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Knowledge of First Aid towards Burning Injury among general population in western region Saudi Arabia

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Burn injuries are considered one of the major global health issues and the most devastating public health issues due to their severe physical, functional, and psychosocial consequences. The cross-sectional descriptive survey study was conducted among the general population of Mecca, Jeddah, and Taif, Saudi Arabia. The participants were selected using a random sample selection method from December 2020 to March 2021. We included participants living in Mecca, Jeddah, and Taif, aged 18 years old and above. We excluded any participants living outside those cities and aged below 18 years old. Around 64.0% of respondents had previously received burn first-aid information, and (61.8%) had a burn history. After the burn injury, the following first-aid practices were followed by the participants: (74.6%) removed clothing and accessories from the injured area, (58.9%) applied cold water and washed the injured area, and only (1.2%) did so for more than 20 minutes. (45.2%) respondents covered the burn area with a cloth, and (84.3%) sought medical assistance. More than half of our participants had a history of burn injuries, which shows a high prevalence, and most of the participants had performed incorrect first-aid practices, potentially leading to a poor prognosis of the injury, and 83.1% of them did not have a plan for home evacuation in the case of a fire emergency, which would lead to a high morbidity and mortality rate. These results must be seriously considered by healthcare and civil defense departments.

Keywords: Burn, First aid, Traditional remedies

INTRODUCTION

Burn injuries have severe physical, functional, and psychosocial consequences, making them a major global and devastating issue. Burns are the fourth most common cause of trauma globally after motor vehicle accidents, falls, and violence (Mishra, 2019- Siddiqui AF 2018, - Mortada H, 2020). In 2018, the World Health Organization (WHO) stated that about 265,000 deaths happen every year, and an estimated 11 million people suffer from burn injuries each year worldwide, and more than 95% of these burn injuries occur in low- and middle-income countries (WHO, 2021).

Smoking cigarettes and using electrical appliances, cookers, water heaters, and chemical items make modern households prone to burn accidents. The kitchen and bathrooms are the most common household areas for household burns (Wong P, 2007-Brusselaers N, 2010).

A number of research studies on burn epidemiology in Saudi Arabia have been published, with similar conclusions, highlighting scalp and flame burns were the most prevalent. The most common place was home, with children being the most common age group affected and the majority of them being under five. Most of these research studies also revealed that males were more likely to burn. Furthermore, mortality was generally low, with rates ranging from 4.4% to 9.4% (RA Al-Hoqail, 2011- Al-Shehri M, 2004- Mahaluxmivala S, 1997- Al-Shlash, 1996- El Danaf A, 1991- Jamal YS, 1990).

The weekly Friday mass prayer and the annual pilgrimage to Mecca are recognized as high-risk gatherings for burns in Saudi Arabia and other Muslim communities (Al-Qattan MM., 2000- Fried M., 1996). The holy month of Ramadan, during which Muslims fast from dawn to sunset,has been shown to increase the severity of burns in epileptic patients who do not take their medications during fasting hours (Al-Qattan MM., 2000).

Burn injuries are preventable and can be initially managed with cheap, simple, and accessible first-aid practices. Following a burn injury, immediate response practices in the context of health emergencies can be implemented in all areas, such as households, schools, workplaces, and recreational areas (Habeeb KA, 2020 -

Harish V, 2019 – Mortada H, 2020).

These life-saving interventions or first aid techniques can be done immediately with limited or without medical equipment by a person nearby (Brusselaers N, 2010), which will result in a reduction in wound depth, faster healing, and decreased grafting requirements (Harish V,2019).

The aim of this research is to assess the knowledge level of first aid for burn injuries among the general population in the western region of Saudi Arabia.

MATERIAL AND METHODS

After obtaining approval from the Ibn Sina National College Research Center (ISNC-H-02-24122020), this cross-sectional descriptive survey study was conducted among the general population of the western region of Saudi Arabia. The participants were selected using a random sample selection method from December 2020 to March 2021. We included participants living in Mecca, Jeddah, and Taif, aged 18 and above.

The sample size required for this study was 484 participants with a 95% confidence level and a margin of error of 5%. The calculations were made using the Raosoft sample size calculator (Roasoft 2022).

A questionnaire was used by AE Kattan, done in 2016 among nationwide Saudi Arabia adults (Kattan AE, 2016); it was designed with a 30-part questionnaire to assess knowledge and practices regarding first aid for burn injuries and traditional remedies. The questionnaire included information on socioeconomic and demographic variables and retrospective questions on first-aid measures used. The survey was distributed online and on social media. The survey was in Arabic to make it easier for the public to read and understand. Then, the results were translated into English through the use of accredited translation tools for data entry and analysis. Microsoft Excel 2013 was used for data entry. Data analysis was done using the statistical package for social science (SPSS), version 21. Frequency test.

RESULTS

A total number of 484 participants were included in this study, 285 (58.0%) were females and 199 (41.1%) were males. Among all the participants aged 19-25 years old were 252 (52.1%) and 26-35 years old 97 (20.0%). More than half of the participants had a bachelor's degree 305 (63.0%). The majority have an income of fewer than 10000 riyals per month 341 (70.5%). Regarding the type of residency, departments have 286 (59.1%). More than half of the participants received information on burn first aid 310 (64.0%) (Table 1).

Table 1: Sociodemographic.

		Count	Percentage %
Gender	Female	285	58.9
	Male	199	41.1
Age	19-25	252	52.1
	26-35	97	20.0
	36-45	63	13.0
	≥46	72	14.9
Education	High School	107	22.1
	Diploma	15	3.1
	Bachelors	305	63.0
	Higher degree	52	10.7
	Less than high school	5	1.0
Have Children	No	194	40.1
	Yes	290	59.9
Income	less than 10000	341	70.5
	10000-20000	109	22.5
	21000-30000	3	0.6
	more than 30000	31	6.4
Type of residence	Villa	198	40.9
	Department	286	59.1
Received information on burn first aid	Yes	310	64.0
	No	174	36.0
Sources of information	Internet	151	31.2
	TV	37	7.6
	Newspaper	25	5.2
	Course	103	21.3
	Pamphlets	8	1.7
	Nothing	160	33.1

Most of the participants, around 299 (61.8%), experienced burn injuries. This subset was used to ask additional questions regarding first aid measures implemented in their experiences. Following the burn injury, 361 (74.6%) removed clothing and accessories from the injured area, 408 (84.3%) sought medical assistance after the burn injury, and 285 (58.9%) provided water to the injured part. Regarding how long the participants applied water to the burned area, 200 (41.3%) never used water, 137 (28.3%) used it for less than 5 minutes and 100 (20.7%) applied it between 5 and 10 minutes (Table 2).

Some of the participants were victims of boiling water injuries. In those situations, 205 (42.4%) removed the shirt and placed the injured area under running water, and 123 (25.4%) did not know what to do. Regarding the man's shirt on fire, 374 (77.3%) chose to ask the victim to stop dropping and rolling, and 49 (10.1%) searched for water to pour over the victim. Regarding the boiling water incident, 253 (52.3%) would place the injured part underwater for 10 minutes, and 100 (20.7%) would cover the injured part with a clean cloth and ask for help (Table 3).

The majority of participants did not have a smoke

detector 426 (88.0%), fire extinguisher 315 (65.1%), storage for caustic and flammable materials 384 (79.3%), and home evacuation plan 402 (83.1%) (Table 4).

Table 2: Knowledge regarding Burn first aid implementation

		Count	Percentage %
History of exposure to burn injury (self or family member)	No	185	38.2
	Yes	299	61.8
Directed questions based on the history of previous exposure			
Remove clothing or accessories		361	74.6
Seek primary medical assistance		408	84.3
Cover the burn injury with cloths		219	45.2
Apply water to the injured\burned area		285	58.9
Apply Cold water		245	50.6
Apply water for	Never	200	41.3
	less than 5 min	137	28.3
	5-10 min	100	20.7
	10-15 min	28	5.8
	15-20 min	13	2.7
	more than 20 min	6	1.2

Table 3: Scenarios of Burn Injury First Aid.

		Count	Percentage %
Hot (boiling) oil was accidentally dropped on a child's chest, you would	Remove the child's shirt and place the injured area under running water for 15 min	205	42.4
	Leave the shirt on, and ask for help	66	13.6
	Remove the child's shirt and place ice on injured part	49	10.1
	Immediately pour water over the child's body	41	8.5
	I don't know	123	25.4
Man's shirt catches fire on a camping trip, you would	Search for water to pour over is body	49	10.1
	Ask the man in question to stop, drop and roll	374	77.3
	Ask him to remove clothing and place ice cubes over the injured area	15	3.1
	I don't know	46	9.6
During a social gathering, boiling water was accidently poured over a person's hand, you would	Place ice cubes over the injury site	52	10.7
	Place the injured area under ice water for 10 min	253	52.3
	Cover the injured area with a clean cloth and ask for help	100	20.7
	I don't know	79	16.3

Table 4: Home Safety Indicators.

	Count	Percentage %

Smoking detector	No	426	88.0
	Yes	58	12.0
Fire extinguisher	No	315	65.1
	Yes	169	34.9
Storage area for caustic and flammable material	No	384	79.3
	Yes	100	20.7
Home evacuation plan	No	402	83.1
	Yes	82	16.9
Training home evacuation plan	No	286	59.1
	Yes	198	40.9
Central emergency responses operator	No	73	15.1
	Yes	411	84.9

Almost more than half of the participants regarded SMS 249 (51.4%) as the most efficient way to increase awareness of burn prevention and first aid, followed by YouTube and Twitter with 89 (18.4%) and 86 (17.8%), respectively (Figures 1 and 2).

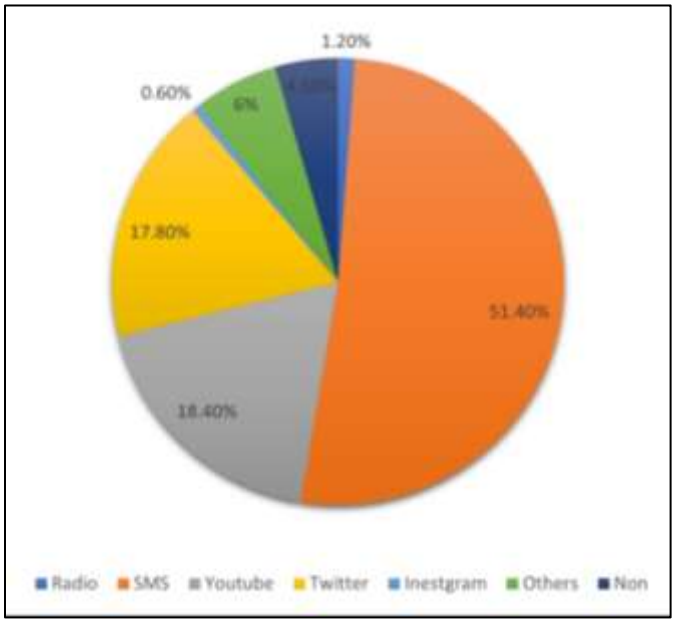

Figure 1: Most Efficiency when used as a means of spreading awareness regarding burn prevention and First-Aid.

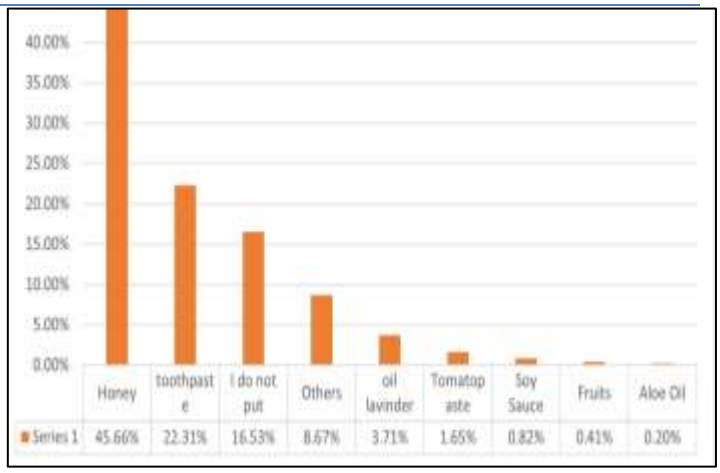

Figure 2: First Traditional Burn Remedies.

DISCUSSION

Burn first aid is a critical care step that determines the overall result of burn wounds, as well as the financial burden attached to them (Karaoz B, 2010). Our findings clearly demonstrate that 61.8% of participants had previously been exposed to burn injuries. Approximately 50.6% cooled their burn with water; however, only 1.2% applied water for more than 20 min. These results are similar to those of a previous Saudi study, which reported that 56.2% experienced a burn injury to themselves or a close family member. Water was applied by 63.9%. Among those who applied water, cold water was applied by 88.6%, and only 5.8% applied water for more than 15 min (Karaoz B, 2010).

Another study was conducted in Milas, Turkey, where 40.8% experienced burns. Almost 51% had treated the burn with inappropriate remedies, including yogurt, toothpaste, tomato paste, ice, raw egg whites, or sliced potato, 52.8% had applied tap water to the burn site, and 39.6% had applied only cold water (Scheven D, 2012).

In Kwa-Zulu Natal's study, 26% applied water, and only 1% applied water for 10 min (Taira BR, 2010). In a study, the general population of New South Wales was asked questions related to burn injuries and first aid. Only 82% reported that they would cool a burn with water, and 9% reported that they would cool the burn for the recommended period of 20 min. A few reported that they would remove clothes and keep the injured individual warm (Harvey LA, 2011). A first-aid study in New York, conducted on 211 burn victims to study their pre-hospital first-aid action, showed that 73% cooled their burns and tap water was used by 39.9% and ice by 25.2% (National Fire Protection Association, 2001). Our results are similar to those in Turkey and Kwa-Zulu Natal and differ from those in New York and New South Wales. In all of these countries, it has been recognized that there was a lack of adequate implementation; even when water was used, it was only for a short time or at a higher temperature than it should be,

limiting the benefit of the recommended measures.

Insufficient knowledge of the general population makes it essential to improve public awareness about this subject. This is done by conducting campaigns in public malls and including first-aid education as a subject in the school curriculum.

Evacuation planning and training directly influence emergency outcomes. Evacuation plans provide safe and systematic evacuation of personnel and visitors in emergencies. This plan comprises certain procedures on how to report an emergency and what is the right thing to do (Mosavi A, 2019). The effectiveness of a home evacuation plan plays a vital role in improving the outcome, decreasing morbidity and mortality, and reducing property loss (Kennedy HR, 2019). This study showed that 83.1% of the study population did not have an evacuation plan and that 59.1% were not trained on home evacuation plans. Training can significantly reduce exposure to fire hazards.

Most of our participants did not have any home safety measures, such as smoke detectors, fire extinguishers, or storage areas for caustic and flammable materials. On the other hand, a study in the United States found that smoke detectors were the most prevalent safety indicators in Airbnb venues. This ranged from 74.4% in Austin to 90.2% in Nashville. Fire extinguishers were less common; their prevalence ranged from approximately 29% in New York City to more than 70% in Austin (Kennedy HR, 2019). Another study was conducted in Germany, where 53.5% had fire extinguishers and 64.8% had smoke detectors (Knuth D, 2017). In Nigeria, 79.1% of public buildings had fire extinguishers, and 46.5% had smoke detectors (Adeleye OI, 2022).

Comparing our results with other countries, we found that we lack awareness of home safety indicators. There are no obligatory rules in Saudi Arabia to have indicators. Therefore, it is recommended that public awareness is increased and strict rules implemented to have home safety indicators in every house.

This study has some limitations, which could be addressed in future research. Our findings may not be generalized to Saudi Arabia's entire population. There are no studies about evacuation plans and home safety indicators in Saudi Arabia, so we cannot compare our results with others. With their diversity and the potential for selection bias to certain questions, various confounding variables may affect the captured population questioned.

The use of home remedies was also high; for example, most of the participants first chose honey among traditional burn remedies, which led to a poor injury prognosis. Regarding home safety measures, the majority did not have any. Most of them did not have a home evacuation plan in a fire emergency, which led to a high morbidity and mortality rate.

These results must be taken seriously by healthcare and civil defense departments. We recommend including first-aid education as a subject in schools and universities. Implementing community health campaigns in shopping malls and other public gatherings will increase knowledge and practice in all burn scenarios. This will also lead to a decrease in morbidity and mortality rates due to burn injuries.

CONCLUSION

In conclusion, the results of this study represent evidence that the first-aid practice for burns in the western region of Saudi Arabia is poor, although most of the participants had a bachelor's degree. More than half of our participants had a history of burn injuries, which shows a high prevalence, and most of the participants had performed incorrect first-aid practices, potentially leading to poor prognosis.

CONFLICT OF INTEREST

The authors declared that the present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

DM contributed to the literature search and designed and reviewed the manuscript. AQ and MY contributed to the questionnaire design and analyzed and interpreted the results; MA, AS, AS, and SY wrote the discussion, provided contributions to the literature search and reviewed the results and discussion, and wrote the conclusion. All authors read and reviewed the final manuscript draft, approved the final version, and did the same efforts equally.

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