

Study on the Epidemiology and Consequences of Electric Burns at a Tertiary Care Center in Bihar

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Abstract

Background: Electric burns and injuries are the result of electric current passing through the body. Temporary or permanent damage can occur to the skin, tissues, and major organs.

Methods: This prospective study was carried out on patients admitted in burn unit of department of General Surgery at JLNMCH, Bhagalpur. Records of the patients admitted from June 2023 to May 2024 were studied. Bed head tickets of the patients evaluated in detail.

Results: In our study out of 113 patients maximum no. of patients were in age group of 21-30 years 44 (38.94%) followed by age group <11 years in 21 (18.58%) patients and age group of > 60 years in only 3 (2.65%). 39 (34.51%) patients were farmer and 15 (13.27%) were electrician in out of 113 total patients, while 37 (32.74%) were without any occupation. 65 (57.52%) cases of high voltage (HV) electrical injury and 48 (42.48%) cases were of low voltage (LV) electrical injury.

Conclusion: Morbidity leading to permanent disabilities make the person physically dependent on others. It can be prevented by educating the people about the proper handling to electric circuits & devices. Proper communication among the electricians may help in lowering such accidents. Proper rehabilitation of the handicapped person & employment to the member of the affected family may reduce the social burden caused by such electricity concerned accidents.

Keywords: Electricity burns, Mortality, Morbidity.

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Introduction

Electric burns and injuries are the result of electric current passing through the body. Temporary or permanent damage can occur to the skin, tissues, and major organs. Extent of the damage depends on the strength and duration of the electrical current. Electrical burns and injuries result from accidental contact with exposed parts of electrical appliances, wiring or lightning strikes. Electrical burn injuries (EBI) comprise a small fraction of the total burn admissions, but they are potentially a mutilating type. [1] Most of these injuries are preventable. Education programs and safety measures, both by the individual and the state, can bring changes in the present situation. Socioeconomic development worldwide has brought changes in the burn incidences; however, India has not witnessed the same. The electric injuries are divided into low voltage (<1000 kv) injuries and high voltage (>1000 kv) injuries.

The aim of this study is to highlight the socio-demographic profile and outcome of electric burn

injury in a high-volume tertiary care centre of North Bihar.

Material and Methods

This prospective study was carried out on patients admitted in burn unit of department of General surgery at Jawaharlal Nehru Medical College and Hospital Bhagalpur, Bihar.

Records of the patients admitted from June 2023 to May 2024 were studied. Bed head tickets of the patients evaluated in detail.

Patients data were examined in detail with references to their age, sex, mode of injury, part of the body affected, surface area involve, hospital stay, ultimate outcome of the disease.

Inclusion criteria: patients who sustain electrical injuries by any mode (Direct current, Arc injuries, Lightning injuries, hot elemental burn) included.

Exclusion Criteria

1. Patients who were managed as outpatient were excluded from our study.
2. Follow up patients who had been already

included in the study.

3. Patients with no clear history of electrical contact

Observations and Results**Table 1: Age wise distribution of electric burn patients**

Age groups (Yrs)	No of patients	Percentage
0-10	21	18.58
Nov-20	18	15.93
21-30	44	38.94
31-40	19	16.81
41-50	4	3.54
51-60	4	3.54
≥61	3	2.65
Total	113	100

In our study out of 113 patients maximum no. of patients were in age group of 21-30 years 44(38.94%) followed by age group <11 years in 21(18.58%) patients and age group of > 60 years in only 3 (2.65%).

Table 2: Sex wise distribution of electric burn patients

Sex	No of patients	Percentage
Male	95	84.07
Female	18	15.93
Total	113	100

In this study it was observed that among 113 patients of electric burn 95 (84.07%) were male and 18 (15.93%) were female.

Table 3: Occupation wise distribution of electric burn patients

Occupation	No of patients	Percentage
Electrician	15	13.27
Farmer	39	34.51
Other	22	19.47
None	37	32.74
Total	113	100

In our study 39 (34.51%) patients were farmer and 15 (13.27%) were electrician in out of 113 total patients, while 37 (32.74%) were without any occupation.

Table 4: Area wise distribution of electric burn patients

Area	No of patients	Percentage
Rural	74	65.49
Urban	39	34.51
Total	113	100

In this study of majority of patients 74 (65.49%) were from rural area

Table 5: Mode of electricity wise distribution of electric burn patients

Mode of electricity	No of patients	Percentage
Low voltage	48	42.48
High voltage	65	57.52
Total	113	100

Distribution of cases according to mode of electric burn showed that there were 65 (57.52%) cases of high voltage (HV) electrical injury, and 48 (42.48%) cases were of low voltage (LV) electrical injury.

Table 6: Morbidity and mortality distribution according to gender

Sex	Morbidity		Mortality	
	No	%	No	%
Male	40	42.11	10	10.53
Female	4	22.22	2	11.11
Total	44	38.94	12	10.62

In present study out of 113 patients, 95 were males with morbidity and mortality of 40 (42.11%) and

10 (10.53%) respectively. Among 18 females morbidity and mortality of 4 (22.22%) and 12 (10.62%)

respectively

Discussion

This study was carried out on electric burn patients who were admitted at Burn unit, at JLNMCB Bha-galpur. Our study include 113 patients of electric burn with maximum number of patients were in age group of 21-50 years (59.29%). As the age increases the incidence of electric burn accidents increases up to 30 years after that incidence decreases. Patients with age group of more than 50 years has the least number of patients 6.19%. The mean age was 25.12 year. The cause of more incidence of electric burn in 21-50 years age group is due to more exposure to external environment and thereby risk factors particularly in agriculture field and jobs concerned to electric handling. In Indian setup joint families, geriatric and pediatric persons spend majority of time at home under supervision of family member. That may be the reason for lower incidence of electric burn injury in these age groups. Kid. M et al [2] study reported that the average age of electric burn patients was 34.9 year and maximum patients in age group of 21-50 years. In our study among 113 victims of electric burn 95 (84.07%) were male and remaining 18 (15.93%) were females with male to female ratio of 5.27:1. With a mortality of 10 (10.52%) in male and 2 (11.11%) in female. The majority of affected persons were male because of their involvement in works concerning to electricity and farm. In our setup females are hardly exposed to high electricity and high-risk jobs. Khan. N. ET al [3] studied 111 patients which were admitted at Pakistan ordinance factory hospital and found that 55% were male and 45% were female.

In our study majority of patients (65.49%) were from rural area, morbidity and mortality was higher among these patients. As the majority of cases of electric burn were referred from peripheral hospital to burn unit of this hospital. Higher incidence of electric burn among the patients from the rural area are because of lack of general awareness, inadequate precaution and protective measures taken while working in presence of high voltage current due to

intense rural electrification projects which are under-way. Saptrishi Bhattacharya et al [4] in their study showed that most of the case were from city and sub urban area.

A study of Saptrishi et al [4] showed majority of electric burn patients were electricians resulted from high tension electric wires due to severe negligence on the part of authorities in maintenance of overhead lines. Another study by E.D. Butler et al [5] reported that bodily contact with high tension wire by lineman constitute the most common accident of electric burn (67% of total) in which 35% of electrician suffered permanent disability and 2.1% electrician had mortality.

Conclusion

Morbidity leading to permanent disabilities make the person physically dependent on others. It can be prevented by educating the people about the proper handling to electric circuits & devices. Proper communication among the electricians may help in lowering such accidents. Proper rehabilitation of the handicapped person & employment to the member of the affected family may reduce the social burden caused by such electricity concerned accidents.

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