

Research Article

Predisposing Factors Affecting Burn among People in Bangladesh

Ehsanur Rahman^{1*}, Bibi Sajida Tultul², Mohammad Habibur Rahman³, Samena Akter³, Saiba Muhammad Sabrin¹, Proshoun Rakshit Himel¹ and Abid Hasan Khan²

¹Department of Physiotherapy, Bangladesh Health Professions Institute, Centre for the Rehabilitation of the Paralysed, Bangladesh

²Centre for the Rehabilitation of the Paralysed, Bangladesh

³School of Science and Technology, Bangladesh Open University, Bangladesh

Abstract

Background: Burns are the most harmful of all injuries and a global public health issue. It is widespread in underdeveloped nations and significantly increases morbidity and death there. Burns are among the most expensive injuries to treat because they need extensive hospitalization and rehabilitation.

Objectives: To identify the predisposing factors affecting burn in Bangladesh.

Study design/methods: The study design was cross-sectional. Total 121 samples were selected conveniently for this study from the study was conducted in several setting in Chittagong, Savar and Dhaka city. Chittagong Medical College (CMC), Enam Medical College and Sheikh Hasina Burn Hospital. Data was collected by using a self-developed questionnaire. Descriptive statistic was used for data analysis which focused through table, pie chart and bar chart.

Results: The mean age was 22.43 (\pm 14.399). Among 121 patients 47.9% (n=58) were female and 52.1% (n=63) were male. In this study, among 121 participants, 56.2% (n=68) participant's injury were accidental, 33.9% (n=41) participants were injured while working, 2.5% (n=3) participant's type of injury were homicidal, 7.4% (n=9) participants were injured while cooking. Among 121 participants, the majority types of burn caused by flames were 37.2% (n=45), 23.1% (n=28) were scald, 38.8% (n=47) were electrical and minority was chemical 0.8% (n=1).

Conclusion: Most of the burn injury occurs accidentally like flame burn occurs mainly from the fire of stove, scald burns occur due to hot water, electric burn occurs from the electric line and chemical burn occurs due to acid throwing. These accidents occur because there is lack of awareness and proper knowledge about burn. Most of the electrical burn occurs due to lack of appropriate training. So, if government is strict in this issue and employ rules for working consciously the percentage of burn due may decrease. Also, it is not only responsibility of the government but also need awareness among people of Bangladesh to decrease burn injury. This study can help to specify the leading cause behind burn injury.

Keywords: Burn; Predisposing factors; Epidemiology; Bangladesh

Introduction

A burn injury is a traumatic experience for both the victim and their families. Internationally, the number of burn injuries severe enough to necessitate medical attention was nearly 11 million, ranking fourth among all injuries. Every year, it kills over 300,000 people worldwide. Burns are one of the leading causes of disability. Loss of Adjusted Life Years in Low- and Middle-Income Countries [1]. The World Health Organization (WHO) reports that burns cause approximately 265,000 deaths each year [2]. In addition to causing large numbers of deaths, millions of non-fatal cases often leave people disabled and disfigured for life. In 2013, the average disability-adjusted life year per capita caused by such injuries was 12.3 years [3].

In low and middle-income countries, burn injuries are among the leading causes of disability-adjusted life years lost. Every year, approximately 6 to 7 million people in India suffer from burn injuries. Seven million of them require hospitalization, and 2.4 million become disabled. At all costs, burn injuries should be avoided, and health education about safety precautions should be implemented in all educational institutions [4]. Research also shows that compared with children, adolescents and younger adults in low- and middle-income countries are at higher risk of burns [5]. Unlike HICs that help prevent proliferation, emergency care and care capacity and burn care, LMICs struggle to deal with infrastructure and management in an efficient manner [6].

Bangladesh is an exception of combustion scenario in Southeast Asia. Almost 173,000 children in Bangladesh have injured in 2003, and made the fifth major cause of their domestic children's diseases. Low socioeconomic status, illiteracy or low education, crowded living spaces, and certain cultural practices have been shown to increase the risk of burns in the environment of low- and middle-income countries [7]. Flames and scalds are the most common causes of burn death and non-fatal injuries, respectively. Similar results have been seen in previous studies in Bangladesh and neighbouring countries such as India, Sri Lanka, Pakistan and Nepal, which may be due to the use of unsafe open-fire stoves and the lack of safe practices for fuels such as oil and butane. South Asia [8,9]. Although electrical burns are less

Citation: Rahman E, Tultul BS, Rahman MH, Akter S, Sabrin SM, Himel PR, et al. Predisposing Factors Affecting Burn among People in Bangladesh. *J Med Public Health*. 2022;3(6):1054.

Copyright: © 2022 Ehsanur Rahman

Publisher Name: Medtext Publications LLC

Manuscript compiled: Dec 28th, 2022

***Corresponding author:** Ehsanur Rahman, Department of Physiotherapy, Bangladesh Health Professions Institute (BHPI), CRP, Savar, Dhaka, 1343, Bangladesh, Tel: +88-01716-062263; E-mail: ehsanurrahman.bhpi@gmail.com

common than other forms of burns, due to their high morbidity and mortality, this type of injury is considered one of the most devastating [10].

Materials and Methods

Cross sectional study was selected for conduct the study. The study was conducted in several setting in Chittagong, Savar and Dhaka city. Chittagong Medical College (CMC), Enam Medical College and Shiekh Hasina Burn Hospital. This study was conducted by using the convenience sampling methods due to the time limitation and as it was the one of the easiest, cheapest and quicker method of sample selection. A total of 121 samples were collected to conduct this study. Data were analyzed with the software named Statistical Package for the Social Science (SPSS) version 20.0. The variables were labelled in a list and the researcher established a computer-based data definition record file that consist of a list of variables in order. The study was approved by the Institutional Review Board (IRB) of BHPI, the academic Institute of Centre for the Rehabilitation of the Paralyzed. This study was conducted from June 2021 to November 2021 and data was collected within this time period.

Data collection tools and procedure

A self-administered questionnaire has been used to conduct this study. At the very beginning researcher clarified that, the participant had the right to refuse to answer of any question during completing questionnaire. They could withdraw from the study at any time. Researcher also clarified to all participants about the aim of the study. Participants were ensured that any personal information would not be published anywhere. Researcher took permission from each volunteer participant by using a written consent form. After getting consent from the participants, standard questionnaire was used to identify the complaint and collect demographic information. Questions were asked according to the Bangla format. For conducting the interview, the researcher conducted a face-to-face interview and asked questions. Physical environment was considered strictly.

Results

Demographic characteristics

This study revealed that the gender, marital status, educational status, and other socio-demographic status. Among 121 patients in case of gender, 52.1% (n=63) were males and 47.9% (n=58) were females. In marital status, 50.4% (n=61) were unmarried and 49.6% (n=60) were married. In educational status, 26.4% (n=32) were illiterate, 41.3% (n=50) had primary education, 22.3% (n=27) had secondary education, 7.4% (n=9) had higher secondary education, 2.5% (n=3) had bachelor & masters. In case of occupation, 24.8% (n=30) were service holder, 21.5% (n=26) were housewife, 9.9% (n=12) were electrician, 2.5% (n=3) were labor, 24.8% (n=30) were student, 3.3% (n=4) were unemployed, 13.2% (n=16) were from other profession. In the living areas, 36.4% (n=44) were from rural area, 2.5% (n=3) were from semi urban area, 61.1% (n=75) were from urban area among 121 patients. In the year of burn, 26.4% (n=32) were burned 1 to 7 days ago, 24.0% (n=29) were burned 8 to 14 days ago, 10.7% (n=13) were burned 15 to 21 days ago, 4.1% (n=5) were burned 22 to 28 days ago, 8.3% (n=10) were burned 29 to 35 days ago, 26.4% (n=32) were burned more than 34 days ago.

Clinical characteristics

This study showed that among 121 participants, 38.0% (n=46) burn occurred in head & neck area, 25.6% (n=31) burn occurred in trunk area, 23.1% (n=28) burn occurred in arm area, 5.8% (n=7) burn

occurred in genital area, 4.1% (n=5) burn occurred in leg area, 2.5% (n=3) burn occurred in buttock area, 0.8% (n=1) burn occurred in trunk+arm area, 0.8% (n=1) burn occurred in head & neck+trunk area, 0.8% (n=1) burn occurred in trunk+leg area, 0.8% (n=1) burn occurred in arm+leg area. 42.1% (n= 51) were injured about 11% to 20% of the coverage area of burn, 28.1% (n=34) were injured about 1%-10% of the coverage area of burn, 17.4% (n=21) were injured about 21%-30% of the coverage area of burn, 6.6% (n=8) were injured about 31% to 40% of the coverage area of burn, 3.3% (n=4) were injured about 41% to 50% of the coverage area of burn, 1.7% (n=2) were injured about 51% to 60% of the coverage area of burn, 8% (n=1) were injured about >60% of the coverage area of burn. 56.2% (n=68) participant's type of injury were accidental, 33.9% (n=41) participants were injured while working, 7.4% (n=9) participants were injured while cooking 2.5% (n=3) participant's type of injury were homicidal. The majority type of burn caused by electrical were 38.8% (n=47), flames were 37.2% (n=45), 23.1% (n=28) were scald and minority were chemical 0.8% (n=1). 38.8% (n=47) burn occurred by electric line, 27.3% (n=33) burn occurred by stove, 12.4% (n=15) burn occurred by hot water, 5.8% (n=7) burn occurred by cylinder blast, 5.0% (n=6) burn occurred by falling into warm food, 2.5% (n=3) burn occurred by candle, 2.5% (n=3) burn occurred by gas cylinder leakage, 1.7% (n=2) burn occurred by hot oil, 1.7% (n=2) burn occurred by matchstick, 1.7% (n=2) burn occurred by acid throwing, 0.8% (n=1) burn occurred by fireworks (Table 1).

Association between gender and type of burn of the participants

In association test using chi-square, the value was 22.294 which indicates among variables was associated because p value was 0.001 ($p<0.05$). So, gender is significantly related to type of the burn of the patient. In the association test using 95% CI it was observed that between upper and lower value difference was small. It proves that gender and type of burn was statistically significant (Table 2).

Association between gender and type of injury of the participants

In association test using chi-square, the value was 8.642 which indicates among variables was statistically significant because p value was 0.034 ($p<0.05$). So, gender is significantly related to type of the burn of the patient. In the association test using 95% CI it was observed that between upper and lower value difference was small. It proves that gender and type of injury was statistically significant (Table 3).

Discussion

This population based cross sectional survey revealed the factors that are responsible for burn in Bangladesh. The purpose of the study was to find out the main factors that are responsible for burn. To find out the factors 121 samples were taken. He et al. [11] conducted a study in Bangladesh, finding Epidemiology of Burns in Rural there were 1169,594 respondents where male participants were 48.5% (n=567,674), rest were female with 51.5% (n=601,919). The majority of the study, participants were married 49% (n=571,206) and unmarried were 19.4% (n=227,319). Nearly half of all burn injuries were sustained by married people. Approximately 25.3% (n=295,314) had no formal education, 35% (n=409,923) received education at primary level, 24.8% (n=289,658) received education at secondary level, 5.1% (n=59144) received education at higher secondary education, 0.4% (n=4729) had bachelor & masters. In 2012 a different study of Mashreky et al. [7] showed that among the total non-fatal

Table 1: Socio-demographic and Clinical Characteristics.

Demographic	%(n)	Demographic	%(n)	Clinical Causes	%(n)
Age (mean \pm SD) 22.43 \pm 14.39		Educational Status		Area of Burn	
Below 22 years	52.1% (63)	Illiterate	26.4% (32)	Head & neck area	38% (46)
22 years and above	47.9% (58)	Primary	41.3% (50)	Trunk area	25.6% (31)
Sex		Secondary	22.3% (27)	Arm area	23.1% (28)
Male	53.7% (65)	HSC	9.9% (12)	Leg area	6.9% (12)
Female	46.3% (56)	Occupation		Genital area	5.8% (7)
Marital status		Service Holder	24.8% (30)	Cause of Burn	
Married	49.6% (60)	Housewife	21.5% (26)	Accidental	56.2% (68)
Unmarried	50.4% (61)	Electrician	9.9% (12)	While working	33.9% (41)
Residential Area		Student	24.8% (30)	While cooking	7.4% (9)
Rural	36.4% (44)	Unemployed	5.8% (7)	Homicidal	2.5% (3)
Urban	63.6% (77)	Others	13.2% (16)	Type of Burn	
				Electrical	38.8% (47)
				Flames	37.2% (45)
				Scald and chemical	23.9% (29)

Table 2: Distribution of Association between gender and type of burn of the participants.

Gender	Type of burn (n)			Chi-Square	P value	95% CI	
	Flame	Scald	Electrical			Upper	Lower
Male	10% (13)	10% (13)	29.8% (33)	22.294	0.001	2.61	2.19
Female	26.5% (32)	12.8% (16)	9% (11)				

Table 3: Distribution of Association between gender and type of injury of the participants.

Gender	Type of injury				Chi-Square	P value	95% CI	
	Accidental	Working	Homicidal	Cooking			Upper	Lower
Male	26.5% (32)	23.2% (28)	0.8% (1)	1.65% (2)	8.642	0.034	1.74	1.4
Female	29.8% (36)	10% (13)	1.6% (2)	14% (7)				

electrical injury of 604 participants, 87% were rural residents and only 13% were urban residents. In similar study of Mashreky et al. [7] in 2012 showed rural residents accounted for 87% of all non-fatal electrical injuries, while urban residents accounted for only 13%.

One of the findings in this study was coverage area of burn. Coverage area of burn means a method that divides the body's surface area into a percentage. This study showed that among 121 participants, 28.1% (n=34) were injured about 1% to 10% of the coverage area of burn, 42.1% (n=51) were injured about 11% to 20% of the coverage area of burn, 17.4% (n=21) were injured about 21% to 30% of the coverage area of burn, 6.6% (n=8) were injured about 31% to 40% of the coverage area of burn, 3.3% (n=4) were injured about 41% to 50% of the coverage area of burn, 1.7% (n=2) were injured about 51% to 60% of the coverage area of burn, 0.8% (n=1) were injured about >60% of the coverage area of burn. Chawla et al. [12] (2010) stated in his study that the highest percentage of burns were 32 % of cases, were in the 91% to 100% range. Only 14% of the cases had burns that were less than 50%. In Iran, a study about Electrical Burn Injury, the mean percentage of Total Body Surface Area (TBSA) was higher in patients with other types of burn injury (32.54%) then electric burn injury (14.43%) among the 681 participants [13].

In this study, association between gender and type of burn was significant as they were related. Here in flame burn females were majority in number 26.5% (n=32) then male 10% (n=13), in scald burn female 12.4% (n=15) and male 10% (n=13) were nearby. Males were predominant then females in electrical burn, here male was 29.8% (n=36) and females were 9% (n=11). In chemical burn there was only male 0.8% (n=1). From the study of Islam et al. (2018), it was showed that males 77.94% (n=53) were majority in number then females 22.06% (n=15). Mashreky et al. [7] stated in his study that a relatively high burn highest incidence among females was also discovered in Kuwait, Iran, and India, with flame being the most common cause of burn mortality. In India, fatalities were caused by

similar sources of fire. Cooking fires were the leading cause of severe burns in Iran and Kuwait [14].

In this study, association between gender and type of injury burn was significant as they were related. Here, accidental injury was high in number in male 26.45% (36), female 29.8% (32). In 2019, Bailey et al. conducted a study in Bangladesh where he stated that flame burn among females were 38.1% (n=8) and male were 61.9% (n=13).

Limitation of the Study

This study had some potential limitations. The main limitation of this study was its short duration. The study was conducted with 121 burn patients which was a very small number of samples. This study only conducts in burn hospitals at Chittagong, Dhaka and Enam medical hospital that is not covering the full area of Bangladesh. The data collection was challenging in hospital site.

Conclusion

Bangladesh is a developing country, and all sectors, including health, are constantly changing and becoming more resourceful through manpower, research, and service quality. Burn is a major public health issue all over the world. It is among the leading causes of poor performance, hampered regular activities, and a social economic challenge. It is obvious that this destructive issue affects not only the patient but also their family. Health services are insufficient in both the government and non-government sectors here. Because burns cannot be suppressed in some conditions, it is critical to take preventive measures to overcome them. Among types of burns, flame burn occurs mainly from the fire of stove, scald burns occur due to hot water, electric burn occurs from the electric line and chemical burn occurs due to acid throwing. These accidents occur because there is lack of awareness and proper knowledge about burn. Most of the electrical burn occurs due to lack of appropriate training. So, if government is strict in this issue and employ rules for working consciously the percentage of burn due may decrease.

References

1. Peck M, Molnar J, Swart D. A global plan for burn prevention and care. *Bull World Health Organ.* 2009;87(10):802-3.
2. Jahromi MAM, Zangabad PS, Basri SMM, Zangabad KS, Ghamarypour A, Aref AR, et al. Nanomedicine and advanced technologies for burns: Preventing infection and facilitating wound healing. *Adv Drug Delivery Rev.* 2018;123:33-64.
3. Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. *Inj Prev.* 2016;22(1):3-18.
4. Shankar G, Naik VA. A study of residual physical disability after a burn injury in patients admitted in tertiary care hospitals in Karnataka, India. *Indian J Burns.* 2016;24(1):58-61.
5. Sharma M, Lahoti BK, Khandelwal G, Mathur RK, Sharma SS, Laddha A. Epidemiological trends of pediatric trauma: A single-center study of 791 patients. *J Indian Assoc Pediatr Surg.* 2011;16(3):88-92.
6. Atiyeh B, Masellis A, Conte C. Optimizing burn treatment in developing low-and middle-income countries with limited health care resources (part 1). *Ann Burns Fire Disasters.* 2009;22(3):121-5.
7. Mashreky SR, Hossain MJ, Rahman A, Biswas A, Khan TF, Rahman F. Epidemiology of electrical injury: Findings from a community based national survey in Bangladesh. *Injury.* 2012;43(1):113-6.
8. Gupta S, Mahmood U, Gurung S, Shrestha S, Kushner AL, Nwomeh BC, et al. Burns in Nepal: a population based national assessment. *Burns.* 2015;41(5):1126-32.
9. Lama BB, Duke JM, Sharma NP, Thapa B, Dahal P, Bariya ND, et al. International burns in Nepal: a comparative study. *Burns.* 2015;41(6):1306-14.
10. Sahin I, Ozturk S, Alhan D, Acikel C, Isik S. Cost analysis of acute burn patients treated in a burn centre: the Gulhane experience. *Ann Burns Fire Disasters.* 2011;24(1):9-13.
11. He S, Alonge O, Agrawal P, Sharmin S, Islam I, Mashreky SR, et al. Epidemiology of burns in rural Bangladesh: An update. *Int J Environ Res Public Health.* 2017;14(4):381.
12. Chawla R, Chanana A, Rai H, Aggarwal AD, Singh H, Sharma G. A two-year burns fatality study. *J Indian Acad Forensic Med.* 2010;32(4):292-7.
13. Ghavami Y, Mobayen MR, Vaghardoost R. Electrical burn injury: a five-year survey of 682 patients. *Trauma Mon.* 2014;19(4):e18748.
14. Bailey ME, Sagiraju HKR, Mashreky SR, Alamgir H. Epidemiology and outcomes of burn injuries at a tertiary burn care center in Bangladesh. *Burns.* 2019;45(4):957-63.