Frequency of Electrocution among employees of LESCO Lahore working at different fields of electricity

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Abstract

Objective: To determine frequency of electrocution related injuries among LESCO Employees.

Method: Total 278 linemen fulfilled the criteria for selection. All 278 linemen who were interviewed, opted all SOPs and were wearing PPEs before starting field work including work at distribution poles, and transmission lines. They also told about earthing the wires before working at any area as well as take proper consent from higher authorities before doing work at any electrical pole. They were asked about development of electrocution injuries, the immediate effects and the serious effects of electrocution. Gathered data was entered and analysed by the SPSS(version20.0). Frequency tables were generated for all possible variables. Chi Square was applied to find association between different variables.

Results: Total participants were 278. The mean age of the linemen was 41.57 ± 9.673 years.(23 - 59).The mean job duration of the interviewed linemen was 18.6891 ± 10.39828 years. 160 (57.6%) of the linemen interviewed said that they developed electrocution injuries while working. 79 (28.4%) linemen claimed that the electrocution injuries were serious. 12 % (4.3%) linemen developed disability due to electrocution injuries.

Conclusion: All 278 linemen who were interviewed told about opting all SOPs and wearing PPEs before starting field work including work at distribution poles, and transmission lines and no fatal injury happened to them. However, despite opting all SOPs , electrocution events occurred which proved that there were certain loopholes that need to be addressed properly.

Introduction

Electricity is part and parcel of daily routine tasks. Pakistan is one of those countries which have problems of outages due to more consumption, less production of electricity along with dilapidated transmission system and line losses. Despite all these predicaments, Government of Pakistan is doing utmost struggle to combat electricity crisis. Special efforts are being put by the well reputed institutions like, National Electric Power Regulatory Authority (NEPRA), National Transmission & Despatch Company Limited (NTDC), Water & Power Development Authority (WAPDA), and regional distribution companies like, LESCO, GEPCO, K-Electric. All those regional distribution companies are working under the auspices of Federal Government and they are responsible for smooth and uninterrupted power supply to both commercial feeders as well as domestic consumption holders. In addition, WAPDA provides man power and technical assistance to these regional distribution companies for ensuring smooth provision of electricity.

LESCO is responsible for provision and supply of electricity in Lahore division and it is working efficiently for regional distribution with the help of hundreds of employees. The purpose of this study is to focus on electrocution injuries faced by the employees of LESCO during field operations. As Lahore is mainly provided by on ground electricity system, there are more chances of injuries among employees while doing maintenance work.

Electrocution injuries are common across the globe. According to data from the Census of Fatal Occupational Injuries (CFOI) , sponsored by the U.S. Bureau of Labor Statistics, show that in 2020, 126 workers died due to exposure to electricity. Almost three in five injuries (56%) were caused by direct exposure to electricity. This is defined as injuries caused by direct contact with the power source , such as direct contact with a live electrical wire or when the victim is struck by an electrical arc. The major cause of death among patients receiving electrocution injuries is cardiac arrhythmias like ventricular fibrillation, respiratory muscle paralysis and rarely brain injury due to permanent damage to neurons as well as electrolyte disturbances.

Information about how electrical injuries occur and other injury circumstances can help guide prevention efforts and identify risk factors that are responsible for electrocution injuries. As LESCO employees are particularly vulnerable to hazardous exposures, this study provides an overview of fatal electrical injuries ,major risk factors, neglected factors, outcomes of these injuries, prevention strategies and consequent conclusion.

Method:

The study was conducted in **Lahore City** and employed a **retrospective cohort design** to analyze relevant data. The duration of the study spanned **three months**, during which participants were selected using a **non-probability consecutive sampling technique**. The **sample size** was determined using a cross-sectional study formula, resulting in a total of **278 linemen from LESCO**, calculated with a **95% confidence interval** to ensure statistical reliability and representativeness of the findings.

Result:

A total of 278 linemen were interviewed. The mean age of the linemen was 41.57 ± 9.673 years.(23 - 59). The mean job duration of the interviewed linemen was 18.6891 ± 10.39828 years. (0.58 – 41). All 278 were following SOPs and wore PPEs while working.160 (57.6%) of the linemen interviewed said that they developed electrocution injuries while working. 79 (28.4%) linemen claimed that the electrocution injuries were serious. 12 % (4.3%) linemen claimed to develope disability due to electrocution injuries.

The mean age of those who developed electrocution injury while working was 43.60 ± 9.562 years, while the mean age of those who did not develop any electrocution injury was 38.82 ± 9.167 years.This difference was statistically significant (p = < 0.001).

The mean duration of job of those who developed electrocution injury was 20.4911 ± 10.442 years , while the mean duration of job of those who did not develop any electrocution injury was 16.2458 ± 9.86571 years.This difference was also stastically significant (p= 0.001).

Table 1. Age & Job Duration of those with union

Variable	Electrocution injuries positive mean ± SD	Electrocution injuries negative mean ± SD	t-test value	P value	Remarks
Age (years)	43.60± 9.562	38.82± 9.167	4.190	<0.001	Significant
Job duration (years)	20.4911± 10.44258	16.2458± 9.86571	3.429	0.001	Significant

Table 2. Age & Job Duration of those with serious electrocution injuries (n =160)

Variable	Serious Electrocution injuries positive (mean ± SD)	Serious Electrocution injuries negative (mean ± SD)	t-test value	P value	Remarks
Age (years)	41.77± 9.678	45.38± 9.159	-2.42	0.016	Significant
Job duration (years)	18.8101 ± 10.42196	22.1306 ± 10.26245	-2.031	0.044	Significant

Table 3. Age & Job Duration of those with serious electrocution injuries (n =160)

Variable	Disability development positive mean ± SD	Disability development negative mean ± SD	t-test value	P value	Remarks
Age (years)	39.33 ± 8.359	43.95 ± 9.595	-1.615	0.108	Not Significant
Job duration (years)	15.9167 ± 8.005	20.8260 ± 10.550	-1.585	0.115	Not Significant

Fig. 2. Electrocution related injuries among study population

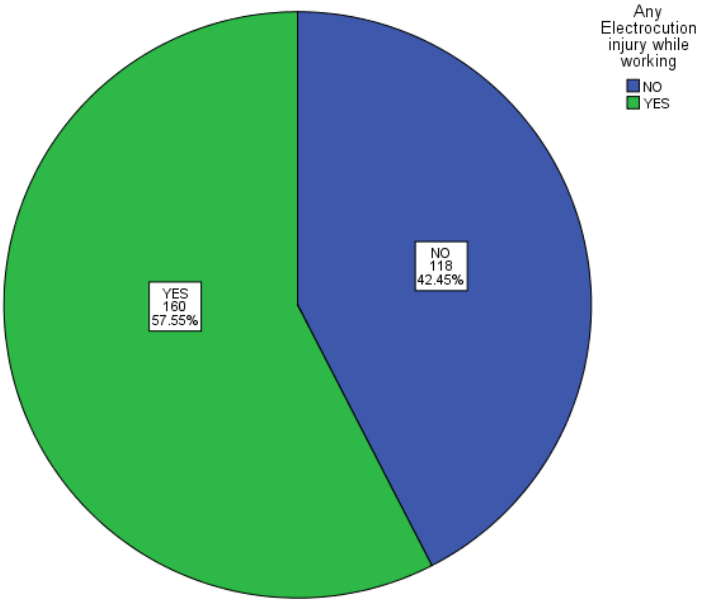


Fig. 3. History of serious electrocution among linemen who developed electroction injuries

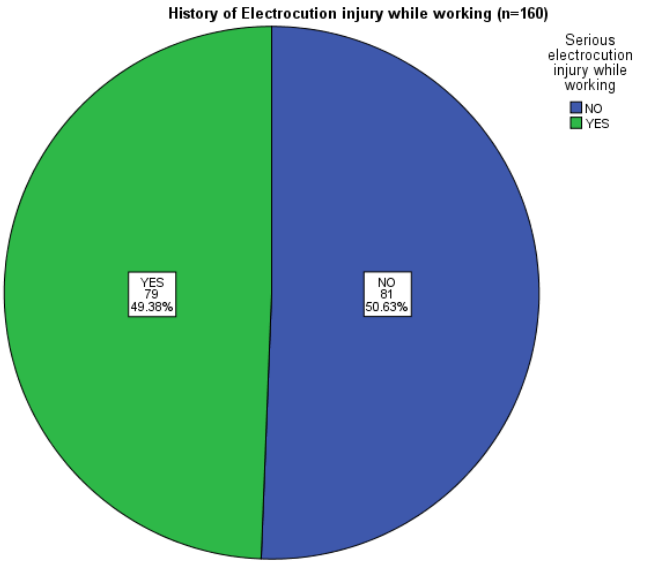
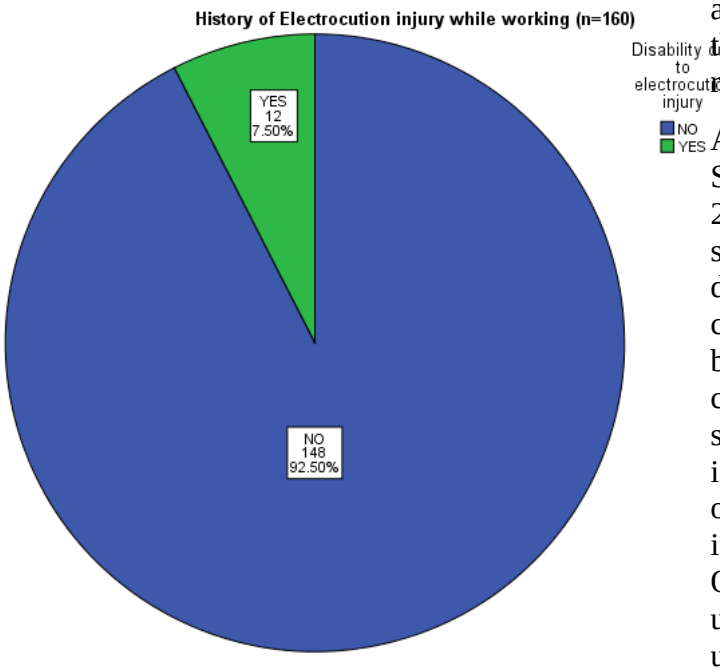


Fig. 4. History of disability development among linemen with electrocution injuries



Discussion

The study shows that out of total 278 employees of LESCO (linemen) who are interviewed , the number of linemen who claimed to have any electrocution injury is 160 (57.6%). Out of these 160 employees , 79 (28.4%) claimed that they faced serious electrocution injury. The serious electrocution injuries are those injuries in which more than 10 milliamperes electric current passed through the body. Similarly , out of 160 , only 12 (4.3%) linemen claimed to develop disability owing to electrocution injury while rest of the 148 linemen recovered completely with no post electrocution sequelae.Interestingly enough , all 278 linemen who were interviewed told about opting all SOPs and wearing PPEs before starting field work including work at distribution poles, and transmission lines. They also told about earthing the wires before working at any area as well as take proper consent from higher authorities before doing work at any electrical pole.Such consent taking ways enable linemen to have least chances of facing any electrocution injury as all preemptive measures are taken.Furthermore , linemen while doing field work follow all rules and regulations pertaining to field work and even higher authorities of LESCO put penalities on those linemen who do not show compliance to these rules.

Anyhow, when the study was compared with Mashreky SR ET AL which was conducted in Bangladesh in 2010, it came to knowledge that both studies have similar findings. Additionally , during childhood , domestic source of electricity is the most common cause of electrocution and such cases are common in both countries.Rural children are at higher risk as compare to urban. (1) However , when the findings of study is compared with Nizhu and Hasan MJ ET AL , it is clearly proven that in USA , few electrocution events occurred. It may be due to better electricity infrastructure and transmission line system with less no. Of electrical poles and more transmission through underground electricity system. Moreover , they are using good qualities of PPEs and ensuring SOPs strictly.

Conclusion:

The conclusion of this study shows that out of total 278 employees of LESCO (linemen) who are interviewed , the number of linemen who claimed to have any electrocution injury is 160 (57.6%). Out of these 160 , 79 (28.4%) claimed that they faced serious electrocution injury. Similarly , out of 160 , only 12 (4.3%) linemen claimed to develop disability owing to electrocution injury while rest of the 148 linemen recovered completely with no post electrocution sequelae.Interestingly enough , all 278 linemen who were interviewed told about opting all SOPs and wearing PPEs before starting field work including work at distribution poles, and transmission lines. They also told about earthing the wires before working at any area as well as taking proper consent from higher authorities before doing work at any electrical pole.Such consent taking ways enable linemen to have least chances of facing any electrocution injury as all preemptive measures are taken.Furthermore , linemen while doing field work follow all rules and regulations pertaining to field work and even higher authorities of LESCO put

penalities on those linemen who do not show compliance to these rules.

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