Study of Pattern of Injuries in Cases due to Accidental Fall from Height: A Prospective Cross Sectional Study in aTertiaryCare Hospital, Telangana, India

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Abstract

Background:A fall from a height is the second most common accidental death globally and a significant source of injuries to the individual, especially for the elderly. One significant category of injuries that can be avoided in older individuals is falls.**Objectives:** Tostudydifferentpatternofinjuriesonthebodieswhodiedincasesofdifferentfallfrom height.Tostudyrelationoffatalinjurieson thebodyandtheheightof fall.Tostudythedistributionofotherinjuriesassociatedwithfallsfromheight withrespect tomortality.**Methodology :**All cases of falls from height presented to the OGH mortuary in Hyderabad for autopsy will be chosen using a purposive sample strategy if they meet the inclusion and exclusion criteria. Each case will be examined in light of 1) Post-mortem results, paying particular attention to the reason of death, the length of time since the death, and the method of death. 2) Information gathered by the police and relatives 3) Hospital data in instances that were admitted 4)Laboratory investigations, such as toxicological (chemical) analyses and histology. 5) Inspect the crime scene or examine photos of the scene to determine the height of the fall and whether an obstruction was in the victim's direction of flight.**Results :** Compared to those at the extremes of age, middle-aged folks were more

susceptible to fatal falls. More men than women have perished from height-related accidents. While middle-aged people tend to fall more frequently during the day, people of extreme ages do so more frequently at night. The most frequent type of mortality from falling from a height is head injuries.**Conclusion:** Injury patterns may contribute to primary injury prevention, effective management of survivors in the acute phase, and the ability to forecast injuries from falls.

Keywords : Fall from Height, Accidental Fall, Pattern of Injuries, Head Injury

INTRODUCTION

The second-leading cause of accidental mortality globally and a significant contributor to personal injuries, particularly for the elderly, is falling from a height. One significant category of injuries that can be avoided in older individuals is falls. Fall injuries are common in the construction, mining, painting, and electrical industries[1]. When a person experiences dizzy after reaching unfamiliar heights, it can happen in either a rural or urban setting. The most frequent cause of death in rural areas is falling from trees, however in urban areas, it is usually a high-rise building like a complex, construction site, electric pole, flyover, and many more. Unless the death is proven, the majority of people who fall from a height seek medical assistance[2]. The fatality relies on the height of the fall and the principal effect on the body.. The government's implementation of 108 services, early access to the health care system provided by ambulance services, and improved treatment techniques all significantly lowered the death rates in cases of falls from height[3].

Surprisingly, there is relatively little published scientific information on the distribution of injuries from falls from height. After recovering from brain injuries, spine injuries, and limb fractures, the majority of them struggle with the social, psychological, and mental problems associated with falls from height[4]. In our Telangana region, the causes and prevention of injuries from falls from height have not yet been thoroughly investigated. My current research tries to shed some light on them. According to a preliminary analysis of the data,

brain injuries are frequently sustained by those who fall from high heights, but they can be prevented by using the appropriate safety precautions while climbing and performing tasks at large heights. When someone falls from a height, their chances of survival rise if they are treated right away. This clarifies the ongoing improvisation in emergency management and trauma care[5].

In order to evaluate the manner and mode of death, it is required to undertake research on the injury patterns in fatal falls from height. Data on fatal falls from height between August 2016 and July 2017 are analysed by the Department of Forensic Medicine and Toxicology at Osmania Medical College in Hyderabad. The economic and health effects of morbidity have not yet been thoroughly researched. The goal of the current study is to create a checklist of safety precautions to prevent falls from extreme heights.

METHODOLOGY: This study titled "Study of Pattern of Injuries in Cases due to Accidental Fall from Height: A Prospective Cross Sectional Study in aTertiaryCare Hospital, Telangana, India"was carried out during the period fromAugust 2016to July2017.The study was conducted on 89dead bodiesfulfillingthe criteria. The study was conducted at Osmania General Hospital with an aim to Study of Pattern of Injuries in Cases due to Accidental Fall from Height

Inclusion criteria:

Autopsyonallcasesofdeathsinfallfromheightconductedat Mortuary,

OsmaniaGeneral Hospital.

Autopsyonallcasesofdeathsinelectrocutionassociatedwithfallfrom height conductedatMortuary, OsmaniaGeneral Hospital.

Autopsyonallcasesofdeathsindrowningassociatedwithfallfromheight conductedatMortuary, OsmaniaGeneral Hospital

Exclusion criteria:

Autopsyonindividualwhofallfromamovingtrain.

Individualwhoarehospitalizedandgottreatedin Osmaniageneral hpspitalfor the injuries infallfromheight

Ethics: This study was approved by the Institutional Ethics Committee,Osmania Medical College,Telangana,India.

Study Procedure: All cases of fall from height brought to OGH mortuary, Hyderabadfor autopsy and those which fulfill the inclusion and exclusion criteria willbe selected on a purposive sampling basis. The details pertaining to theage,socio-economicstatus,maritalstatus,educationalqualification,occupational status and health status will be ascertained from the reliableattendants of the deceased. Details regarding the manner of death will beobtainedfrominvestigatingpoliceofficer,inquest report.

Allcaseswillbestudiedwithreferenceto:-

1.Post-mortem findings with special reference to cause of death, time sincedeathandmanner of death.

2.Historyobtainedbypoliceandrelatives

3.Hospitalrecordsinadmittedcases

4.Laboratory investigations including histopathology and toxicological(chemical)analysis.

5.Visit to the scene of crime or study of photographs of scene of crime forheight of fall, whether obstruction presents in the path of trajectory of theindividual.

Results : A total of 4185 cases were autopsied at medico legal centre in the timeperiod ofAugust 2016to July 2017 ofwhich89 cases meet therequiredcriteria.Of the total cases of 89, 81 cases are of identified dead bodies and 8casesareof unidentified deadbodies.Mostfatalities(70.8%)occurredinpersonsaged20-50years,whereasfew(29.2%) were >50 years and <20years accordingtotheTable1.

TableNo 1 Percentageofdistributionofageintheindividualdiedfromfallfromheight

AgeGroupOfTheIndividual		
	Frequency	**Percentage %**

0-9Yrs.	1	1.1
10-19Yrs.	2	2.2
20-29Yrs.	25	28.1
30-39Yrs.	17	19.1
40-49Yrs.	21	23.6
50-59Yrs.	11	12.4
60-69Yrs.	5	5.6
70-79Yrs.	5	5.6
80-89Yrs.	2	2.2
Total	**89**	**100**

It appears that males died of falling are more than females. Of the 89cases, 85 were men (96.5%) and 4 were women (4.5%) distributed by age asshown in Table 2. Fatal falls were more common in men than in women in allage groups. Thus, although accidental injuries of all types were more commonin the younger age group, ground-level falls (<10 feet) were a much morecommoncause ofdeath in theolder ages.

Table 2 **Percentageofdistributionofgender intheindividualdiedfromfallfromheight**

GenderOf TheIndividual		
	Frequency	**Percentage%**
Female	4	4.5
Male	85	95.5
Total	**89**	**100.0**

There are more deaths in married people due to fall from height, as all ofthem belong to young and middle age group. The marital status of 7 malepersons were not mentioned in the Inquest as they were brought for autopsy asunknowndeadbodies

Table3 distributionofmarital status intheindividualdiedfromfallfromheight

MaritalStatus	DistributionOfMaritalStatus
Divorced/Separated	2
Married	51
Unknown	7
Unmarried	26
Widowed	3

Almostalltheindividualinvolvedinfallfromheightbelongtoeitherrural(43.8%)orurban area(46.1%).

Table4 Percentageofnativity of theindividualdiedfromfallfromheight

NativityOf The Individual		
	Frequency	**Percentage %**
Rural	39	43.8
Sub Urban	7	7.9
Unknown	1	1.1
Urban	41	46.1
Total	**89**	**100.0**

Percentage of illiteracy (73 %) is more among the individual from fall fromheight.13personsareilliterate,27personshaveonlyprimaryschooleducationand 25 have secondary school education. Only two individuals had aPost graduatedegree and only 16 persons have completed graduation. While the literacy status ofthe 6 individuals is not known as they are brought to the autopsy as unknownindividual.

Table5 Percentageofliteracy status of theindividualdiedfromfallfromheight

LITERACYSTATUS OFTHEINDIVIDUAL

	Frequency	Percentage%
Graduation	16	18.0
Illiterate	13	14.6
Post-Graduation	2	2.2
PrimaryEducation	27	30.3
SecondaryEduation	25	28.1
Unknown	6	6.7
Total	**89**	**100.0**

All the deaths in fall from height has no diurnal variations. Except that as theday passes most of the individual are intoxicated. Over all the intoxication rate islessamongtheindividualinfallfromheight(21.3%).Youngagepeopleareinvolved in morning and afternoon falls. All of them are working at their sites. Earlymorning fall involved people who are attending the natural calls or persons who aresleepingontheterrace.

Table6 PercentageofTime OfOccurrenceOfTheFall of theindividualdiedfromfallfromheight

Time OfOccurrenceOfTheFall		
	Frequency	**Percentage%**
Afternoon	19	21.3
Evening	15	16.9
Morning	25	28.1
Night	28	31.5
Unknown	2	2.2
Total	**89**	**100.0**

Table7PercentageofIntoxicationStatusOfTheIndividual OfTheFall of theindividualdiedfromfallfromheight

IntoxicationStatusOfTheIndividual		
	Frequency	**Percentage%**
Intoxicated	19	21.3
NotIntoxicated	70	78.7
Total	**89**	**100.0**

The place where the incident occurred, most of the fall occurred at theirresidence (41.6%) or place of work which may include construction site (18%),bridge (6.7%), electric pole (5.6%), or tree (10.7%). While the construction siteas place of work is seen in most of the urban areas; electric pole, tree as placeofwork in rural areas. Elderly persons are involved in injuries due to fall fromthestairs.

Table8PercentageofPlaceOfFall OfTheIndividual OfTheFall of theindividualdiedfromfallfromheight

PlaceOfFall		
	Frequency	**Percentage%**
Bridge	6	6.7
Chair	1	1.1
CommercialBuilding	3	3.4
ConstructionSite	16	18.0
ElectricPole	5	5.6
Platform	1	1.1
ResidentialBuilding	37	41.6
Road	4	4.5
StairCase	4	4.5
Stand	1	1.1
Tractor	2	2.2
Tree	9	10.1
Total	**89**	**100.0**

Most of the individual have been hospitalized after the fall due to improvedaccesstothehealthcarefacilities.Butperiodofsurvivalafterthefallinmostof the individuals is <24 hours (63%). Among the 89 cases, there were 18craniotomiesperformedfortreatmentofacutesubduralhematoma.Thesurvival of those so treated ranged from <6 hours up to 3 days. The other 41cases with acute subdural hematoma who did not have craniotomy also hadsame range. Thus, there were no measurable differences in survival related toperformanceof craniotomy.

Table9PercentageofPlaceOfDeath OfTheIndividual OfTheFall of theindividualdiedfromfallfromheight

PlaceOfDeath

	Frequency	Percentage%
Hospital	50	56.2
On The WayTo The Hospital	16	18.0
SpotDeath	23	25.8
Total	**89**	**100.0**

In 71 (79.8%) of the 89 cases are healthy, which was confirmed anatomically byautopsy. Of all 89 cases, some of elderly persons are atherosclerotic, hypertensiveother cardiovascular disease. In two cases there was a medical history of previousstroke, but these were not confirmed anatomically, possibly because the remotelesions were small and obscured by the recent injuries. Liver disease, includingcirrhosis,fattymetamorphosis,wasencounteredinfewcasesassociatedwithalcoholicintoxicationinyoungpeople.Theseconditionshadnotaffectedtheirworking environment at heights so persons with cardiovascular or liver diseases areconsidered healthy. One case had a history of epilepsy and was allowed to work atheights where he developed the attack and accidentally fell down during that period.Therapeutic anticoagulation did not appear to play a role in any of the cases weanalyzed

The persons with motor defects or psychiatric illnesses are more prone for fallfrom height if not taken care properly. Thus, it is justified to think of suicide when aknown history of psychiatric illness is present. In the present study, illicit drugs orpsychiatricmedicationswerefoundin5ofthesuicidaldeaths(26%).Itisimportantto consideranacuteepisodeof thepsychiatricillnessasadifferentialdiagnosis.

Table 11PercentageofHealthStatusOf TheIndividual OfTheIndividual OfTheFall of theindividualdiedfromfallfromheight

HealthStatusOf TheIndividual		
	Frequency	**Percentage%**
Epileptic	1	1.1
Healthy	71	79.8

MotorDefects	1	1.1
Psychiatric	5	5.6
Unknown	11	12.4
Total	**89**	**100.0**

Table12Frequencyof the injuries inrelation to theHeightof fall

Frequencyof the injuries inrelation to theHeightof fall									
Height Of Fall	**N**	**H.I.**	**S.I**	**C.I**	**A.I**	**P.I**	**U.L.I**	**L.L.I**	**As.I**
<10 Ft.	21	13	3	1	2	2	0	2	2
>60Ft.(SixStoreys)	3	3	1	2	3	2	2	1	0
11-19Ft.(SingleStoreys)	24	14	7	7	6	2	0	3	0
20-29Ft.(TwoStoreys)	15	12	5	2	2	3	0	0	0
30-39Ft.(ThreeStoreys)	9	6	1	2	3	1	0	3	0
40-49Ft.(FourStoreys)	11	10	0	3	4	1	1	0	0
50-59Ft.(FiveStoreys)	4	3	0	1	1	1	3	2	0
Unknown	2	2	0	0	0	0	0	0	0
P Value		.375	.208	.208	.036	.210	.000	.048	.469
LikelihoodRatio		.229	.122	.184	.037	.418	.000	.044	.548

N = Frequency of Height Of Fall, Feet = Ft.; Head Injury=H.I; Spinal Injury= S.I; Chest Injury = C.I; AbdominalInjury=A.I;PelvicInjury=P.I;UpperLimbInjury=U.L.I;LowerLimbInjury =L.L.I;AssociatedInjury =As.I

Table13Frequencyof the injuries to the various regions of the body

Frequencyof injuries to the various regions of the body	
Head	63
Vertebralcolumnandspinal cord	17
Chest injury	18
Abdominalinjury	21
Pelvicinjury	12
Upperlimbinjury	6
Lowerlimbinjury	11
Associatedinjury	2

Table 14AssociationOfThePatternOfHead InjuryInRelationToTheSkull Fracture

AssociationOfThePatternOfHead InjuryInRelationToTheSkull Fracture.				
	Total	**With SkullFractures**	**ithout SkullFractures**	**PValue**
EpiduralHemorrhage	20	19	1	.000
SubDuralHemorrhage	59	44	15	.000
ubarachnoidHemorrhage	63	48	15	.000
ntra CerebralHemorrhage	2	0	2	.139
CerebralContusion	4	3	1	.340
CerebralEdema	3	3	0	.048

Table 15Frequencyof pattern theinjuriesin thechest region

Frequencyof pattern theinjuries in thechest region		
	Frequency	**Percentage %**
Haemopericardium	3	3.4
Lacerationof Heart	3	3.4
Fractured Ribs	27	30.3
Haemothorax	22	24.7
Lacerationof thelung	18	20.2

Table 16Frequencyofpatternofinjuries intheabdominalregionin relationtoheight

Frequencyofpatternofinjuries intheabdominalregionin relationtoheight								
Height OfFall	**NRLK**	**RLK**	**NRLS**	**RLS**	**NRLL**	**RLL**	**NGP**	**GP**
<10Ft.	20	1	21	0	19	2	21	0
>60FT.	1	2	1	2	0	3	0	3
11-19FT.	21	3	22	2	17	7	23	1
20-29FT.	14	1	15	0	12	3	13	2
30-39FT.	6	3	8	1	7	2	9	0
40-49FT.	10	1	9	2	9	2	11	0
50-59FT.	3	1	3	1	2	2	4	0
UK	2	0	2	0	2	0	2	0
Total	77	12	81	8	68	21	83	6
PValue	0.066		0.010		0.037		0.000	
No Ruptured/ Laceration Kidneys = **NRLK**; Ruptured/ Laceration Kidneys = **RLK**; NoRuptured / Laceration Spleen = **NRLS**; Ruptured / Laceration Spleen = **RLS**; NoRuptured/LacerationLiver=**NRLL**;Ruptured /LacerationLiver=**RLL**;NoGastric/ IntestinalPerforation=**NGP**;Gastric/IntestinalPerforation=**GP**;Unknown=**UK**								

Table17Frequencyofpattern ofinjuriesin theabdominal region

Frequencyofpattern ofinjuriesin theabdominal region		
	Frequency	**Percentage %**
Ruptured/LaceratedLiver	21	23.6
Ruptured/LaceratedKidneys	12	13.5
Ruptured/ LaceratedSpleen	8	9.0
Gastric/IntestinalPerforation	6	6.7

Discussion : The present analytical study conducted on the fall fromheight, includes the

deaths which occurred on the spot after fallandalsothosewhichdiedduringtreatmentafterhospitalization.

Age distribution wise most fatalities (70.8%) occurred inpersons aged 20-50 years similar results were obtained in apreviousstudybyNabeel R[10].Itappearsthatmalesdiedoffallingaremorethanfemales. Of the 89 cases, 85 were men (96.5%) and 4 werewomen (4.5%) distributed by age as shown in Table 2. Fatalfallsweremorecommoninmenthaninwomeninallagegroups.Thus,althoughaccidentalinjuriesofalltypesweremore common in the younger age group, ground-level falls (<10Ft.) were a much more common cause of death in the olderages.Similarresultsareseeninpreviousstudyby Hartshorne.Therearemoredeathsinmarried(56of89)peopledue tofall from height,asmostofthefallsoccurinyoungandmiddleage group.Illiteracyismorecommonamongthevictimsoffallfromheight. As most of the persons who work at heights are illiterate(73%).

Peoplefromextremesofagesfellduringnighthours.Whereas young age people are involved in morning and mid-dayfalls.Allofthemareworkingattheirsites.Earlymorningfallinvolvedpeoplewhoareattendingthenaturalcallsorpersons who are sleeping on the terrace. There is no clearHomicidal fall seen in this study[9]. Accidental falls involved mostofthedeaths.Onlyin21%oftheindividualareundertheinfluence of alcohol. There is no diurnal variation among theindividualintheaccidentalfallfromheight.Butasthedaypasses intoxication status among the individual rises (12 of 28cases in the night) with a P value of .003 correlating with thestudy done by L. Fanton, Gill JR, Goren S.We observed nodifferences in the severity of injuries between those who testedpositive for alcohol and those who tested negative. Other thanfor alcohol, toxicology testing was not performed with sufficientfrequency to allow an evaluation of the contribution of drugs totheincidenceoffalls.

Majority of people died in urban areas, are from

constructionsites(18%constructionsite,5.6%electricpole,3.4%commericalbuilding)staircases(4.5%),buildings(41.6%). Fatal fall from trees is seen in rural people (10.1%).Thebuildingheightsrangedfrom>10Ft.(1storey's)to>60Ft. (6 storey's) for buildings. For bridges and building sites, theheightrange wasfrom 10Ft. to 39 Ft.For the accidental fall,the heights were more randomly distributed (Table 11). Thefallingsitewasthedeceased'sresidencein37(41.6%)ofcases in the accidents. Sixteen accidents (18%) occurred atconstruction sites. Careful examination of the scene of crime isneededtoopineonmannerofdeath.Ithasbeensuggestedthat the barrier preventing an accidental fall should be carefullydocumented from the scene of crime. If this barrier is higherthan the person's center of gravity, this will make an accidentunlikely. In some cases, a chair or a ladder might have beenemployedbythesuicidingpersontogetoverthebarrier,strongly hinting it as a suicidal fall. In case of an accident atdeceasedresidence[8],scenefindingsmayincludetoolsindicating that the person has been working in a dangerousposition (i.e., painting the house, cleaning the house, wiring thehouse). None of the suicides happened at the individual's workplacepredominantlyconstructionsites.Accordingly,mostaccidentshappenedduringthedayinthe"workinghours,"whereas most suicides happened in the evenings or at night. Ithas been suggested to use the distance of the dead body fromthefallingsiteasahelpfultooltodifferentiateifsomeonejumped from a building or just fell down since in suicides thedistance between the body and the building wall is assumed tobe frequently greater than the one in accidents. In the presentstudy, these data were not available in all cases and, therefore,we are unable to comment on this variable. We believe that theusefulnessofthesedataisverylimitedinmanycases.Thisistosaythatifsomeonejumpsoffabuilding,itdoesnotnecessarily mean he has a suicidal intention. In the presentstudy, one person with alcoholic intoxication jumped out of thewindow after consumption of alcohol. This death was termed"unclarified" as a clear suicidal intention could not be made outand it could not be

excluded that the person just thought hecould fly because of the intoxication. This was classified as anaccidentasthere wasno suicidal intention. In addition,theposition of the body is often changed by members of the rescueteamwithouttheoriginalpositionbeingdocumented.

Most of the individual have been hospitalized after the falldue to improved access to the early health care facilities. Butperiod of survival after the fall in most of the individuals is <24hours (63%).Among the 89 cases, there were 18 craniotomiesperformed[7]fortreatmentofacutesubduralhematoma.Thesurvivalofthosesotreatedranged from<6hoursupto3days.

The other 41 cases with acute subdural hematoma who did nothave craniotomy also had same range. Thus, there were nomeasurable differences in survival related to performance ofcraniotomy. There were 23 individuals (25.8%) who died onimpact. Demographic characteristics (age, sex), work status,and intentionality of fall did not significantly differ in rates ofdeathonimpact.Thepresenceofequipmentmisuseormalfunction,however,did resultin significantly more deathsuponimpact(P=0.020).Inaddition,thosewithhigherfallswere more likely to be dead on impact (P < 0.000). Injuriesresulting from a fall are due to the sudden deceleration of thebody after it hits a surface. Sudden deceleration results in 2typesofinjuriesthosefromdirectimpactandthosefromtransmittedforce.Directimpactinjuriesresultingreaterseverity of injury, whereas transmitted forces are absorbed bythebody'stissuesandinjurevulnerabledistantorgans.Previous studies of free falls have demonstrated that height offall correlates with injury severity and is a good predictor ofdeath. Height beyond 5 Storey's has been shown to causemortality in most cases. Our study similarly demonstrated thatincreasing height of fall was associated with a higher likelihoodofdeathuponimpact.

An analysis of the association between regional injury typeand height of fall was performed (Table 11). Higher falls wereassociatedwithanincreaseofintra-abdominal(P=0.036),upper limbs (P = 0.000), lower limbs, (P = 0.048). Lower

fallswerecharacterizedbymoreintracranialhaemorrhage(P=0.020). The association between height of fall and skull injurywas significant (P = 0.048), with the lowest prevalence in mid-rangefalls(30-39Ft.).

Inthepresentstudy,fallfromaheightwasthemostcommon cause of death is head injury. A number of studiesindicate that relatively less severe traumatic findings, such asslightcontactwoundsasscalpinjuriesandbruises,areobserved in cases of falls from lower height. The severity oftraumatic findings is increased with the increasing height of fall.Mortality rate shows a peak in falls from a height of >3 Ft. orgreater,in particularasseenincasesoffall below<10Ft..

There are a number of factors that determine the severity ofhead. Undoubtedly, the most important factor determining injuryseverity for any person is the force of head impact. Based onthe equation: $a = v (K/M)^{1/2}$, derived for evaluating head injuryseverity in pedestrians, the acceleration(a) of the head at thetimeofimpactcanbeestimatedfromthevelocity(v)andthemass (M) of the head when it strikes the ground, imagining thatthe head falls vertically downward from a standing height (h)acceleratedbygravity(g)alone,andusingastiffnesscoefficient (K) for the combination of the impacting surface andthe head. Assuming a standing height of about 1.5 m, from $v =(2gh)^{1/2}$, the velocity of the head when it reaches the ground isbetween 5 and 6 m/sec. With a head mass of approximately 10kg and a stiffness coefficient of up to 600 KN/M for a hardsurface, the value of $(K/M)^{1/2}$ is 200-300 seconds, giving arangeofimpactaccelerationfortheheadstrikingsurfacebetween 1,000 and 1,800 m/sec. This acceleration is in thesame range as the estimated threshold for the occurrence ofobservablebraininjury.

Thecalculatedminimalimpactoftheheadontoahardsurface is in the range of that necessary to injure the brain.Factors which modify the impact are the impact surface, theskull, were both very stiff, thusa more flexible skull or anypaddingbetweentheheadandthesurfacewouldgreatlyreduce the risk of serious injury.

Another important factor is thatthe forces that produce acute subdural hematoma have a highrate of acceleration onset and a short duration and in this way itdifferfromthoseforcesthatproduceobservablebraininjury.

Falls in particular generate those types of forces that produceacute subdural hematoma. Furthermore, owing to age-relatedchanges of the central nervous system, older individuals areespecially susceptible to acute subdural hematoma followingheadimpact.

Other factors in the severity of head injury in a fall that aremore difficult to calculate are the specific dynamics of the fallsuch as stumbling or tripping could significantly add to the fallvelocity, and the rotational acceleration during the fall wouldproduce another component of the forces at impact. Factorsintrinsic to the individual would also be important in determininginjury severity. Older individuals are likely to fall differently thanyounger persons, owing to gait disturbances and instability, andslower responses would impair their ability to break their fall sothat impact is more likely to occur directly on the head. Ethylalcohol intoxication would augment this propensity of gait.Altogether,most of the factorspredisposing to falling, aswellascontributingtoinjuryseveritypartlyexplaintheirhigherincidenceoffatalheadinjuriesinground-levelfalls.

Fromourobservations,theheightoffall,thecombinedstiffnessoftheheadandimpactsurface,andage-relatedchangesofthecentralnervoussystemarethemostimportantfactors in predisposing to severe head injury. It is well knownthat drinking and driving represent a lethal combination, thedrunkpedestrian,pronetolethalground-levelfalls,remainsignored. Physicians' advice may be greatly beneficial, in termsof alcohol counselling, prescribing exercise, and monitoring theprescription of medications that can adversely affect sensoriumand equilibrium.

Cervicalblunttraumawasfoundin17casesandmostofthe fracture are seen in the fall below 30 Ft. (P=0.572) which isalesssignificantaccordingtothestatisticalanalysiscontradicting the previous study show the relationship betweencervical fracture and fall from the height. It is

thought that mostof these spinal injuries are the result of vertical transmission ofthe forces of deceleration upwards along the axial skeleton,which would explain their concurrence with the fracture of thelower limbs and of the pelvic girdle. Alternately, primary andsecondaryimpactwiththebackorthebuttockscouldalsoresult in vertebral injuries. It is noted, the weakest point in spineis thoracolumbar region when the spine is held rigidly straight,fractures will however occur in thoracocervical region when thespine is in flexion. It has been pointed out that falls from heightarehighlydynamicprocessesthatcanresultinaextensivepattern of injuries[6]. It must be presumed that the most extensivetraumatization would occur at the site of impact. Since the bodymay, however, bounce and ricochet after the primary impact,any combination of injuries on multiple sides of the body mayoccur. Because of the flexibility of the cervical spine, it can beimagined that the neck would become an injury-prone structureas the head is violently jerked backwards by the force of theimpact.

Conclusion : We can infer from the findings that patterns of injury can aid in the prediction of injuries caused by falls, may contribute to primary injury prevention, and may improve management of survivors during the acute phase. All those involved in providing care for these patients, such as first responders, emergency medicine doctors, and trauma surgeons, may find this information to be useful. It becomes more challenging to evaluate the injury pattern in falls from height as the fall height rises. Even when hospitalised, the mortality rate for people who fall from a height is very high within 24 hours of the accident

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