



ELECTROCUTION: A THREE YEARS AUTOPSY BASED STUDY

Forensic Medicine

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ABSTRACT

Introduction: Electrocution means death caused by electricity. Alternating Current is 4-5 times more dangerous than Direct Current. **Material And Method:** The data from 01 Jan 2020 to 31 Dec. 2022, was collected for this study. The present study was carried out in department of FMT, JLNMC Bhagalpur. **Observation And Results:** This study observed 64 cases of electrocution death among which that maximum cases were male 60 (94%) and female 4 (6%), religion Hindu 57 (89%) Muslim 7 (11%). Age group among more common was 21-30 years. Manner of death: Usually 97% were accidental and homicidal 3%. Among month maximum in September (rainy season-June to September) and June & August 2nd most. Common cause of death in a electrocution victim is Asphyxia and electric shock/ Ventricular fibrillation. **Recommendation:** Recommended precautionary steps to avoid electrocution deaths. No to go to an open place during rainy season, Storm. Urgently disconnected domestic electricity supply just before storm, cyclone, rain.

KEYWORDS

Electrocution, Accidental deaths, Ventricular fibrillation

INTRODUCTION:

Electrocution means death caused by electricity. If any part of your body meets live electricity an electric current flows through the tissues, which causes an electric shock. Alternating current is 4-5 times more dangerous than direct current. Voltage is the most important factor in electrocution. DC injury are uncommon, except in lightning. 40mA current cause ventricular arrhythmias and >50mA leads to instantly fatal. Dangerous level² of AC is 70-100mA and of DC is 200-300mA. Most fatalities occurs at household domestic supply 220 to 250 volt AC. Low voltage current causes death due to Ventricular fibrillation. Exogenous burn/Flash burn caused by high voltage current.

NCRB data showed 10218 deaths from electrocution and that constitute 2.6% of all the accidental deaths, of which 0.7% were by lightning, which forms about 2833 cases⁶. Self electrocution in India accounts for 0.7% of the total suicides, that is 952 out of 134799 suicide deaths in the year 2013. Electrocution fatalities: Over 30 people die every day in India, NCRB data shows.⁴

MATERIAL AND METHOD

The present study was carried out in department of FMT, JLNMC Bhagalpur. The data from 1 Jan 2020 to 31 Dec. 2022, was collected for this study. This study includes only those cases showing sign of electrocution death on police inquest and other unknown cause. Decomposed bodies and the cases where nature of injuries was undetermined, lightning deaths was excluded from this study. The various epidemiological features and medicolegal aspects of cases where collected from police inquest, PM reports and other datas (FIR, hospital records etc) and interrogation of the relatives and friends neighbours accompanying the dead body.

In every case of Electrocution death, details of these injury were studied for positive factors, external examination, internal examination, number of injuries, part of the body and organ involved, any other type of associated injuries and manner of death, cause of death. This study was also evaluated according to age, religion, sex, marital status, habitat, occupation, place of occurrence.

OBSERVATION AND RESULT

The study of ELECTROCUTION DEATH AUTOPSY based study was done from 01 Jan 2020 to 31 Dec 2022. During this period a total number of 2967 cases of medicolegal autopsies were conducted in mortuary of JLNMC Bhagalpur, dept. of FMT out of this 64 cases (2.16%) were death due to electrocution.

Sex – Among 64 cases electrocution death male – 60 (94%) and female – 4 (6%). **Religion** – Hindu-57(89%), Muslim 7 (11%).

Manner of death – Accidental-62(97%) Homicidal -2(3%), Suicidal 0.

Cause of death – Asphyxia and shock/Ventricular fibrillation - 55 cases, septicemia and other causes – 09 cases.

Survival time of Electrocution death victims – Found death at scene/spot death – 56 cases, more than 1 day – 8 cases.

Month wise distribution – Maximum in September (Rainy season-May to October) and (2nd most-June & August, Minimum – December

Occupation of electrocution victims – Farmer – 30, Households – 10, Unknown – 3.

Habitat – Urban – 39, Rural – 25 cases.

Distribution of cases According to Site of of electrocution mark - Head&Neck-12cases, chest-8 and abdomen 5cases. Back-9, Upper limb(Right-18, Left-10) Lower limb(Right-11, Left-7)

Distribution of cases according to place of incident – House-37(58%), Work place-14, Industrial-1, Road-8, Others-4 Marital Status-Married-54, Unmarried-10

Distribution of cases according to voltage (high voltage >1000V-19, low voltage 1000V-45 cases)

Distribution of cases according to surrounding of place of incident (dry condition-36, wet condition-28)

Distribution of cases according to site of electrocution mark present over body – Entry mark-48, entry&exit-3, without mark-3, Additional marks-2, Burns(Flash-5, Charred-3)

Age Wise Distribution Of Electrocution Death :-

Age group	2020	2021	2022	Total
1 – 10 years		1		1
11-20	3	4	2	9
21-30	12	7	7	26
31-40	4	3	4	11
41-50	6	2	3	11
51-60	2		2	4
61-70		1	1	2
Total	27	18	19	64

Sex And Year Wise Of Electrocution Death

YEAR	MALE	FEMALE	TOTAL
2020	25	2	27
2021	17	1	18
2022	18	1	19
TOTAL	60	4	64

Month And Year Wise Distribution Of Electrocution Death.

Month	2020	2021	2022	Total
JANUARY	3		2	5
FEBRUARY	2		1	3
MARCH	4			4
APRIL	1	2	1	4
MAY	5	1	1	7
JUNE	2	3	3	8
JULY	2	2	2	6
AUGUST	3	2	3	8
*SEPTEMBER	4	3	3	10
OCTOBER		4	2	6
NOVEMBER	1		1	2
DECEMBER		1		1
TOTAL	27	18	19	64

DISCUSSION

The danger of a person dying in a bath by touching a defective electrical switch as a result of the water and bath furnishing a perfect 'earth' for the current, is well known. Deaths have occurred of persons trying to remove the affected person from the charged conductor with unprotected hands. Electrocution deaths usually accidental in nature. Cause of death in electrocution¹: ventricular fibrillation, respiratory paralysis, paralysis of respiratory centre. Effect of electric shock causes local effects and systemic effects- renal failure: current causes muscle damage- release of myoglobin into urine myoglobinuria- dysfunction- leads to acidosis Joule burns/Endogenous burn seen most of the cases. Morphology of joule burns is like round, shallow, Pale Central crater, with a raised border around. The crater floor is lined by pale flattened skin. Joule burn is commonly found on palmar aspect of hands. More prone was low socio economic class. Here are some essential guidelines to follow for your safety and well-being: **Keep Away from live Electrical wire. Educate Children on Electrocution Safety. As per the NCRB data, in the last decade (2011 – 2020), about 100,000 people lost their lives due to electrocution. It reflects that nearly 11,000 electrocution deaths happen every year, this number rose to 12,492 in 2022. This equates to 34 fatalities daily on average.**

SUMMARY AND RECOMMENDATIONS

The study is an attempt to discover and to analyze patterns of electrocution death form among 64 victims of electrocution death examined in the Department of FMT, JLNMC Bhagalpur between Jan 2020 to Dec 2022. In India every year hundreds of people lose their lives due to light striking. As nature's electrifying storms sweep across various regions, it is vital for everyone to be well-prepared and informed on how to stay safe when electrocution strikes. Electrocution can be a deadly force of nature, and taking precautions during such weather conditions is of utmost importance. Here are some essential guidelines to follow for your safety and well-being: Every year hundreds of people lose their lives due to light striking. As nature's electrifying storms sweep across various regions, it is vital for everyone to be well-prepared and informed on how to stay safe when electrocution strikes. Electrocution can be a deadly force of nature, and taking precautions during such weather conditions is of utmost importance. **Dos and don'ts**² to avoid electric shocks at home: Never use a damaged extension cord. Never use a defective electrical device. Pull on the plug and not on the cable to unplug an electrical device. Unplug the toaster before trying to dislodge stuck toast. Before changing a lightbulb, switch the light off or unplug the lamp. The human body conducts electricity. Disconnect the power supply before trying to help someone suffering from an electric shock³. Be especially careful in wet environments and around fallen powerlines, they may still be conducting electricity even if they are broken or not moving. Always hire a licensed electrician for all electrical work around the home. Primary aid treatment is must. Sometime cardio-pulmonary resuscitation needs urgently at the scene. Keep maintain distance from high tension wire live current.

CONCLUSION:

Death due to electrocution is usually accidental. Most common site of electrocution is on exposed part of body especially palmar aspect of hand, especially the tips of index fingers and thumb. Some Persons may survive within 1 to 2 days. Most common cause of death was due to asphyxia and electric shock/ Ventricular fibrillation. Joule burns or Endogenous burn seen up to 80 to 90 percent victim. Recommended precautionary steps to avoid electrocution. More deaths occurred in domestic surroundings means that people living at home did not have

elementary knowledge of risk of electrocution. Most of deaths were either instantaneous or immediate. Rate of fatality is significantly higher. In the rainy season more than 50% deaths occurred. Male where the predominant victims.

Weather forecast plays important role in reduce the electrocution death. Government should more attentive in weather science and trained electrician to solve this problem.

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Ethical Clearance- Approval taken from institutional ethical committee.

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