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RESEARCH ARTICLE
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PATTERN OF ELECTRIC BURN FATAL INJURIES IN WESTERN UTTAR PRADESH

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Abstract:
A necessary evil of today's life intervention are the result to our life threatening causes of our fatality mostly due to recklessness. Nearly, thousands of death occur in western Uttar Pradesh due to the electrical burn injuries over a year. The electrical conductivity through the tissue making it porous furnishes to death. High voltage burns as well as the low voltage burns comes in this purview of our study. Over 100 of cases were thoroughly gone through to predicate our conclusions through this paper of research. Of these cases, mostly the fatalities were accredited to the male (81.5%) gender than the females (18.5 %). The research was done in the western districts of Uttar Pradesh primarily in Kanpur District due to ease of access of the author. The groundwork is solely dependent upon the acquiring pattern of electrical injury with their entry wound and exit wound patterned delineation. Hence the present treatise is a work of practical aspect of post mortem abstract pronouncing the pattern of electric burn injury rendering fatalities as well as construing the adaptive meed for the prevention of the same.

Keywords: Electric burn injury, Entry wound, Exit Wound, Pattern, Contact Burn, Joule Burn, Electrocution.

INTRODUCTION:

Ben Franklin discovered electricity but has been remarkably defined by *George Carlin,* as, "*Electricity is really just an organized Lightening".* The electricity has thus become an overused and over dependent sort of consortium for our livelihood in order to let it be recalled as necessary evil. As dangerous as lightening, and as fierce as the stroke, electricity causes poration when considered in

high voltage cause, and causes cardio vascular related difficulties when considered in low voltage cause.

Mostly the reason behind the electric burn fatality is accidental manner of death. Other manners of death are very rarely evident in India, even in Western U. P. And as a matter of fact, the alternative current proves to be more fatal than the direct current. The accidental phenomena results from the power breakage of electrical mains which may plummet over a person or becoming a livewire circuit. Livewire circuit is due to coming in contact with the positive and negative poles or may be through the contact with positive pole and negative pole served through the earth or non – insulating object. The astray measures are kept on stake while handling the domestic electricity with faulty operations without much going through prescribed leaflets. Also, marketing and business of electrical aids have gone cheaper beyond safety, rendering pose to the open danger life threat. The effect of electric shock can be equated through an equation defining the factors accumulating to fatality as the influential effects.

$$Effect\ of\ electric\ shock = (\ Voltage\ x\ Amperage\ x\ Duration\ ) - (\ Resistance + Alertness\ )$$

The purview of the current treatise is laid over the pattern of electric burn injury through the meticulous analysis of numerous autopsies. The histopathological examination helped rendering the conclusive observational relevance along with the adaptive meed count listing. The entry and exit wound resembling the ferning structure is pathognomonic in nature.

MATERIALS AND METHODS:

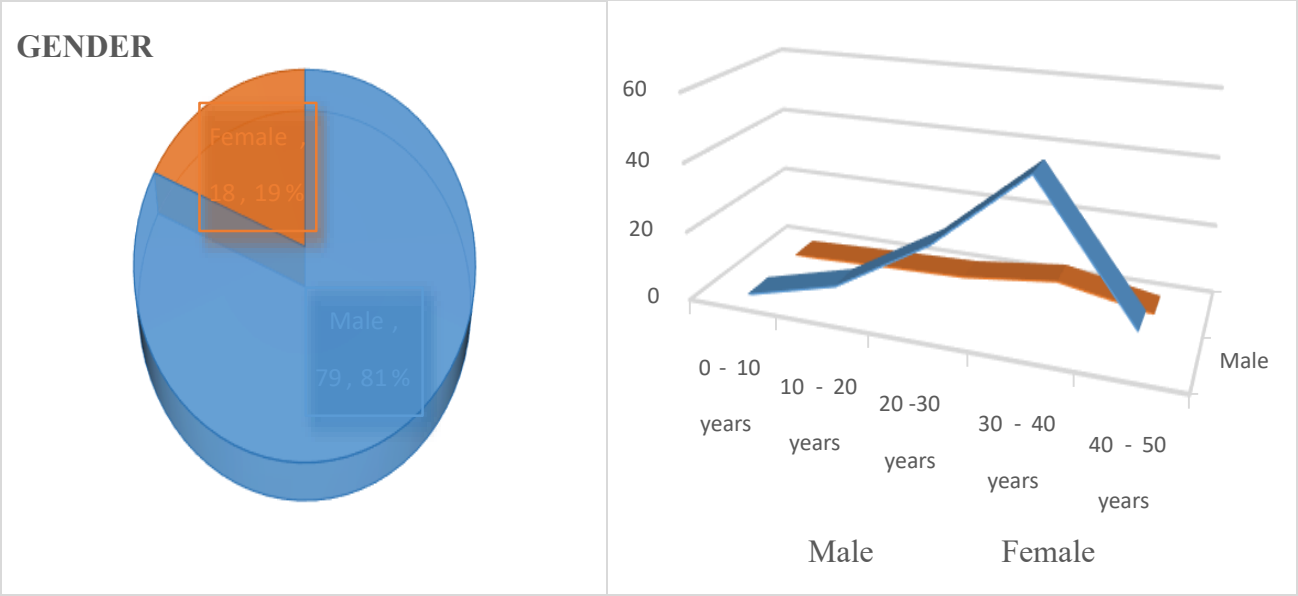
The present treatise covered roughly 100 of cases acquired with the electric burn injury which proved fatal to the victim eventually and those undergone post mortem examination were closely studied for the patterned remarks. The greatest number of cases of those taken into account were autopsied in the district of Kanpur, rest were observed in the district of Unnao, Kannauj and Lucknow. The cases analyzed represent a comprehensive collection for over a year from 2014 to 2015.

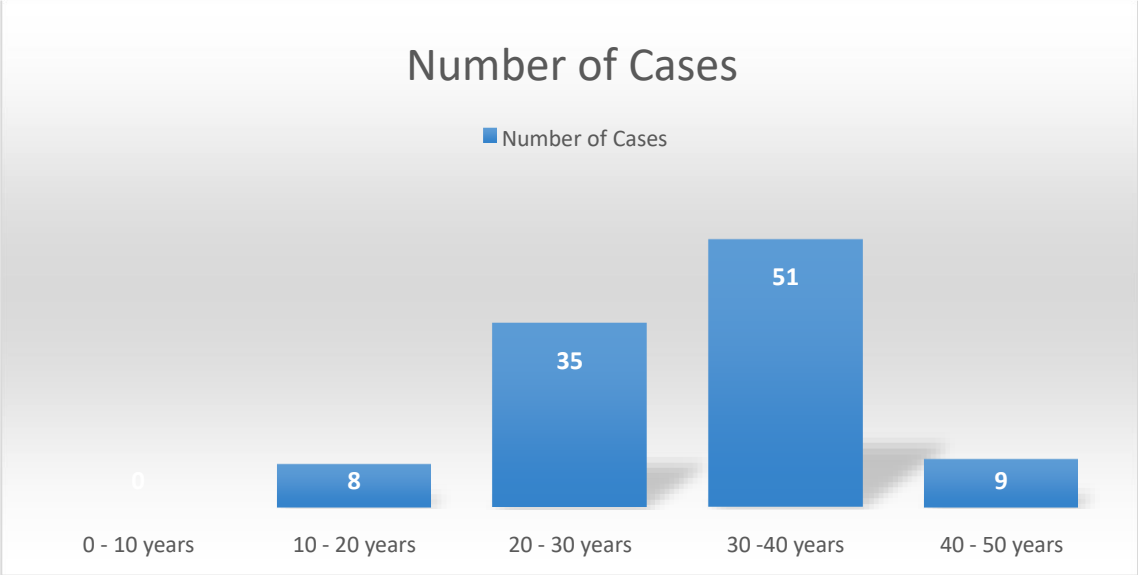
The post mortem examination leads to the findings in the categorical assessment about the fatality depending upon gender, the contact burn area specifications, type of voltage targeted and the pattern of injury involved. The research to the least comprises of the fact known through the Panchayatnama and the accompanying person of the dead body evidential statement and to some extent scene of occurrence of incident evaluation. Histopathological assessment was pen down in relevance to the contact site and exiting site illustrating the pattern and the manner of causation of injury with the fatalities.

All the data of relevance has been statistically graphed and tabulated for enthralling grasp of the topic of discussion with the literature in scope.

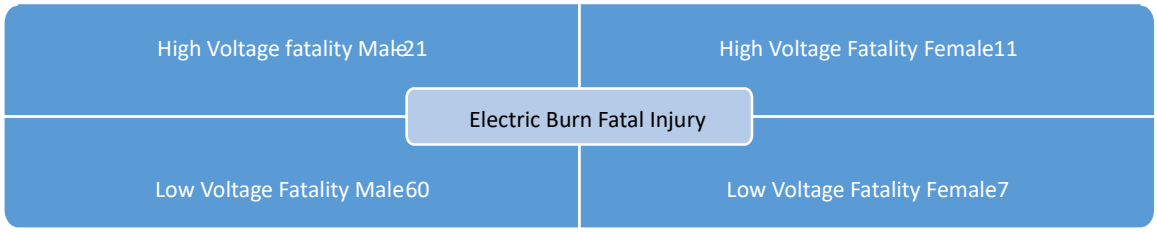
OBSERVATION & RESULTS:

A total count of 97 cases were taken into consideration, of which, 81.5 % of the victim were male that is a total of 79, and 18.5 % were females that is a total of 18. A group wise distribution based on the age when taken, revealed that there were least cases in the group of infants to 10 years of group of age, forming a peak in number of cases up to increase in group of age till 35 and then a subtle stability seen and then declination in number of cases in the group of ages considered further.



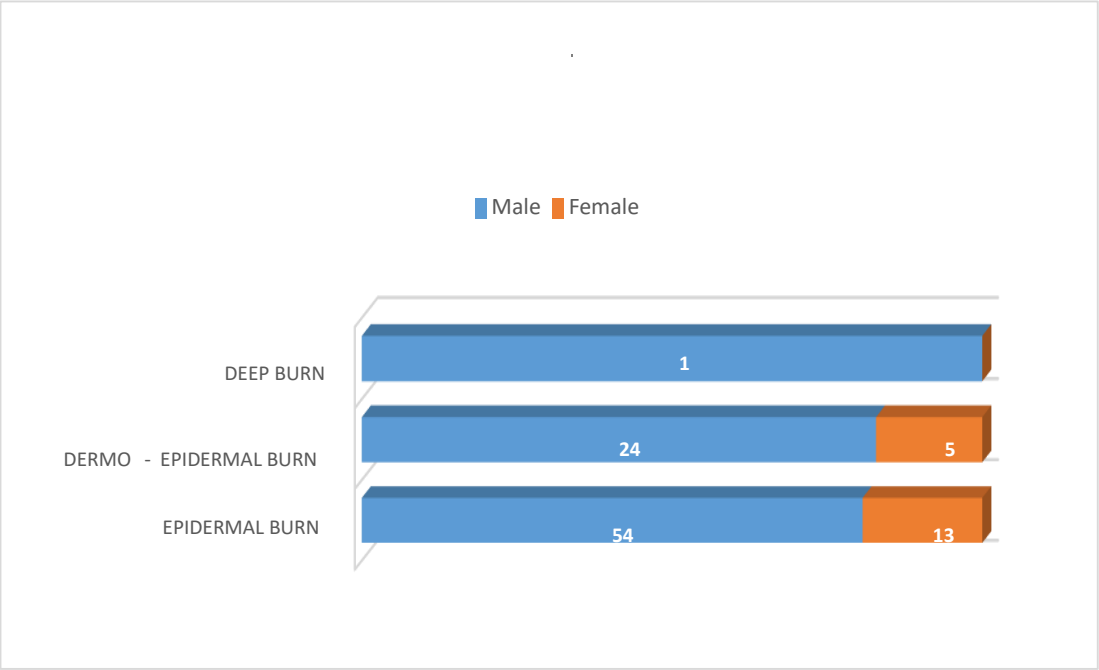


Almost all the fatality considered were caused due to the high voltage electricity drop down over the body or travelled through the body as a source involved in circuit causing short circuit, the physical phenomena where body serves to be the conductor of electricity. Only few of the cases, counted to be 32 of all 97 cases had its inception due to low voltage trauma. Of these 32 low voltage traumata, most of the females out of 18, sustained this type of fatality pertaining to the weaker physique and mal – nutritive condition being in the rural areas.



According to the Dupuytren's classification of burns, the three classified categories are epidermal, dermo – epidermal and deep. Evaluating the data to this classification, we had almost 67 cases (69.07 %) as the epidermal burn with 29 cases (29. 89 %) pertaining to dermo – epidermal category of burn with only 1 case (1.04 %) evaluating to deep burn.

Epidermal Burn	67 cases
Dermo – Epidermal Burn	29 cases
Deep Burn	1 case



The pattern of injury was resembled to a fern with an entry wound and a distant exit wound. Associated injuries were mostly dependent upon the place of occurrence of the incident as it, on a larger aspect, had have been caused a fall from height resulting fracture and lacerations to the mere occurrence of abraded contusion in contrast. Mostly cases, about 86 of the 97 cases analysed had sustained abraded contusion and lacerations as associative injuries, with 34 subjects undergone fractures such as of limbs (27 subjects) and of ribs (7 subjects).

Injuries	Male	Female
Entry Wound	81	18
Exit Wound	48	14
Abraded Contusion	77	9
Lacerated Wound	73	13
Fractures	23	11
Regional Injuries	29	6

Contact Burn and Joule Burn were almost a universal as characteristic outcome of the electric burn injury. Though some were evident of Spark burn too. Overall, every studied subject has the entry wound conspicuous to our best evidence with some cases of inconspicuous exit wound (35 cases). Mostly the working hand were affected of the male subjects as the right handers had the entry wound in the right arm or right side whereas the left handers similarly had entry wound from the left side of the body or particular left arm entrance of electric burn injury. Exit wound were mostly situated medially exiting through the genitals and rarely through the other side of the respective body. Mainly females of all the cases undergone had their exit wound through the lower limbs.

DISCUSSION:

The rigorous amount of electricity used and mishandled have increased rapidly and shows inverse bottle neck pattern over the economy of our country. Every male member of a household is presumed to have good hold of minimal handling knowledge of electricity and is being asked to rectify least to

large possible electric faults to handle at own. The use of cheap quality material in wiring and non-insulation of home further pushes the fatality to a greater extent in our Country as evident from the statistical analysis of the 97 cases studied and patterned over western Uttar Pradesh.
As earlier stated, mostly the alternating current proves to be main reason behind the major fatalities in western U. P. which occurs in a voltage range of 220 to 240 Volts which is in accordance to the domestic supply of a household. Usually, an average of 25 cycles per second in frequency hits a victim over domestic accident. These low voltage traumatic accidents cause ventricular fibrillation amounting to be the cause of death. In high voltage traumatic accidents, 1000 volts, causes respiratory failure causing the death. Usually, the accumulated immediate cause of death is inscribed as Shock due to Ante Mortem electrocution, as observed throughout the post mortem report prepared by the autopsy surgeon in Western Uttar Pradesh.

As observed through the group of age affected, mostly the group of age lying between 25 to 35 years fall in the assessment as the peak range of age pertaining to the electric burn fatal injury. Below the stated range of group of age as well as above the same, were least into accountability. The reason behind may be the responsible and heroic enthusiasm seen in the mentioned particular group of age towards any household rectifying habits or faults in the North Indian scenario.

In accordance to the group of age, next relevant observation came into light was of the gender. Females are seen less prone to electrical injury than males in the area of study. The reason observed were that the females are not seen keenly interested into rectifying electrical faults and usually have been observed as a victim of fall down electrical circuit as livewire. Number of Male fatalities were consistent with variety of reason being involved either be it the rectification mishap or livewire caught in or short circuit. Transgender category did not come to the author's accessibility for study.

The categorical classification of the electrical injuries sustained by the subjects according to the Duputyren was observed closely with the highest in fall to the category of epidermal burn and then an average fall into the category of dermo – epidermal burn with least fall into the category of deep burn. These patterns concluded that the western Uttar Pradesh do not witness deep burn fatality due to electric burn fatal injury and all the fatality are conclusive of the fact of faulty operations or livewire mishap.
Associative Injuries with entry and exit wound of the undergone subjects were mostly abraded contusions with lacerations and some with fractures of limbs or ribs. These add up to ascertain more obvious pattern formation for the injury. Mostly the pattern of electric injury is being a follow up of the path of current travelled and traversed through the body of the victim. These patterns fall into the categorization such as upper arm to upper arm, upper arm to medial aspect, upper arm to lower arm, from head to toe, from toe to head, from head to upper arm. Such a pattern observed conclusively remarked the evitability of the death occurred directed towards the shortcomings of the incident which could have been prevented from occurrence at the first place if recklessness could have been ignored and omitted, with the efforts made in by the witnesses of the incidental survivorship.

CONCLUSION & RECOMMENDATIONS:

The overall treatise of research work presented the analytical study of roughly 100 cases observed in the part of western Uttar Pradesh. The major fatalities were seen in the adult group of age falling in the range of 25 to 35 years. Mostly the males are affected of mortality than the females. The Males mostly acquired dermo – epidermal electrical burn accumulating to the cause of fatality, due to their resistance of existence when sustained epidermal burn according to their physique and robustness in the make – up. Females faced consequential death mostly after sustaining epidermal death due to their weaker physique and brittleness make-up constitution with the reason being mal – nutritive due to rural livelihood. Of all the subjects examined thoroughly, had ferning pattern of electrical injury with mostly evident entry as well as exit wound respectively with very less cases of inconspicuous evidence

of subtle exit wound. The pattern observed were mostly upper arm to upper arm and upper arm to medial aspect flow of current causing the patterned injury through the travel of current.

Adaptive meed towards safety against electric mishap could be the steps taken towards standard use of electrical wiring and appliances in use. Cheap marketed products must be wisely chosen over the standard costly products as life costs more than the cheap market taglines. Average knowledge of electricity meagre to the use of mishandled operations concludes to proneness of trauma, and must be avoided well in hand. Any electrical rectification must be done in presence of an observer so as to be in close acquaintance to help in needy incident to omit large implications. Thereby, the overall safety measures of the necessary evil be treated in such a way that the evil be an organized assembly in the household for the domestic use and occupants be safe.

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