Article published online: 2023-04-14

Priming Factors Related to Burn Injury among People in Bangladesh

Abid Hasan Khan[1] Saruar Hossain Bhuiyan[2] Zahid Hossain[2]

[1] Department of Physiotherapy, Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka, Bangladesh
[2] Department of Physiotherapy and Rehabilitation, Jashore University of Science and Technology, Jashore, Bangladesh

Address for correspondence Abid Hasan Khan, BSC PT, Intern Physiotherapist, Department of Physiotherapy, Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka 1343, Bangladesh (e-mail: abidhasankhan1997@gmail.com).

J Health Allied Sci[NU] 2024;14:102–105.

Abstract

Background Burns cause the most severe injuries and are a major public health concern worldwide. It is common in third-world countries and it greatly increases mortality and illness there. Because of the long period of time spent in the hospital and the effort required to recover from a burn, it is one of the most costly injuries to treat.

Objectives The aim of this study was to identify the priming factors related to burn injury among people in Bangladesh.

Materials and Methods The study design was cross-sectional. Total 121 samples were selected conveniently for the study and the study was conducted in several hospital settings in Chittagong, Savar and Dhaka city like Chittagong Medical College Hospital, Enam Medical College Hospital, and Sheikh Hasina Burn Hospital. Data was collected by using a self-administered questionnaire.

Statistical Analysis Descriptive and inferential statistics (chi-squared test) were used for data analysis that focused through tables.

Results On average, people were 22.43 (14.399) years old. Of the total of 121 patients, 48.1% were female ($n = 58$) and 52.1% were male ($n = 63$). Among the participants, 56.2% ($n = 68$) were hurt accidentally, 33.9% ($n = 41$) were injured on the job, 2.5% ($n = 3$) were harmed intentionally, and 7.4% ($n = 9$) were injured while preparing food. In case of occurrence, 37.2% ($n = 45$) were burned by fire, 38.8% ($n = 47$) were electrical burn and 23.9% ($n = 29$) were chemical or scald type burn.

Conclusions Most burn injuries are accidental, such as cooking fires, hot water, electric lines, and acid throwing that are significantly considered as the priming factors of burn injury among people in Bangladesh. The lack of awareness and ignorance causes these accidents and insufficient training causes most the electrical burns.

Keywords
- priming factors
- burn injury
- types of burn injury

Introduction

The trauma of a burn injury affects both the person and their families. Nearly 11 million burn injuries occurred worldwide, placing them fourth among all injuries in terms of severity and requiring medical attention. Over 3,00,000 individuals are killed by burn injury worldwide each year. One of the main causes of impairment is burns. In low- and middle-income countries (LMICs), there has been a loss of adjusted life years.[1] The World Health Organization reports that burns

article published online
April 14, 2023

DOI https://doi.org/10.1055/s-0043-1766126.
ISSN 2582-4287.

© 2023. The Author(s).
This is an open access article published by Thieme under the terms of the Creative Commons Attribution License, permitting unrestricted use, distribution, and reproduction so long as the original work is properly cited. (https://creativecommons.org/licenses/by/4.0/)

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

cause approximately 265,000 deaths each year.[2] In addition to producing a significant number of fatalities, millions of nonfatal cases frequently result in permanent disability and disfigurement. The typical disability-adjusted life year per person brought on by such injuries in 2013 was 12.3 years.[3]

In LMICs, 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.[4] 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.[5] Research also shows that compared with children, adolescents and younger adults in LMICs are at higher risk of burns.[6] Unlike high-income countries that help prevent proliferation, emergency care and care capacity, and burn care, LMICs struggle to deal with infrastructure and management in an efficient manner.[7]

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.[8] 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 LMICs.[9] Flames and scalds are the most common causes of burn death and nonfatal injuries, respectively.[10] Similar results have been seen in previous studies in Bangladesh and neighboring countries such as India, Sri Lanka, Pakistan, and Nepal (South Asia), 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.[11,12] Although electrical burns are less common than other forms of burns, due to their high morbidity and mortality, this type of injury is considered one of the most devastating.[13]

Burn injuries are quickly becoming one of the most significant concerns of everyday life among people in Bangladesh. Therefore, the purpose of this research is to identify the factors that contribute to the prevalence of burn injuries among the population of Bangladesh.

Materials and Methods

Cross-sectional study was selected to conduct the study. The study was conducted in several setting in Chittagong, Savar, and Dhaka city Chittagong Medical College, Enam Medical College, and Shiekh Hasina Burn Hospital. This study was conducted by using the convenience sampling methods due to the time limitation and 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 labeled in a list and the researcher established a computer-based data definition record file that consisted of a list of variables in order. The study was approved by the Institutional Review Board (IRB) of BHPI (CRP/BHPI/IRB/06/2021/461), the academic Institute of Centre for the Rehabilitation of the Paralysed. This study was conducted from June 2021 to November 2021 and data was collected within this time period.

Respondents who were recruited for this study were aged between 12 and 50 years old. Both male and female and who were admitted in the hospital at least for 1 week were included in this study. Unwilling participants, having poor cognitive function and severe burn injury participants, were excluded from the study. A self-administered questionnaire was 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

The demographic and clinical characteristics of respondents are summarized in ►**Table 1**. Among 121 patients, majority of the respondents were male and under 22 years of age. Respondents who lived in urban areas were found mostly injured by burn injuries. As for clinical characteristics most of the participants had burn injury in the head and neck area followed by area of trunk and arm. Majority of them responded that accidental cause was the prime reason of burn among the participants and electrical burn injury was common among other types of burn injury.

Relationship between gender and type of burn of the respondents is shown in ►**Table 2**. In associated test using chi-square, the value was 22.294 that 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 associated test using 95% confidence interval (CI), it was observed that between upper and lower value difference was small. It proved that gender and type of burn were statistically significant.

Relationship between gender and reason behind burn injury of the respondents is shown in ►**Table 3**. In associated test using chi-square, the value was 8.642 that 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 associated 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.

Discussion

This population-based cross-sectional survey revealed the factors that are responsible for burn in Bangladesh. The

Table 1 Sociodemographic and clinical characteristics

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

Abbreviations: HSC, higher secondary; SD, standard deviation.

Table 2 Distributions of association between gender and type of burn of the respondents

Gender	Type of burn			Chi-square	*p*-Value
	Flame, % (*n*)	Scald, % (*n*)	Electrical, % (*n*)		
Male	10 (13)	10 (13)	29.8 (33)	22.294	0.001
Female	26.5 (32)	12.8 (16)	9 (11)		

Table 3 Distribution of association between gender and reasons behind burn injury of the respondents

Gender	Type of injury				Chi-square	*p*-Value
	Accidental, % (*n*)	Working, % (*n*)	Homicidal, % (*n*)	Cooking, % (*n*)		
Male	26.5 (32)	23.2 (28)	0.8 (1)	1.65 (2)	8.642	0.034
Female	29.8 (36)	10 (13)	1.6 (2)	14 (7)		

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. Our study found that most of the burn injury participants were from urban areas and majority of them were male. He et al conducted a study in Bangladesh to find epidemiology of burns in rural area. There were 1169,594 respondents where male participants were 48.5% ($n = 567,674$), and rest were female with 51.5% ($n = 601,919$).[14] In 2012, a different study of Mashreky et al showed that among the total nonfatal electrical injury of 604 participants, 87% were rural residents and only 13% were urban residents. It showed that rural residents accounted for 87% of all nonfatal electrical injuries, while urban residents accounted for only 13%.[8]

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, and 8% ($n = 1$) were injured about more than 60% of the coverage area of burn. Chawla et al stated in his study that the highest percentage of burns were 32% of cases. Only 14% of the cases had burns that were less than 50%.[15] In Iran, a study about electrical burn injury, the mean percentage of total body surface area was higher in patients with other types of burn

injury (32.54%) then electric burn injury (14.43%) among the 681 participants.[16]

In this study, association between gender and type of burn was significant as they were related. Here, majority of cases due to flame burn were females (26.5%; *n* = 32) than male (10%; *n*= 13), while in scald burn 12.4% cases were female (*n*= 15) and 10% were male (*n* = 13). Males were predominant then females in electrical burn, here 29.8% were male (*n*= 36) and 9% were female (*n* = 11). In chemical burn, there was only one male (0.8%). Mashreky et al 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 morality.[8] In India, fatalities were caused by similar sources of fire. Cooking fires were the leading cause of severe burns in Iran and Kuwait.[17]

In this study, association between gender and type of injury burn was significant as they were related. Here accidental injury was high in number among females (29.8% *n* = 36) than males (26.45%, *n* = 32). In 2019, Bailey et al conducted a study in Bangladesh where he stated that flame burn among females and males were 38.1% (*n* = 8) and 61.9% (*n* = 13), respectively.[18]

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

Conclusion

Burns are a significant problem for public health all around the world. The majority of burn casualties are from urban areas and result of preventable accidents caused by things is as follows: the majority of burn caused by flames are 37.2%, followed by scaled (23.1%), and electrical (38.8%), while minority of burn is caused by chemical (0.8%). Moreover, most prevalent cause for the burn injury is human error or accident, which was more than 50%. Most electrical burns are caused due to insufficient training and ignorance. So, it is necessary for the Government of Bangladesh and its people to promote awareness about the necessity of preventing burn injuries.

Funding
The study is solely a self-funded and academic work.

Conflict of Interest
None declared.

Acknowledgement
We are very thankful to all the participants for their voluntary participation.

References

1 Peck M, Molnar J, Swart D. A global plan for burn prevention and care. Bull World Health Organ 2009;87(10):802–803
2 Mofazzal Jahromi MA, Sahandi Zangabad P, Moosavi Basri SM, et al. Nanomedicine and advanced technologies for burns: preventing infection and facilitating wound healing. Adv Drug Deliv Rev 2018;123:33–64
3 Haagsma JA, Graetz N, Bolliger I, 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(01):3–18
4 Price K, Lee KC, Woolley KE, et al. Burn injury prevention in low- and middle- income countries: scoping systematic review. Burns Trauma 2021;9:tkab037
5 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(01):58
6 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 (03):88–92
7 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(03):121–125
8 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(01):113–116
9 Patel DD, Rosenberg M, Rosenberg L, et al. Poverty, population density, and the epidemiology of burns in young children from Mexico treated at a U.S. pediatric burn facility. Burns 2018;44 (05):1269–1278
10 Olaitan PB, Jiburum BC. Analysis of burn mortality in a burns centre. Ann Burns Fire Disasters 2006;19(02):59–62
11 Gupta S, Mahmood U, Gurung S, et al. Burns in Nepal: a population-based national assessment. Burns 2015;41(05):1126–1132
12 Lama BB, Duke JM, Sharma NP, et al. Intentional burns in Nepal: a comparative study. Burns 2015;41(06):1306–1314
13 Sahin I, Ozturk S, Alhan D, Açikel C, Isik S. Cost analysis of acute burn patients treated in a burn centre: the Gulhane experience. Ann Burns Fire Disasters 2011;24(01):9–13
14 He S, Alonge O, Agrawal P, et al. Epidemiology of burns in rural Bangladesh: an update. Int J Environ Res Public Health 2017;14 (04):381
15 Chawla R, Chanana A, Rai H, Aggarwal AD, Singh H, Sharma G. A two-year burns fatality study. J Indian Forensic Med 2010;32(04): 292–297
16 Ghavami Y, Mobayen MR, Vaghardoost R. Electrical burn injury: a five-year survey of 682 patients. Trauma Mon 2014;19(04):e18748
17 Shahid F, Chowdhury TM, Begum A, et al. Cross sectional study of burn - experience in 158 cases. Delta Med Coll J 2018;6(02):82–85
18 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(04):957–963