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**Research Article**

# Correlates of Industrial Accident in cases admitted in a Tertiary Care Hospital in Kanpur

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**Abstract:** ***Context:*** Globalization has brought India into the forefront of progress. India is the second fastest growing economy in the world and is fourteenth in the world in factory output. Injuries are responsible for approximately 9 percent of all causes of deaths and about 16 percent of the disabilities are reported due to injuries. Industrial accidents and injuries constitute a significant public health issue because of the human, social and economic losses associated with them. ***Objectives:*** To study the various correlates of industrial accident in cases admitted and the characteristics of injuries sustained. ***Material & Methods:*** The present study was a hospital based, cross-sectional study conducted among industrial accident cases admitted in Lala Lajpat Rai Hospital in Kanpur. Study period was from May, 2015 to December, 2016. Data was recorded in a pre-designed, pre-tested questionnaire. WHO's Injury Reporting Form (2010) was used to record type of injury sustained. Data was analyzed using percentages and proportions. **Results:** Out of 90 cases of industrial accident enrolled in the study, majority (73.3%) were in the 20-40 years age group. Most of the cases were males (62.2%). Most of the cases were due to fall (58.8%). Fracture (54.4%) was the commonest injury sustained. ***Conclusion:*** Young adults in the economically most productive age group are the commonest victims. Periodic surveillance of industries should be conducted by concerned authorities to ensure strict enforcement and compliance of workplace standards.

**Keywords:** Injury, industrial accident, industrial worker, safety equipment.



## INTRODUCTION

World Health Organization (WHO) has defined accident as an "unpremeditated event resulting in recognizable damage (Hogarth, J. 1978)." Injuries are a global public health problem and account for 5 million deaths each year globally which is 9 percent of all deaths (World Health Organization. 2014a). Industrial jobs have become more and more complex following the ever increasing mechanization, electrification and chemicalization leading to increased risk of accidents and injuries. This underlines the need for and importance of industrial safety.

An industrial accident is a sudden and unexpected occurrence in the industry which interrupts the orderly progress of the work. According to the Factories Act (1948) of India, it is an accident in an industrial establishment causing death or bodily injury to a person which makes him unfit to resume his duties in the next forty-eight hours or more (Factories Act. 1948). Industrial accidents and injuries constitute a significant public health issue because of the human, social and economic losses associated with them. There might be major or minor accidents depending on severity and degree of injury. Individual as well as work-related factors play an important role in the occurrence of accidents. Work-related factors include a variety of physical and psychosocial factors. Unsafe working conditions, high physical as well as mental workload have been found to be associated with work-related accidents in several studies (Swaen, G. M. H. *et al.*, 2004; & Julià, M. *et al.*, 2013; & Lu, M. L. *et al.*, 2014). Unsafe working conditions that are the biggest cause of accidents are associated with improper guarded equipment, defective tools and machines, faulty layout and location of plant, inadequate lighting and ventilation, inadequate safety devices, etc.

Globalization has brought India into the forefront of progress. India is the second fastest growing economy in the world and is fourteenth in the world in factory output. The industrial sector is one of the main sectors that contribute to India's GDP. There has been a surge in the country's industrial production growth. Along with this growth, there has been a rise in the incidence of injuries following industrial accidents. Kanpur in Uttar Pradesh is one of the greatest industrial

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giants of Northern India, where life runs in its full spectrum of riches and rags. It is the main centre of commercial, trading, educational and industrial activities in Uttar Pradesh. Previously known as the "Manchester of East", Kanpur is famous for its leather industries. There are a plethora of large and small scale cotton textile, paper and paper product, agriculture based, chemical based and metal based industries. However, non-compliance to occupational and industrial safety norms is rampant in this industrial and commercial metropolis. Studies on industrial accidents in Kanpur are extremely rare. A study on injured patients admitted in Medical College Hospital of Kanpur following any accident was done by Gupta AK *et al.*,, way back in 1991-92 (Gupta, A.K. *et al.,* 1994).

There is an immense need of strengthening and undertaking research on the public health burden and impact of industrial accidents, understanding the risk factors and characteristics of trauma and measuring the impact of interventions in this major industrial town of the country.

**Objectives**

- To study the various correlates of industrial accident in cases admitted.
- To study the characteristics of injuries sustained.

## MATERIAL & METHODS

This was a hospital based, cross-sectional study conducted among industrial accident cases admitted in Lala Lajpat Rai Hospital which is an associated hospital of G.S.V.M Medical College, Kanpur. Study period was from May, 2015 to December, 2016. Institutional Ethical Committee clearance was obtained. A written informed consent was obtained from the cases. Data was recorded in a pre-designed, pre-tested questionnaire and was analyzed using percentages and proportions. SPSS version 18 was used for data analysis.

General physical examination of the cases was done. WHO's Injury Reporting Form (2010) was used to record type of injury sustained (World Health Organization. 2010).

Inclusion criteria- All industrial accident cases admitted during the study period, except those who did not give consent for the study.

## RESULTS

Out of 90 cases of industrial accident enrolled in the study, most (62.2%) were males **[Table 1]**.

**Table 1-** Distribution of cases according to gender (N= 90)

| Gender | Mode of Accident | | | Total n (%) |
|---|---|---|---|---|
| | Fall n (%) | Burn n (%) | Others n (%) | |
| **Male** | 35 (62.5) | 11 (19.6) | 10 (17.9) | 56 (62.2) |
| **Female** | 18 (52.9) | 7 (20.6) | 9 (26.5) | 34 (37.8) |
| **Total** | 53 (58.9) | 18 (20.0) | 19 (21.1) | 90 (100) |

Majority (73.4%) of the cases were in the 20-40 years age group **[Table 2]**. Most of the cases were due to fall (58.9%) followed by other modes of accident (21.1%).

**Table 2-** Mode of accident according to age (N=90)

| Age group (in years) | Mode of Accident | | | Total n (%) |
|---|---|---|---|---|
| | Fall n (%) | Burn n (%) | Others n (%) | |
| **20-30** | 21 (61.7) | 9 (26.5) | 4 (11.8) | 34 (37.8) |
| **>30-40** | 20 (62.5) | 4 (12.5) | 8 (25.0) | 32 (35.6) |
| **>40-50** | 9 (52.9) | 3 (17.7) | 5 (29.4) | 17 (18.8) |
| **>50-60** | 3 (42.9) | 2 (28.6) | 2 (28.5) | 7 (7.8) |
| **Total** | 53 (58.9) | 18 (20) | 19 (21.1) | 90 (100) |

Fracture (36.8%) was the commonest injury sustained followed by superficial injury like scratches, abrasions etc. (20.4%) **[Table 3]**.

**Table 3-** Distribution of cases according to type of injury sustained (N=90)

| Type of Injury* | Mode of Accident | | | Total n (%) |
|---|---|---|---|---|
| | Fall n (%) | Burn n (%) | Others n (%) | |
| **Superficial injury** | 6 (19.3) | 18 (58.1) | 7 (22.6) | 31 (20.4) |
| **Open wound** | 8 (42.1) | - | 11 (57.9) | 19 (12.5) |
| **Fracture** | 47 (83.9) | - | 9 (16.1) | 56 (36.8) |
| **Joint dislocation** | - | - | 3 (100) | 3 (2.0) |
| **Nerve injury** | 2 (33.3) | - | 4 (66.7) | 6 (4.0) |
| **Muscle injury** | 17 (65.4) | - | 9 (34.6) | 26 (17.1) |
| **Organ injury** | 1 (25.0) | - | 3 (75.0) | 4 (2.6) |
| **Amputation** | - | - | - | - |
| **Others**** | - | - | 7 (100) | 7 (4.6) |
| **Total***** | 81 (53.2) | 18 (11.8) | 53 (35.0) | 152 (100) |

*As per WHO's Injury Reporting Form (2010)
**Others include cases presenting with eye injury, respiratory distress etc.
***Multiple type of injuries were recorded

Majority (81%) of the victims had no institutional training **[Figure 1]**.

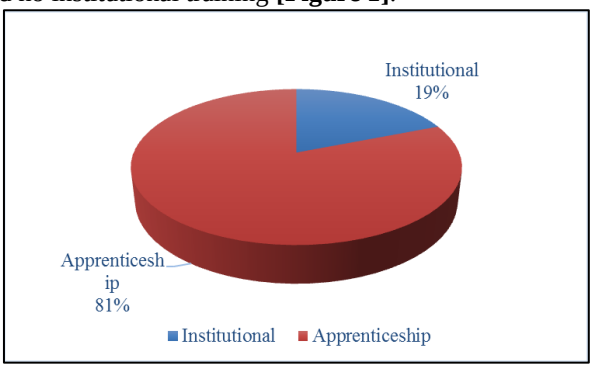


**Figure 1** Training received

Most (68%) of them were working for less than 5 years **[Figure 2]**.

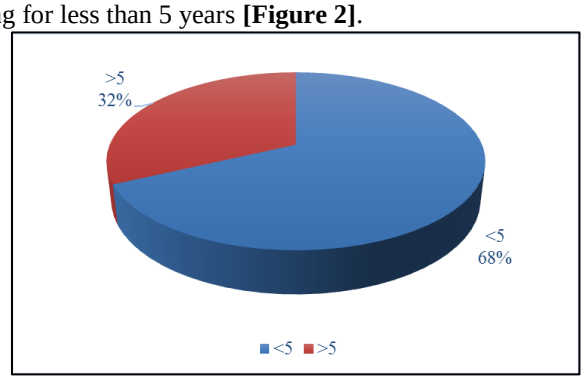


**Figure 2** Work experience (in years)

Maximum cases (53%) were working for more than 8 hours in a day **[Figure 3]**.

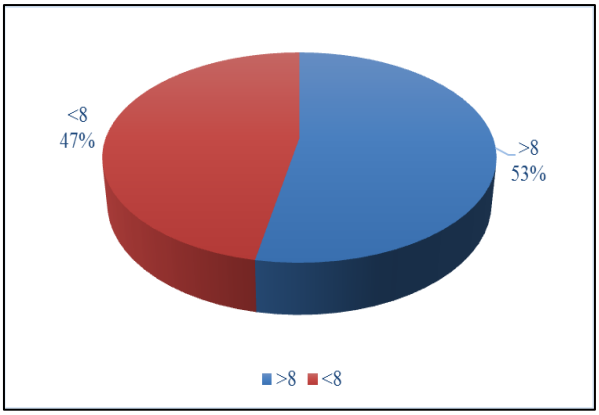


**Figure 3** Duration of work (in hours)

Safety equipment was not used by majority (77%) of the accident cases **[Figure 4]**.

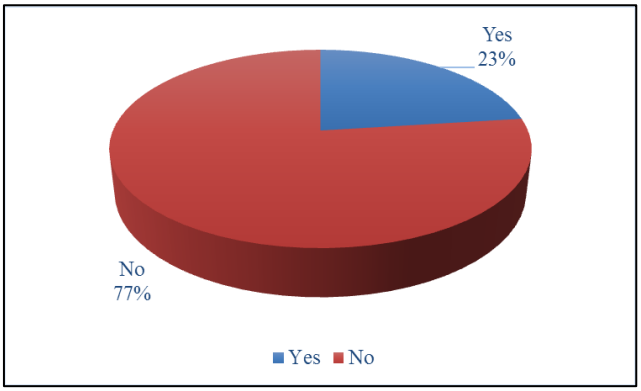


**Figure 4** Use of safety equipment at work

## DISCUSSION

In the present study, most of the victims of industrial accident were males which is similar to the finding of Berecki-Gisolf J *et al.,* (2015) In a study conducted in a major trauma centre in northern India, Rastogi D *et al.,* also observed that males were more injured than females (Rastogi, D. *et al.,* 2014).

In our study, majority of the cases were young adults in the economically productive age group which is similar to the findings of Bena A *et al.,* (2013). Fall was the most common mode of accident in our study. In a study done in a metal smelting industry by Saha A *et al.,* also, fall was found to be the commonest mode of accident and younger age was found to be significantly associated with accidents (Saha, A. *et al.,* 2007).

In our study, fracture was the most common injury sustained. This is in line with the finding of Minj C *et al.,* in southern India whereby fractures and dislocations were most common among workers who had suffered compensable injuries (Minj, C., & Joseph, B. 2012).

In the present study, majority of the cases did not receive any kind of institutional training for their concerned work. Lack of proper training was also observed by Saha A *et al.,* as human errors like stepping/striking against objects and wrong body movement/posture led to most of the superficial injuries sustained at workplace (Saha, A. *et al.,* 2007).

In our study, most of the industrial accident cases were inexperienced with less than 5 years of work experience. This is similar to the finding of Bena A *et al.,* where previous work experience was found to have a protective role against accidents among workers (Bena, A. *et al.,* 2013). Significant association of accidents with work experience was also observed by Saha A *et al.,* in India (Saha, A. *et al.,* 2007).

In the present study, maximum industrial accident cases were working for more than 8 hours daily which is overworking as per the Factories Act, 1948. Overworking leads to fatigue which was found to have a strong relation with occupational accident among workers as observed by Swaen GM *et al.,* (2004).

Majority of the cases in our study reported that they were not using any kind of safety equipment while working. This is similar to the findings of Ganesh Kumar S *et al.,* and Haldiya KR *et al.,* whereby low use of safety equipment was observed among industrial workers (Kumar, S. G. *et al.,* 2013; & Haldiya, K. R. *et al.,* 2005).

## CONCLUSION

As per the International Labour Organization (ILO), workplace practices such as regular training and learning, efficient management of labour as well as taking care of workers' rights helps in improving industrial productivity (International Labour Organization. 2014). Young adults in the economically most productive age group are the commonest victims of accidents at workplace. Promotion of responsible workplace practices through quality training and awareness generation regarding use of safety equipment amongst workers can prevent majority of industrial accidents. Periodic surveillance of industries should be conducted by concerned authorities to ensure strict enforcement and compliance of workplace standards. In-service trainings of workers should be conducted at regular intervals. Periodic health check-ups of workers will also help in reducing the burden of occupational health hazards.

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