

## Burn Prevalence, Risk Factor, Causality and Management Pattern Among Saudi Population, Medina, KSA

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### ABSTRACT

**Background:** Burn is a major public health problem worldwide associated with significant morbidity and mortality. It occurs in any age group with majority among children and old age. There are various causes for burn injuries as flame, hot water, chemicals, electricity and radiation.

**Objective:** To detect prevalence, most causes and management of burn injuries among Saudi population in Medina city.

**Methodology:** A cross-sectional study was done among the Saudi population in Medina city including rural and urban area. Through an electronic questionnaire including 21 questions about various important aspects about burn injuries (severity, prevalence, cause, outcome ...etc)

**Result:** A total of 281 participants were included in this study and data analyzed, female to male participant ratio were (74% to 26%) out of them 69.4% got burning injuries. 68% was from urban area while 18% rural. Most of them had mild severity injuries 53.8%. Site of injuries mainly on periphery 90% and occurred at home with ratio of 67%, most of them get injured three times and more as 45%. Participated in this study 80% didn't need to go to hospital. Outcome of burn injuries were 54% no deformity or scar. 37% developed skin scars.

**Conclusion:** This study showed that, there was insufficient knowledge regarding first aid of burn management. The prevalence of burning victims were high in both rural, urban area. Severity of burn mainly was simple on most of participants regardless source of burn. Most of victims got burned at home. Risk factor mostly children below age of 4 years old.

**Key words:** Burn, Injuries, Deformity, Flame, Severe Pain.

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### Article History:

Received: 17-09-2017, Revised: 14-10-2017, Accepted: 18-11-2017

### Access this article online

Website: <a href="http://www.ijmrp.com">www.ijmrp.com</a>	Quick Response code 
DOI: 10.21276/ijmrp.2017.3.6.025	

### INTRODUCTION

Burn is a major public health problem worldwide associated with significant morbidity and mortality. It occurs in any age group with majority among children and old age. There are various causes for burn injuries as flame, hot water, chemicals, electricity and radiation. There is evidence that burn injury is more common among people in low and middle income than those with high one.<sup>1</sup> Burn could occur in any place such as home, work, school, but it occurs mainly at home. Burn could be preventable through a combination of strategies that set for improvement the provided care modality and also through increase awareness about burn injury and how to avoid it and deal with it if occurred.<sup>2</sup>

The prevalence of burns is higher for women than men.<sup>3</sup> There are many risk factors of burn; some of them are low to middle income, low maternal educational level, absent or non-functioning smoke detector, poor quality electrical supply or products, careless smoker and unsafe storage of inflammable or caustic materials.<sup>4</sup> Rural burns were more severe than urban burns; they were

deeper, involved a larger body surface area and caused more deaths.<sup>5</sup> The high burn injuries burden makes it challenging for the policy makers to implement a proper strategic plan for burn prevention. So, this study aims to study the burn prevalence, causality and management pattern which are fundamentals in aiding strategic preventive efforts for burn.

### OBJECTIVES

1. To determine the prevalence, types, causes and risk factors of burn injury among Saudi population, Medina, KSA
2. To identify the initial management pattern of burn injury

### SUBJECTS AND METHODS

#### Study Design, Setting and Period

A community-based, cross-sectional survey was carried out at Medina city, Kingdom of Saudi Arabia during the period between June and July 2017.

**Study Population**

The targeted population were those above age 16 of Medina city who had experienced burn injuries through the last 6 months.

**Sample Size**

A convenience sample was obtained.

**Data Collection Tools and Instruments**

The data was collected by using a pre-tested, coded, semi structured electronic based questionnaire that was distributed to the participants through different types of social media (e mail, whats app and twitter) which includes two parts:

**Part I:** Questions on *socio-demographic* information as age, gender, educational level, residence, occupation and income.

**Part II:** Questions focusing on burning (frequency in last year, causes, risk factors and initial management pattern of burn)

**Pilot Study**

Before the start of the study, the semi-structured questionnaires was pre-tested on 10 individuals to explore if there is any ambiguity or items leading to misunderstanding in the

questionnaire in order to reach to its current final form. These 10 individuals were not included in the main survey.

**Validity and Reliability of the Questionnaire**

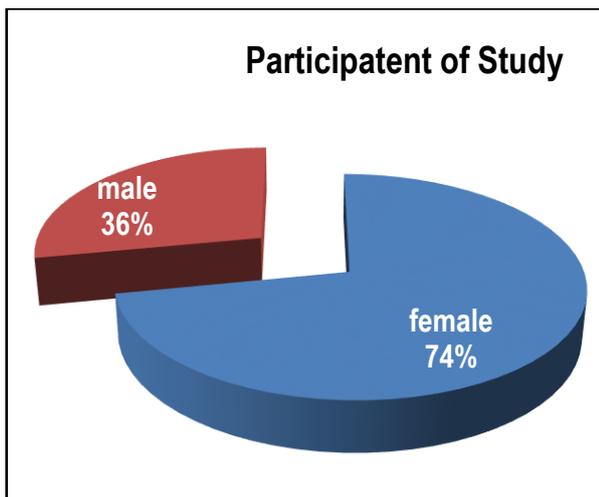
The items in the questionnaire were obtained from numbers of validated questionnaires and validity was completed by reviewing it by 3 experts. The questionnaire was re-administered after a week to the same sample of the pilot study to check test-retest reliability.

**Data Management**

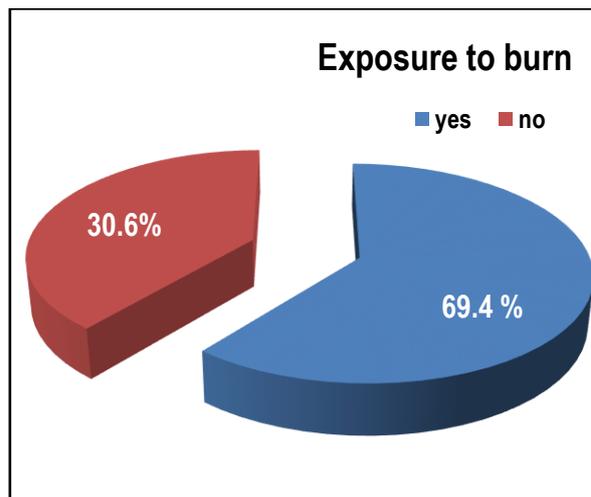
Data was coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 21.0 (SPSS, Chicago, IL, USA).

**Ethical Considerations**

Official permissions were obtained from the scientific ethical committee of the college. Informed consent were obtained from all the participants after describing the aim of the study. Privacy and confidentiality was assured.



Graph 1: The gender of participant in study



Graph 2: Percentage of participant that exposure to burn

Table 1: Epidemiology data of study population:

Socio-demographic		Severity			P value
		Mild	Moderate	severe	
1-Residence	AL-madina city ( urban)	74(37.9%)	51(26.15%)	11(5.6%)	.15
	Rural area of madina	17(8.7%)	7(3.6%)	7(3.6%)	
	Other	14(7.2%)	9(4.6%)	5(2.6%)	
2- Age	20-16	25(12.8%)	18(9.23%)	3(1.5%)	.06
	21-30	58(29.7%)	40(20.5%)	12(6.15%)	
	31-40	21(10.8%)	9(4.6%)	6(3.1%)	
	Other	1(0.51%)	0(0%)	2(1.0%)	
3- Sex	Female	86(44.1%)	58(29.7%)	9(4.6%)	.000
	Male	19(9.7%)	9(4.6%)	14(7.2%)	
4-Educational level	Secondary school	17(8.7%)	8(4.1%)	4(2.1%)	.92
	University students	50(25.6%)	33(16.9%)	9(4.6%)	
	Bachelor's Degree	34(17.4%)	21(10.8%)	8(4.1)	
	Others	4(2.1%)	5(2.6%)	2(1.0%)	
5- Monthly income	Little below demand	14(7.17%)	5(2.6%)	6(3.1%)	.3
	Moderate income	72(36.9%)	53(27.18%)	13(6.67)	
	High income	19(9.7%)	8(4.1%)	4(2.1%)	
	Others	0(0%)	1(0.5%)	0(0%)	
6- Marital status	Married	45(23.1%)	29(14.9%)	11(5.6%)	.97
	Not married	60(30.77%)	38(19.49%)	12(6.15%)	

**Table 2: Illustrates the characteristics of burn.**

Characteristic of the burn	The source/type of burn							P value
	Flame	chemical	Hot liquid	Electrical	Hot surface	others		
Where did you get burn?	At work	4(2.1%)	1(0.5%)	10(5%)	2(1%)	5(2.6%)	0(0%)	<b>.000</b>
	At home	30(15.4)	3(1.5)	68(34.8%)	14(7.2%)	34(17.4%)	1(0.5%)	
	At school	10(5%)	1(0.5%)	4(2.1%)	3(1.5%)	0(0%)	0(0%)	
	Others	4(2.1%)	0(0%)	1(0.5%)	0(0%)	0(0%)	0(0%)	
Severity	Mild	25(12.8%)	2(1%)	43(22.1%)	11(5.6%)	24(12.3%)	0(0%)	<b>.000</b>
	Moderate	19(9.7%)	2(1%)	30(15.3%)	6(3.1%)	10(5.1%)	0(0%)	
	Severe	4(2.1%)	1(0.5%)	10(5.1%)	2(1%)	5(2.6%)	1(5%)	
The site of burning was on	Periphery	44(22.5%)	2(1%)	77(39.5%)	19(9.7%)	34(17.4%)	0	<b>.00</b>
	Face	4(2.1%)	3(1.5%)	3(1.5%)	0	3(1.5%)	0	
	Abdomen or back	0	0	2(1%)	0	2(1%)	0	
	other	0	0	1(5%)	0	0	1(5%)	
Have you been exposed to the following symptoms/ deformity?	Functional impairment on site of burn	1(5%)	0(0%)	2(1%)	1(5%)	1(5%)	0	<b>.00</b>
	Scars or deformity.	12(6.1%)	2(1%)	32(16.4%)	10(5.1%)	16(8.2%)	1(5%)	
	Need of skin graft at site of burning	3(1.5%)	0(0%)	3(1.5)	0	1(5%)	0	
	Nothing from above	31(15.9%)	3(1.5%)	43(22.1%)	8(4.1%)	21(10.7%)	0	
	Others	1(5%)	0	3(1.5%)	0	0	0	
The degree of burning was?	Superficial burning sensation with redness	31(15.9%)	4(2.1%)	54(27.%)	15(7.7%)	31(15.9%)	0	<b>.00</b>
	Severe pain with bluster formation	16(8.2%)	1(5%)	28(14.4%)	4(2.1%)	8(4.1%)	1(5%)	
	The skin was dropped off without pain	1(5%)	0	1(5%)	0	0	0	

**RESULTS**

A total of 281 participated in this study. 193 (68.7 %) were from Al Madina city (urban), 51 (18.1 %) were from rural area of Madina city and 37 (13.2 %) were from other area outside city. Their age range as 23.8% (16-20), 53.4% (21-30), 21.4% (31-40) and other represents 1.4%. Female ratio that participate in study was 74%, and male was 26% (p = .00).

46.3% are university students, 16% secondary school, 31.3% had bachelor's degree and 6.4% other. 70.5% had moderate income, 14.6% high income and 14.2% little below demand. 61.6% had no job and 38.4% did. 56.2% were non married, while 43.8% did. Majority of them had burned 69.4%, while 30.6% not. In case of source of burn that people got injured by, 42.6% burned by hot liquid, 24.6% flame, 20% hot surface, 9.7% electrical and 2.6% chemical. 76.9% get burned at home, 11.3% at work and 9.2% at school (p value = .00). Many of them get burned three times and more 45.7%, 42.6% at once and 11.8% twice. In case of initial first aid, 53.8% cool the burn under cold running water for 10 minutes, 30.8% Analgesic on site of burning, 10.8% put toothpaste over it to cool burning site and 4.6% Put a bandages to protect injury from exposure to infection.

90.3% of participated were burned on Periphery (arms, limbs, foot, hands), 6.7% on their face and 2.1% on abdomen and back (p value =.00). Pain severity was mild on 53.8%, moderate on 34.36% and severe on 11.8% (p value =.00). As a risk factor of burn, 48.2% children below age of 4 years, 25.1% absent or non-functioning smoke detector, 10.8 % Poor quality electrical

materials, 8.2% Exposed electrical sources and 4.1% Unsafe storage of inflammable or chemical materials. The degree of burning was Superficial burning sensation with redness on 69.2%. 29.7% Severe pain with bluster formation and 1% The skin was dropped off without pain (p value =.00). 80% of them didn't need to go to hospital while 20% did. Over those who went to hospital, 35.9% went there on less than 30 min, 28.2% more than 30 min, 17.9% more than 1 h, 17.9% more than 2 hour. 43.6% admitted to hospital because of burn 56.4% not. 54.4% not exposed to scars symptoms/ deformity, 37.4% had scar on site of burning, 3.6% Need of skin graft at site of burning and 2.6% had Functional impairment on site of burn (p value =.00)

**DISCUSSION**

As the best of our knowledge, no similar studies regarding Burn prevalence, risk factor, causality and management pattern have been done in Saudi Arabia before. Other studies were conducted to estimate the prevalence of burn in infant.<sup>6</sup>

In this study, in case of source of burn that people got injured by 42.6% burned by hot liquid, 24.6% flame, 20% hot surface, 9.7% electrical and 2.6%. Similar study in Nigeria were, 86% burned by hot liquid, 14 % flame.<sup>4</sup>

In this study, in case of gender of burning person female were more affected than male by 74% to 26% female to male. Similar study in south Asian found that female also was more affected than male. In some culture, females are responsible for daily

household activities more than male. This is the reason that more females sustain flame burn compared to males.<sup>7</sup> Although house is considered to be a safe place, most burn injuries in this study reflect that burn occurred inside the house itself, 76.9% in study of Nepal report that most burning occurred at home 86%.<sup>8</sup>

In this study, most burn injury was mild in severity 53.8%. In similar study pain severity was mild on 19.4% of participant.<sup>7</sup> In this study the educational level of people that get burned were most of them on university, get bachelor's degree as 46%, 31% respectively, in contrast with similar study that show most of participant had secondary school degree 87% and higher educational level 13%.<sup>9</sup> In this study, the degree of burning was Superficial burning sensation with redness on (partial thickness) 69.2%. 29.7% severe pain with bluster formation and 1% The skin was dropped off without pain (full thickness), in contrast to that<sup>10</sup>, similar study was published on UK show that most of burn was partial thickness (86%), full thickness 3%. This study represent that site of burn in affected individual were 90.3% of participated were burned on Periphery (arms, limbs, foot, hands), 6.7% on their face and 2.1% on abdomen and back. In other study it shown that Burns most commonly occurred on periphery (7 3%), and face, head and neck (9%).<sup>10</sup>

This study show that in case of initial first aid, 53.8% Cool the burn under cold running water for 10 minutes, 30.8% analgesic on site of burning, 10.8% put toothpaste over it to cool burning site and 4.6% put a bandages to protect injury from exposure to infection.

Other study, first aid measures used by the injured. These ranged from irrigation with cold water (51%) through to no first aid at all (29%). Our study also revealed the use of topical application of toothpaste (4%).<sup>10</sup>

This study showed up that 54.4% of victims not exposed to scars symptoms/deformity, 37.4% had scar on site of burning, 3.6% Need of skin graft at site of burning and 2.6% had Functional impairment on site of burn. On other study, there were result as follow, The majority (54%) were reviewed that had no scar or deformity symptoms. Seven per cent were admitted to the plastic surgery for skin graft.<sup>10</sup>

#### LIMITATIONS

The response from participant in this study was little in number; it is due to difficulty to reach them through sending an electronic questionnaire. There was no burning care center in this region, making the purpose of this study difficult to reach.

#### CONCLUSION

This study showed that, there was insufficient knowledge regarding first aid of burn management. The prevalence of burning victims were high in both rural, urban area. Severity of burn mainly was simple on most of participant regardless source of burn. Most of victims got burned at home. Risk factor mostly children below age of 4 years old.

#### RECOMMENDATIONS

Increase awareness about first aid management. Do a conference about safety at home and how to deal with burning victims in

sufficient way, which material that could be risky and may lead to burn injuries. Further research and resources are required to detect prevalence, severity management of burn victims.

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**Source of Support:** Nil.

**Conflict of Interest:** None Declared.

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**Cite this article as:** Shorooq Abdulrazzaq Alsubhi, Amal Adnan Arruhaily, Samah Mohammed ALAmri, Haifa Saeed Alrumeh, Marwa Zalat. Burn Prevalence, Risk Factor, Causality and Management Pattern Among Saudi Population, Medina, KSA. *Int J Med Res Prof*. 2017 Nov; 3(6):123-26. DOI:10.21276/ijmrp.2017.3.6.025