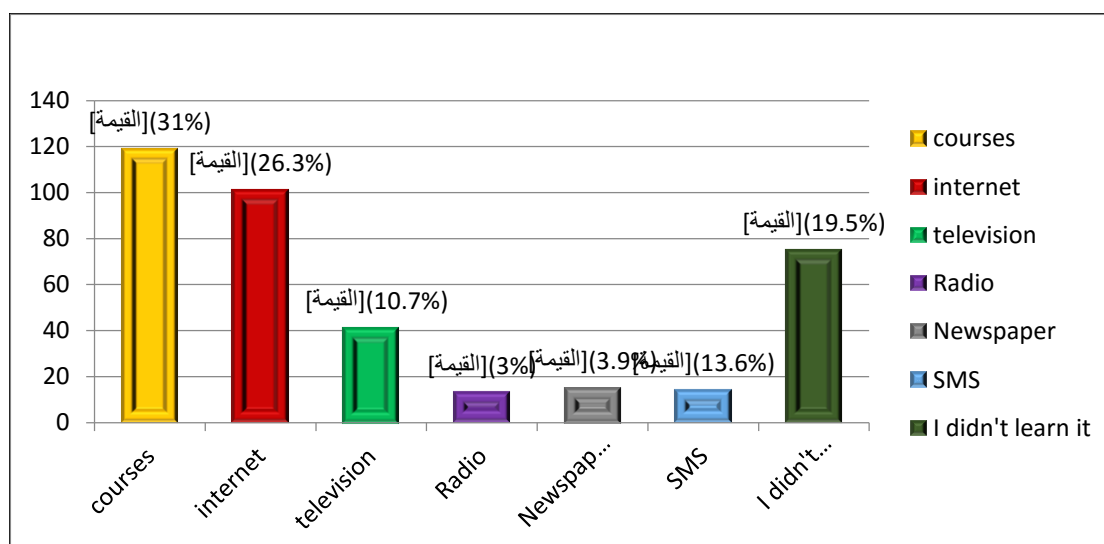
Question	Yes ( frequency / percent)	No ( frequency / percent)
<b>Do you have previous knowledge of applying first aid for burns?</b>	271 (70.6%)	107 (27.9%)
<b>Have you or any member of your family been burned?</b>	301 (78.4%)	77 (20.1%)
<b>When your clothes burn, is it better to lie down and spin on the floor?</b>	302 (78.6%)	76 (19.8%)
<b>Should you put raw eggs or herbs on the wound?</b>	137 (35.7%)	241 (62.8%)
<b>During burning, should jewelry and clothing be removed from the affected area?</b>	293 (76.3%)	85 (22.1%)
<b>Should water be used for any burns?</b>	230 (59.9%)	148 (38.5%)

The results presented in **table 4** show that 70.6% of the study sample have previous knowledge of applying first aid for burns, while 27.9% of them don't have. 78.4% of the study sample experienced burn either them or members of their families. 78.4% of the study sample think it's true to lie down and spin on the floor when they expose to burn, and 62.8% of them think it's false to put raw eggs or herbs on the burnt area.

76.3% of the study sample think that during burning, jewelry and clothing should be removed from the affected area, and 59.9% think that water should be applied for any burns.

Regarding the source of knowledge about burn first aid, 31% of the study sample study learned it from courses and 26.3% of them learned it first aid from internet as shown in **figure 3**.

**Figure 3: the source from which the participants have learned about burn first aid**



Regarding the practice to burn, our study results showed that 51.04% of the study sample used honey to treat burns, and 30.73% of them used toothpaste, while only 26.3% of them used cold water to treat burns as in **table 5**.

**Table 5: participants' opinion about the treatment that should be used in burns**

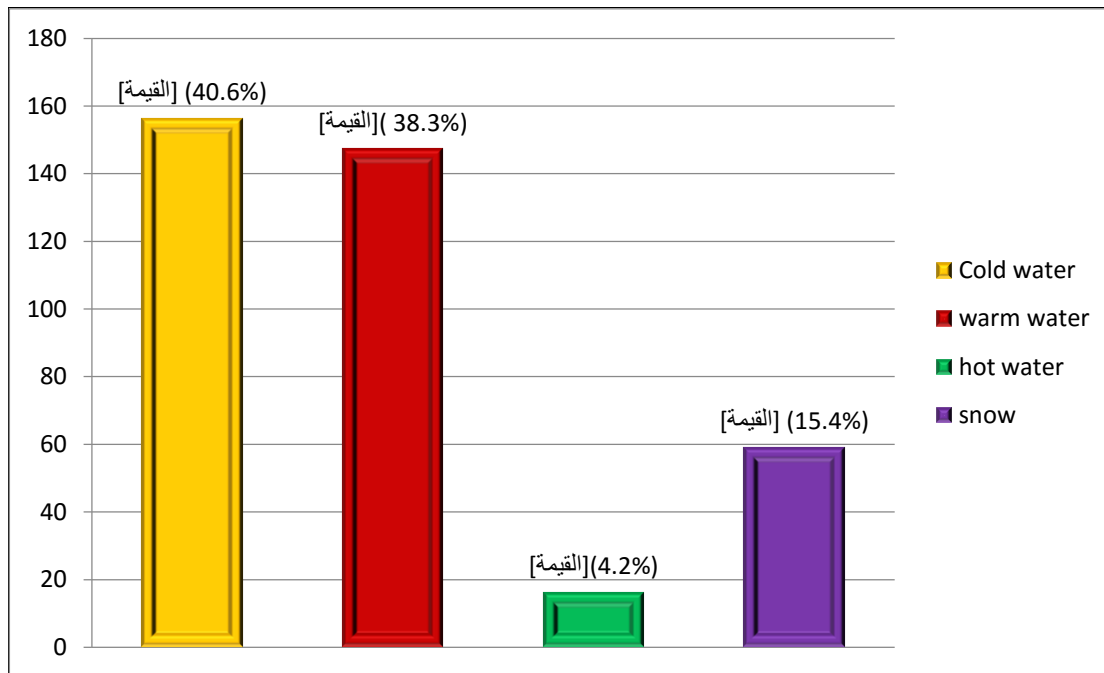
Which one of these can be used to treat burns?	Frequency	Percent (%)
Honey	196	51.04
Toothpaste	118	30.73
Ice	96	25.00
Cold water	101	26.30
Vaseline	76	19.79
Aloe juice	124	32.29

**Table 6: participants' opinion about How long should they put the water on the burn?**

Duration	Frequency	Percent (%)
Less than 10 minutes	156	40.6
10 -20 minutes	108	28.1
More than 20 minutes	45	11.7
Do not put water on them	69	18.0

Regarding duration of water application on the burn, the results showed that 40.6% of the sample study think that they should apply water Less than 10 minutes, while only 28.1% of the sample study think that they should apply water 10 -20 minutes, and 18% think that they should not apply it as in **table 6**.

**Figure 4: participants' opinion about the kind of water that they should use in case of burn**



**Figure 4** shows that 40.6% of the study sample used cold water on burns, while 15.4% of them used ice.

The results in **table 7** show that 76.82% of the study sample think that the skin burns with all its thickness needs emergency medical intervention, 42.71% of them think that electric burns needs emergency medical intervention, and 28.39% of them sample study think that chemical burns needs emergency medical intervention.

**Table 7: participants' opinion about the burn condition that requires emergency medical intervention**

Burn condition	Frequency	Percent (%)
The skin burns with all its thickness	295	76.82
Any burning on the face, ears, eyes, hands, feet or genitals	94	24.48
Burning taking away the entire body	79	20.57
Chemical burns	109	28.39
Electric burns	164	42.71
Burns associated with large fractures or other large injuries	69	17.97
Burns in the pulmonary stream	73	19.01
Cigarette burns	89	23.18
Minor burns	43	11.20

- The results of our study showed that there is significant difference in the knowledge of the participating individuals about the first aid according to their educational level where P-value =0.002, and this difference is to those in the medical field with mean (1.37) then to academic ones with mean (1.30).

Also there is significant difference in their knowledge according to their job where the p-value = 0.008 and this difference is to those in the medical field with mean (1.67) then to academic ones with mean (1.35) as demonstrated in **table 8**.

Also the results showed that there is significant differences on the first aid Practice by the study members according to their educational level and job where the p-value was 0.000 in both of them with the highest mean related to those in the medical field.

**Table 8: differences in the knowledge of the participating individuals about first aid regarding their educational level and job**

Educational level	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.394	5	.279	1.377	.002
Within Groups	75.318	372	.202		
Total	76.712	377			
Job					
Between groups	3.172	5	.634	3.209	.008
Within groups	73.539	372	.198		
Total	76.712	377			

## Discussion

This study aims to assess the awareness regarding burn first aid among the general population of Saudi Arabia. These first aids play an important role in improving the outcome and reducing the economic burden related to burns (Cuttle et al, 2009, Smolle et al, 2017). Our results showed that 70.6% (n=271) of the study population have previous knowledge of applying first aid for burns, while 27.9% (n=107) of them do not have previous knowledge of it. 78.4% (n=302) of the study sample knew that it's true to lie down and spin on the floor when their clothes burn, and 62.8% (n=241) of them think that it is false to put raw eggs or herbs on the wound. 76.3% of the sample study think that jewelry and clothing should be removed from the affected area during burns. 59.9% of the sample study think that water should be used for burns. Two previous studies conducted in Saudi Arabia (AlQahtani et al, 2019, Kattan et al, 2016) showed similar results with majority of respondents knew to remove clothes during burns, apply water, and to seek medical assistance. The nationwide study conducted by Kattan et al (Kattan et al, 2016) reported that honey and toothpaste were the most common herbal remedies used in treating burns with 69.9% and 53.7% of their study sample using these methods respectively. These percentages are higher than that of our study where 51% used honey and 30.7% used toothpaste. The percentage of population using toothpaste in burns is not low, which is a wrong practice as it may exacerbate the initial injury (Khan et al, 2007). This indicates that the awareness of the population should be increased regarding this wrong traditional belief.

A similar study conducted in 2011 in New South Wales (Harvey et al, 2011) to assess the knowledge of first aid for burns was used to compare Saudi Arabia results as a second world country to a first world country. Data was collected in Wales study through a telephone survey; thus, there is a potential for selection bias. The main source of knowledge in Wales was first aid books representing 41.7%, while in our study it was first aid courses (31%) followed by internet in both studies representing 32.9 in Wales and 26.3% in KSA. In addition, this is quite similar to Kattan et al study (Kattan et al, 2016) whose results showed that the highest percentage of his study population (44.4%) learned about burns first aid through courses then internet which indicate that courses and internet may be effective methods to raise population awareness about burns.

Regarding what to do in case of a burn injury, the most commonly used method was putting cool water in Wales study (82%), while in Saudi Arabia the percentage was 26.30%; which is similar to the study conducted in Kwa-Zulu Natal (Scheven et al, 2012) where the percentage was 26%. However, this percentage is lower than Karaoz B (Karaoz et al, 2010) results who conducted a study in Milas, Turkey about first aid home treatment for burns and it showed that 39.6% have applied cold water. This difference means low knowledge of the population which may be due to their false traditional beliefs. Among those who used cold water, there was better result at knowing how long the water should cool the burn; in Saudi Arabia, 28.1% answered 10 to 20 minutes, while in wales only 9.4% knew that it was 10-20 minutes, also in Scheven et al (Scheven et al, 2012) study conducted in Kwa-Zulu Natal, only 1% knew that they should apply water for 10 minutes at least.

51.04% of our study population used honey in the first aids which can be an accepted intervention due to its benefits as many research have shown that pure honey usage on burns can stimulate rapid regeneration of tissues and decrease incidence of scar formation. (Al-Waili et al, 2011, Lindberg et al, 2015) In a study conducted by Al Dhafiri et al (Al Dhafiri et al., 2022) in Saudi Arabia on 461 subjects, they have concluded that the most common reason behind the burn injuries is due to hot water or the hot steam. Furthermore, they have found that around 63% of the participants have shown satisfaction in their responses towards the self first aid approach at home.

Regarding the healthcare workers, a previously conducted study by Mortada et al. (Mortada et al, 2020) among the health-care workers working in Saudi Arabia have shown that around

65.4% of the study subjects approach their burn incidences by using the traditional medications to apply them on the area of burn.

The results also showed that there significant differences in the knowledge and practice according to their educational level and job, which will guide us to which categories of the population require more education about the burn first aids.

Study limitations: it is a cross-sectional design of the study, which could determine the relation between factors not causality.

## **Conclusions**

70.6% of Saudi population had basic knowledge regarding to first aid to burn, however, there are wrong beliefs about the usage of toothpaste and raw egg in case of burns. There are significant differences in the knowledge and practice of the general population according to their educational level and job.

## **Ethical Approval And Consent**

The study was ethically approved by the Institutional Human Ethics Committee of Taibah University. Informed consent was obtained from all the participants after describing the aim of the study.

## **Recommendations**

It is recommended to raise the awareness of community members about the effectiveness of the correct approach in a setting of burn incidence through the social networks, available courses on the internet, or public campaigns. In addition, the authors believe that it is recommended to provide trained teams supervised by the Ministry of Health to apply the steps of first aid in incidences of burns.

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