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FATALITIES OF FALL INJURIES IN KARACHI- A FIVE YEAR AUTOPSY BASED STUDY

1. FARHAT HUSSAIN MIRZA
2. HAMID ALI PARHYAR
3. SYED ZUBAIR TIRMIZI
4. ABDUL WAHEED

1. *Associate Professor & Head*
Department of Forensic Medicine
Dow University Of Health Sciences
Dow Medical College & Civil Hospital Karachi
2. *Assistant Professor & Head*
Department of Forensic Medicine
Shaheed Muhtrama Benazir Bhutto Medical College, Lyari, Karachi
3. *Assistant Professor & Head*
Department of Forensic Medicine
Bahria University Medical & Dental College, Karachi
4. *Lecturer*
Department of Forensic Medicine
Bahria University Medical & Dental College, Karachi.

Corresponding author
CAPT. DR. FARHAT HUSSAIN MIRZA
Associate Professor & Head
Department of Forensic Medicine
Dow University of Health Sciences
Dow Medical College & Civil Hospital Karachi
captdrmirza@hotmail.com

ABSTRACT

Objective: To determine the frequency, cause and manner of death, factors responsible, & to draw the attention towards the implementation of safety measures & building laws, for minimizing the incidences of fall from height. The autopsies were carried out in the three major hospitals i: e civil hospital, Jinnah post graduate medical center & Abbasi shaheed hospitals of Karachi.

Study Design: Autopsy – based descriptive cross-sectional study.

Place: Mortuaries at Civil hospital, Jinnah Postgraduate Medical Center and Abbasi-Shaheed Hospital of Karachi.

Duration of study: The duration of study is based on five years, from January 1, 2007 to December 31, 2011.

Materials & Methods: Data of 144 autopsies, due to fall was collected during the autopsies carried out in, three major Medico legal centers, i.e. Jinnah Postgraduate Medical Center, Civil Hospital and Abbasi Shaheed Hospital,during the study period .The findings with reference to age, gender, cause and manner of death, year wise distribution of cases and body parts sustaining injuries were recorded in the proforma. The police inquest, the crime scene reports were also examined to verify/confirm the facts of the cases.

Results: Incidence rate of deaths due to fall was 1.29% .Male predominance, with 93.75% in comparison to 6.25% of females. Highest number of fall related deaths occurred in 2007 and more or less similar trend was observed during 2008, 2009 and 2011 with a decline. Two third of the studied cases belong to age group from 15-45 years. The accidental falls were the most common manner of death and head/skull was the leading part of the body, sustaining injuries either alone or combined with other parts of the body.

Conclusion: Fatalities due to falls were substantially accidental, while working on heights, without safety & preventive measures in Karachi, predominantly involving males and young of 15-45 years of age group. The Head was the leading part of the body involved in majority of cases, indicating the necessity of the implementation of the building laws protecting, the rights of poor labor, working on heights & minimizing the fatal injuries.

Key words: Autopsy, fall from height, Fatalities, Manner of death, Accident.

INTRODUCTION:

Falls considered as persistent hazard met in all communities and occupational settings. World wide it is major public health concern and still a significant cause of morbidity and mortality.

There is always a risk of falling when a person is working on height, above the ground. It is a common accident both at home and work place.

Fall has been defined variously in relation to the setting of incidence. Generally it refers to an event in which a person inadvertently comes to the ground, floor or other lowest

level[1].

In occupational settings these incidences are referred to as slips, trips and falls. The events, cause the subjects to fall to ground against their will [1], all the way down to floor or ground, or other lower level and hitting on a hard object, an event which results in sustaining a violent blow, loss of consciousness, paralysis and often death. The World Health Organization has reported that 4,24,000 fatal falls occurring each year, making it the second leading cause of accidental or unintentional injury /death, after motor vehicle accidents[2].

It is difficult to decide whether the death resulted due to fall is from an accident, suicide or homicide, particularly in the absence of an eye witness, suicidal notes or other indications suggesting suicide or homicide. History of mental disorders with previous attempts of suicide is the likely explanation of suicide but not a conclusive proof [3].

The Deaths due to fall often becomes most controversial episode. The occupational injury incident investigation report from police &Environment Authority must focus on ascertaining, who or what was at fault. A user friendly, comprehensive and systemic approach is needed for investigating fatal and non fatal incident.

Industrial accidents and falls from height related to suicide are encountered more often in adults as compared to children[3]. In occupational settings fall from the height is the most common type of accident[4].

Factors related to falls are present both in human being and the equipment he uses. Many factors have been implicated as a cause of fall, resulting into injuries and fatal outcome. The factors, some of which pointed out in different reports or studies are discussed below:-

THE RISK FACTORS OF FALLS;-

It has been pointed out that there are many risk factors, which play their role, one or other way, in the incidences of fall, some are:-

· Non supply of preventive and safety measures, a. Crush helmet for protection of skull, b. Life line supports / strong rope or string with hook to prevent fall from heights.

· Non supportive shoes/foot wears, to prevent slipping [5].

· Old age, fall rates increased with age [6].

· Vision defects cause vertigo.

Gait problems, (e.g., weakness and impaired sensation)[7]

Anemia. Mild anemia increases the risk of falls in older adults8.

· Narcotics consumption (False perception to increase the stamina/ strength) increases the risk of fall.

· Mal nutrition (saving more n more and eating less)

· Recent illness/fracture/trauma (interfere with gait/walking)

· Chronic illness, like T.B, due to environmental hazards.

· History of vertigo. (Due to Ears problems)

· Syncope. The fall incidences be can increased if he/she is having syncope attacks[9].

· Over timing/tiredness (try to earn more n more by over timing.)

Neglecting the Building codes which ensure that balconies, decks, porches, bleachers, roofs, must have railings with vertical openings not greater than 4 inches.

No study has been carried out on risk factors for labors (because only poor labor is affected) by Government or any concerned department, nor by any N.G.Os (which are getting funds for benefits and well beings of labor.)

Close and colleagues found that fall rate were reduced 61% and recurrent fall by 67% for

patients who had comprehensive risk assessment after fall. (Not yet implemented in Pakistan)

The potentials for the prevention of fall and related injuries in the community would be increased with the accurate, identification of persons at risk of fall while they are in Emergency Department of a hospital.

It has been estimated that each year more than one third of older adults suffer fall accidents10, & 10-20% of falls involve head and vertebral column leading to brain and spinal cord injuries along with upper and lower extremities causing bones fractures11. In children falls frequently occur at schoolyards, playgrounds, at home due to fall from balconies, windows and trees[12].

Karachi is emerging as an economical hub of Pakistan, where demand for construction of housing, factories and offices is increasing day by day. The increasing population in the city has also placed the burden over the construction industries, to provide the low cost accommodations. The problem is now tackled by constructing the multistoried buildings which has increased the risk of fall of the labor and later on occupants as a result of avoidance of safety measures and building construction codes.

The fatal outcome requires investigation on a scientific basis to satisfy the state, the relatives of the deceased and the public at large and to rule out any foul play of the death under question.

There is no specific study on fall related injuries and deaths among the young and old population of Pakistan. This has created a gap about the epidemiology of fall injuries and deaths. Moreover it is a neglected public health problem in Pakistan. The present study was carried out to determine the magnitude of fall injuries and subsequent deaths in metropolis of Karachi, as well as to find out the associated factors of death due to fall.

MATERIAL AND METHODS:

This autopsy based descriptive cross-sectional study was conducted on 144 cases of deaths due to fall, during the period of five years from 1st January 2007 to 31st December 2011 brought to all the three major centers i.e. Jinnah Postgraduate Medical Center, Civil Hospital and Abbasi Shaheed Hospital of Karachi.

The statistical data was collected from the record of 11109 autopsies conducted in all the three major medicolegal sections located in these hospitals, which were reported and brought by the police. This study includes variables investigated like age, sex, cause of death, manner of death, year wise distribution of cases and body parts sustaining injuries.

A purposeful Proforma was designed for this particular study and all findings except manner of death were recorded from autopsy reports. The manner of death was concluded from the police officer`s report, who investigated, the deaths according to the legal, provision under section 174 of Criminal Procedure Code as well as the Police Rules & Police Act 1981. In those cases, where poisoning was suspected, viscera were sent to chemical examiner for toxicological analysis either to rule out intoxication as a cause of death or a precipitating factor.

INCLUSION CRITERIA:

The study included all medicolegal deaths due to fall of either gender

& age groups.

EXCLUSION CRITERIA:
The Medico legal deaths due to reasons of fall where the autopsies could not be performed due to heavy pressure of relatives or accompanying persons were excluded from the study. Beside, the cases taken to hospitals other than the above mentioned three major centers (having the autopsy facilities) were also excluded.

DATA ANALYSIS:
Data was entered in a Microsoft Excel spreadsheet and analyzed using SPSS version 16.The frequency and percentages were calculated for all categorical variables.

RESULTS:

Scanning the record of 11,109 autopsies, conducted during the period of five years extending from 1st January 2007 to 31st December 2011, revealed 144 cases reported to have died due to fall from height. It makes the incidence rate 1.29% of the total postmortems conducted in mortuaries of three major hospitals.

Most of the fatalities as a result of fall from height occurred in the year 2007 and least in the year 2010. More or less similar incidences took place in the years 2008, 2009 and 2011. (Table-I)

Out of the total n=144 cases of deaths due to fall, n=135 (93.75%) were males and n: 09 (6.25%) were females with a male to female ratio of 15:1. It suggests increased vulnerability of male victims. Two third of the total cases (70.84%) with equal distribution were reported to Abbasi Shaheed hospital and Jinnah Postgraduate Medical Center. This indicates more labor work with scaffolds, ladders, steel erection and climbing associated with construction of bridges and buildings in south and central district of Karachi (Table-II)

More than two third of the studied population belonged to the age groups 2nd: &3rd: (15-45 years). Age group 1 and 5 were least affected. It suggests more vulnerability of young age group having occupational setting of work at reasonable height (Table-III)

Accidental fall from height was the most common manner of death (99.30%) as reported by police investigation as well as confirmed by the autopsy findings. This was followed by suicide (0.70%), while no case was reported as homicidal. It indicates that fall related deaths are mostly accidental at workplaces (Table-IV).

TABLE-I:
FREQUENCY OF CASES OF DEATHS DUE TO FALL DURING THE PERIOD FROM 2007-2011 AT KARACHI

HOSPITAL YEAR	2007	2008	2009	2010	2011	TOTAL	% AGE
Civil Hospital Karachi	14	06	07	09	06	42	29.16%
Abbasi Shaheed Hospital	12	10	16	06	07	51	35.42%
Jinnah Postgraduate Medical Center	14	11	08	03	15	51	35.42%
Total	40	27	31	18	28	144	100%

TABLE-II:
GENDER DISTRIBUTION AMONG DEATHS DUE TO FALL DURING THE PERIOD FROM 2007-2011 AT KARACHI

HOSPITAL	MALE	FEMALE	TOTAL	PERCENTAGE
Civil Hospital Karachi	40	02	42	29.16%
Abbasi Shaheed Hospital	48	03	51	35.42%
Jinnah Postgraduate Medical Center	47	04	51	35.42%
TOTAL	135	09	144	100.00%
PERCENTAGE	93.75%	6.25%		

TABLE-III
AGE DISTRIBUTION AMONG" DEATHS DUE TO FALL" DURING THE PERIOD FROM 2007-2011 AT KARACHI

AGE	CASES	PERCENTAGE
<15 Years (Group-1)	07	4.86%
= 15 To < 30 Years (Group-2)	65	45.14%
= 30 To < 45 Years (Group-3)	46	31.94%
= 45 To <60 Years (Group-4)	19	13.20%
= 60 Years (Group-5)	07	4.86%
	144	100.00%

TABLE –IV
MANNER OF DEATH AMONG" FALL RELATED DEATHS"

MANNER OF DEATH	NO. OF CASES	PERCENTAGE
Accidental Fall from building	137	95.13%
Accidental Fall from balcony	05	3.47%
Accidental Fall from boom of crane	01	0.70%
Suicidal Fall	01	0.70%
Homicidal Fall	0	0
TOTAL	**144**	**100.00%**

TABLE –V
BODY PARTS INVOLVED

BODY PART (S) INJURED	NO. OF CASES	PERCENTAGE
HEAD	70	48.61%
HEAD AND NECK	18	12.50%
HEAD AND LIMBS	24	16.67%
HEAD AND PELVIS	01	0.69%
HEAD, CHEST AND ABDOMEN	29	20.14%
ANY OTHER	02	1.39%
TOTAL	**144**	**100.00%**

Most common part of the body receiving injury was the head, either alone or in combination with the other parts. 48.61% of the total cases received injuries over the head alone & when the body regions were considered separately and marking it as the most vulnerable region of the body in cases of fall.

This was followed by injuries over the head together with chest and abdomen (20.14%). Limbs (16.67%), neck (12.50%) and pelvis (0.69%) two cases (1.39%) showed injuries over the multiple areas of the body (Table-V).

DISCUSSION

Death as a consequence of fall from height is one of the unnatural types of deaths, mostly encountered on workplace.

The unnatural deaths include fatalities from criminal intent, omission or negligence of a person. Beside it also includes cases of death resulting from the unexpected misadventures or accidents.

The society often expresses resentment, demand investigation & prevention of such incidences in future.

The fatalities resulting due to fall from height are preventable and therefore this study is carried out to assess the cause along with manner of such fatalities and evaluate the associated factors.

The construction business accounts for the greatest number of labor employment in Karachi and thus accounts for majority of cases of fall from height. The peoples from remote, backward and undeveloped areas of country rush to Karachi for earning the bread/butter for there families. They are always ready to work at cheaper rates without considering the availability of safety /preventive measures.

During the study period, the major incidences of deaths due to fall were reported in the year 2007 and since than there was a decrease in the incidences with similar trend observed throughout the rest of four years. It indicates some implementation of safety measures and enforcement of building construction codes.

Gender distribution of victim in our study has reported male predominance, involving 93.75% males and 6.25% females.

Generally both the genders are at risk of fall but the figure is reflecting our cultural and working setup in which males are mostly busy in outdoor work and those working at height and thereby likely to die from falls. Females are mostly involved in house work or indoor works, suffer nonfatal fall injuries. Few women may take unnecessary physical risks compared to men.

Young age group ranging from 15 to 45 years was shown to be mostly affected in our study, involving two third of the total victims of death due to fall. In this period of life the person is active and shows risk taking behavior. Present study has reported 99.30% deaths due to accident and only one case of suicide.

It is fact that the majority (88%) of person, who died due to fall, were below 40. Besides, the suicide was only one, found in 20-39 age group (could be due to painful manner of death due to fall in comparison to availability of other painless manners of suicide).

The incidence rate of fall related deaths in our study is 1.29% which is considerable as compared to a study conducted in other parts of Pakistan. A three years study from

Hyderabad Sindh, Pakistan has not reported a single case of death due to fall among the accidental causes of death[13].

One year study from India has reported 7.5% of cases of death due to fall which is much higher than our study14. This might be due to the working circumstances, difference in the enforcing safety measure and reporting of death to the hospital.

This study reported 6 (66.7%) out of 7 cases of fall related deaths belong to the age group 21-30 years and among them 5 were males and 1 female14. One year study from India has reported 9 cases of deaths due to fall out of which 7 (77.8%) were accidental and 02 (22.2%) suicidal[14]

A consecutive five years decline in fatal construction injuries extracted from the result of Census of Fatal Occupational injury (CFOI) program has been reported by US bureau of Labor Statistics[15].

One of the reports has shown that male and children are more susceptible to falls from height[16].

In a report from New Zealand, falls have been shown to be the common cause of hospitalization in children and adults over 65, increasing with the advancing age[17]. The difference in distribution of fall related injuries and deaths among the various age groups could be due to the proportion of population of any country working at height related jobs..

Three years study from Manhattan, New York has reported 120 fatalities, comprising 4.2% of the total 2860 autopsies in which there were 77 suicides, 36 accidents, 02 homicides and 5 undetermined deaths due to blunt injury resulting from a descent from height[18]. It is generally described that most of the suicides occur at descendant's residence while accidents occur at workplace. Construction sites descents are also work related accidents.

Study from USA has demonstrated falls (25%), electrocutions (15%), and motor vehicle related accidents (14%) as the leading causes of death for constructions workers with 99% involvement of men19, [20].

Head is found to be the most common part of the body, received injuries in our study and nearly all victims of fall showed involvement of head, either alone or in combination with other parts of the body. It has been reported that falls from low or high levels have been brought to trauma centers due to serious head injuries[21, 22].

Reporting accidental deaths in our culture is one of the ways to avoid confrontation with the police and legal outcome which may defame the victim's family. Moreover the family wants to dispose the body immediately. Claiming for compensation is another important aspect in such cases.

Another aspect of more accidental deaths could be the police behavior hiding the actual reason of the incidence and thereby misleading the higher authorities about the actual criminal record of one's territory i.e. to show a clean slate of their area to high ups.

CONCLUSION:

(TOO long, should be only one paragraph with fewer concluding lines)

Fatalities due to falls are substantial accidents in Karachi because construction work, in this city of Pakistan is under progress on large scale. Few studies are being conducted on unnatural deaths in Pakistan and no one has highlighted the deaths resulting from fall from height. This is the first study of its kind in which the falls related deaths have been investigated. Falls are common in males and in age group ranging from 15-4 years. Head was the leading region of the body involved in majority of cases, necessitating the implementation of prevention measure particularly to protect head from injuries.

The most important factor behind the morbidity and mortality of fall is the hunger of earning more n more because, of low expenditures of employer over the safety measures for poor, cheap labor, avoiding the implementation of labor laws, building codes, negligence's of police &other civic authorities.

Strict measures are required, for implementation of labor laws, scrutiny of labors in view of risk factors must be carried out before employment / engagement for working on height.

The safe environment with immediate first aid emergency& medical management at working place, better quality food and regular check up by healthcare provider is necessary, in order to decrease & prevent the death of fall victims.

The supervising staff should be educated to address the basic issues of fall & subsequent management of victims.

Close and colleagues found that fall rate were reduced 61% and recurrent fall by 67% for

Patient, who had comprehensive risk assessment after fall. (Not yet implemented in Pakistan)

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