EPIDEMIOLOGICAL STUDY OF FATAL ELECTROCUTION CASES- A MORTUARY BASED 3 YEARS RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

At present, we cannot think of a life without electricity and it has become one of the significant causes of our morbidity and mortality. Effect of electricity depends on certain factors like nature of current, resistance offered by the body, duration of current exposure. Cause of death in electrocution cases is cardiac arrest, spasm of the respiratory muscles, paralysis of the respiratory centre and due to other complications like burn injury, infection or other injuries.

Aim of the study is to analyse the various epidemiological factors related to electrical fatalities in this part of our state and thereby generate public awareness.

MATERIALS AND METHODS

The present study is a 3 years retrospective study done in the Department of Forensic Medicine and Toxicology, Agartala Government Medical College & GBP Hospital during the study period of January 2013 up to December 2015.

RESULTS

A total 2737 autopsies were conducted and 53 cases (1.93%) were due to fatal electrocution during this study period. Male female ratio was 9.6:1. Maximum electrocution deaths occurred in the age group of 21 to 30 years with a total number of 14 cases (26.41%). Majority of the electrocution deaths occurred in the day time. Most of the cases were spot dead with a total number of 49 cases (92.45%) and only 4 cases required hospital admission. Based on the information gathered from the investigating officer and other post-mortem records all the cases of fatal electrocution during the study period were found to be accidental in nature.

CONCLUSION

Majority of the electrocution deaths occurred in the day time. Most of the cases were spot dead. Prevention is the gold standard and it can be achieved with proper awareness about handling of electrical appliances.

KEY WORDS

Electrocution, Fatal, Voltage, Current.

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BACKGROUND

With the advent of modernisation, electricity has become an integral part of our day-to-day life. At present, we cannot think of a life without electricity and it has become one of the significant causes of morbidity and mortality. The term electrocution has been coined for skin lesions, organ damage or death caused by the passage of electric current through the body tissues. But sometimes the term has been used only in cases of fatal injuries or death caused by electricity. Electrocution remains one of the top five leading occupational killer.¹ Mortality rate is 3% to 5% in the United States.² Majority of the electric injuries occur at the working places. However, they are common at home and outdoors also. Fatal electrocutions are usually accidental in both domestic and industrial environments.³ Suicide cases increased in the recent years in Germany. Homicide cases are rare but recorded in USA as a means of judicial execution.⁴

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Effect of electricity depends on certain factors like nature of current, resistance offered by the body, duration of current exposure. Cause of death in electrocution cases is cardiac arrest, spasm of the respiratory muscles, paralysis of the respiratory centre and due to other complications like burn injury, infection or other injuries.⁵

In India, the voltage of domestic supply is usually 220 V to 240 V. Electrocution fatalities are rare at less than 100 V and more deaths occur at voltages above 200 V.⁶ Majority of the electrical injuries are as a result of ignorance, misuse or carelessness.⁷ The present study has been taken up to analyse the various epidemiological factors related to electrical fatalities in this part of our state to generate public awareness.

MATERIALS AND METHODS

This is a 3 years retrospective study done in the Department of Forensic Medicine and Toxicology, Agartala Government Medical College & GBP Hospital during the study period of January 2013 to December 2015. Relevant data were collected from the Mortuary Autopsy Register. Only the cases which were confirmed to be electrocution deaths were included in the study based on the information provided by the concerned investigating officer and relevant autopsy records. Deaths caused due to lightning were excluded from this study.

RESULTS

Out of 2737 cases of medicolegal autopsy done during the study period January 2013 to December 2015, a total 53 number of cases were due to fatal electrocution (1.93% cases). Male female ratio is 9.6:1. Maximum electrocution deaths occurred in the age group of 21 to 30 years with a total number of 14 cases (26.41%). Majority of the electrocution deaths occurred in the day time with a total number of 32 cases (60.37%). Maximum males, 22 in number (41.50%), died at place of work while all the females died at home. Most of the cases were spot dead with a total number of 49 cases (92.45%), only 4 cases (7.5%) required hospital admission. Based on the information gathered from the investigating officer and other post-mortem records, all the cases of fatal electrocution during the study period were accidental in nature.

Year	Total Autopsies Done	Number of Fatal Electrocutions
2013	891	12
2014	934	21
2015	912	20
3 years	2737	53

Table 1. Incidence of Electrocution Deaths

Age in Years	Male	Female	Total
0 to 10	1	nil	1
11 to 20	10	nil	10
21 to 30	12	2	14
31 to 40	11	1	12
41 to 50	10	1	11
51 to 60	2	1	3
Above 60	2	nil	2
Total	48 (90.56%)	5 (9.43%)	53

Table 2. Age and Sex Distribution of Electrocution Deaths

Place	Male	Female	Percentage (%)
Domestic	12	4	30.18
Outdoor	14	1	28.30
Work Place	22	nil	41.50

Table 3. Place of Occurrence

Time	Number of Cases	Percentage (%)
9 AM TO 5 PM	32	60.37
5:01 PM TO 10 PM	15	28.30
10:01 PM TO 8:59 AM	6	11.32

Table 4. Time of Occurrence

Period of Survival	Number of Cases	Percentage (%)
Instant Death	49	92.45
Within 24 hours	3	5.66
More than 24 hours	1	1.88

Table 5. Period of Survival

DISCUSSION

Table 1

Shows the incidence of electrocution deaths on a yearly basis which is consistent with the findings of Ardeshtir Sheikhezadi, B.D. Gupta, R.A. Mehta.^{8,9} Some difference in the incidence may be due to geographical variation.

Table 2

Shows that the most common vulnerable age group for fatal electrocution is 21 years to 30 years which may be due to the

fact that this is the most productive age group who often remain outdoors in search of occupations. The findings of this study are similar to the studies conducted by AJ Taylor,¹⁰ Kusa Kumar.¹¹

Table 3

Shows the place of electrocution, which is maximally seen in the working places. These findings are similar to the studies conducted by Ardeshtir Sheikhezadi⁸ and Kusa Kumar.¹¹

Table 4

Depicts the time of occurrence of fatal electrocutions, which is maximum in the day time.

Table 5

Shows the period of survival of the victims from fatal electrocution and it is seen that 92.45% of the cases died on the spot and only 1 victim survived for more than 24 hours. All the fatal electrocution cases were accidental in nature in the present study. The findings are consistent with the study findings of Ardeshtir Sheikhezadi, Kusa Kumar¹¹ and Gadge Sachin.¹²

CONCLUSION

Electrocution deaths comprised 1.93% of the total autopsy cases conducted during the study period. Males outnumbered females and 21 to 30 years age group is found to be most vulnerable age group for fatalities in the present study. Only 4 cases out of 53 cases were hospitalised and only 1 case survived more than 24 hours which shows that there is no time for receiving medical care in these fatal cases. So prevention is the gold standard and it can be achieved with proper awareness about handling of electrical appliances.

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