FATAL FALLS FROM HEIGHT: PATTERN OF INJURIES AND EFFECT OF LEVEL OF FALL

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ABSTRACT

In both clinical and forensic medicine, injuries resulting from falls establish a non-negligible ratio of patients and post-mortem examinations. **Aim:** The aim of this study is to assess the pattern of injuries and effect of level of fall among cases of fatal falls from height admitted to Menoufia University Hospital from the first of June 2016 to the end of May 2021. **Patients & methods:** This retrospective study data was retrieved from patients' medical reports and from patients' hospital records using a special questionnaire prepared for this purpose. Data were collected including socio-demographic data, fall characteristics (time and place of occurrence), the height of fall (fall height was classified into two categories: high (≥ 6 meter and low < 6meter), circumstances, injury pattern (site and type of injuries), duration of survival, level of consciousness according to Glasgow coma scale and possible cause of death. **Results:** The most represented age group was 18-<40years (41.5%)**.** Most of the cases were males (73.6%), accidental (98.1%), fell from ≥6 meters (56.6%), occurred at home (62.3%), at daytime (77.4), and 58.5% of cases showed injuries at multiple anatomical regions in the body. The level of fall significantly affected survival duration and types of chest and abdominal injuries. Central nervous system impairment was the cause of death in 73.6% of cases. Most patients (71.7%) had a Glasgow coma scale below 8. **Conclusion**: most cases were accidental, males, occurred at home, with multiple injuries. The level of fall significantly affected survival duration and types of chest and abdominal injuries. **Recommendations:** Necessary precautions to prevent accidental falls and safety measures for construction workers and window cleaners are mandatory.

Keywords: Fatal fall, Level of fall, Pattern of injuries.

INTRODUCTION

A fall can be defined as an incident in which a person suddenly crashes into the ground, floor, or other lower level. Falls at ground level may also occur due to sliding on smooth polished surfaces or rugs, postural hypotension, etc. **(National Institute for Occupational Safety & Health 2013).**

Globally, fall is considered a major public health challenge that calls for attention. According to WHO report 2018, an estimated 646 000 fatal falls (increased number compared to 424 000 in 2012) occurred each year. Considering it the second leading cause of death due to unintentional injury, after road traffic injuries. Low- and middle-income countries constituted over 80% of these deaths. **(WHO**

2012; WHO 2018). It can cause fatal and non-fatal injuries (**Burns et al., 2016).**

Evidently, the outcome depends on the height of fall, nature at the impact site, victim's age, body structure, landing position, bone density, and the associated comorbidity, although the primary injury mechanism involves severe blunt trauma and acute vertical deceleration **(Bertocci et al., 2004; Demetriades et al., 2005; Liu et al., 2009; Turkoglu et al., 2019).**

In dealing with cases of falling from a height, forensic experts may face difficulties related to the nature, severity of injuries, and the cause of death due to a lack of information on the posture and height of falls **(Türk and Tsokos 2004).**

AIM: The aim of this study is to assess the pattern of injuries and effect of level of fall among cases of fatal falls from height admitted to Menoufia University Hospital from the first of June 2016 to the end of May 2021.

PATIENTS AND METHODS

This is a retrospective study done on all cases that died from falling from height admitted to Menoufia University Hospital over the period started from the first of June 2016 to the end of May 2021. Data were retrieved from patients' medical reports (primary medical reports done at the time of arrival and death reports) done in the Forensic Medicine and Clinical Toxicology department and from patients' hospital records using a special questionnaire prepared for this purpose. Approvals from the Menoufia University Hospital Ethical Committee and the director of Forensic Medicine and Clinical Toxicology department were taken. Confidentiality was ensured by keeping all records anonymous. Data were collected including socio-demographic data, fall characteristics (time and scene of occurrence), the height of fall (fall height was classified into two categories: high (≥ 6 meter and low < 6meter), circumstances, injury pattern (site and type of injuries), duration of survival, level of consciousness according to Glasgow coma scale and possible cause of death.

Exclusion criteria

Cases with incomplete records, falling from the standing position, and those subjected to other secondary traumas as a traffic accident after fall, etc., were excluded as the findings may be inaccurate and misleading.

Glasgow coma scale (GCS) was determined based on three components: eyes, verbal, and motor response **(Barsic et al., 1996).**

The collected data were computerized, tabulated, and analyzed using Statistical Package of Social Science (SPSS) version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics as numbers and percentages were used. Associations were analyzed using the Chi-square test ($\chi 2$). $P < 0.05$ was considered statistically significant, $P < 0.01$ was considered statistically highly significant, and a P-value >0.05 is considered insignificant.

RESULTS

The current study was done on 53 patients who constituted fatal cases due to falling from height. These cases were admitted to Menoufia university hospitals from the first of June 2016 to the end of May 2021. Concerning the age of the studied patients, 11 (20.8%) patients were below 7 years, 2 patients (3.8%) were in the age group between 7-<18 years. 22 (41.5%) patients were between 18-<40 years, 8 (15 %) patients between 40-<60 years, while 10 patients (18.9%) were ≥ 60 years old. Regarding gender, the present study revealed that 73.6% were males, and 26.4% were females. The present work revealed that falls in urban areas (54.7%) exceeded that of rural areas (45.3%) **(Table 1).**

Regarding seasonal variation of fatal falls cases, there were no great differences in the seasonal distribution of cases as winter, spring, summer, and autumn were 20.8%, 28.3%, 24.5%, and 26.4%, respectively. Most fatal falls occurred during the daytime (77.4%), compared to those during the night (22.6%) **(fig 1)**.

Concerning the circumstances of falls, 98.1% of cases were accidental, 1.9% were suicidal, and no homicidal cases **(fig 2).** As regards the scene of falls, the home was the most commonplace (62.3%), followed by workplace (22.6%), and 15.1% were in other places **(fig 3).**

As regards the level of falls, 56.6% fell from 6 meters or more while 43.4% was from levels less than 6 meters **(fig 4).**

All cases of fatal fall from height at workplace (100%) and 87.5% of those fell at other places were males, versus 0% and 12.5% in females, and this difference was statistically significant. But there was no statistically significant correlation between age of studied cases & scene of falls **(Table 2).**

Regarding the site of injuries, 58.5% of cases involved in the study showed injuries at multiple anatomical regions in the body, followed by isolated head injury (30.2%). Isolated spine and isolated chest injuries were observed in 5.7%, 3.8% of cases, respectively. Isolated extremities injuries comprise about 1.9% of injuries **(fig 5).**

Regarding the Glasgow coma scale of the studied patients, 71.7% had GCS below 8, 22.6% was from 8-12 GSC, while 5.70% was 13 and more GCS. Considering survival duration, 34% of patients died within 24 hours of hospital admission. 30.2% died from 1 day to less than1 a week, 22.6% survived for 1 week– 1 month, and only 13.2% survived more than one month **(fig 6).**

Regarding complications, Pneumonia, DVT, hydrocephalus, and paraplegia were seen in 1.9% of cases for each. Surgical interference was done in 47.2% of cases **(fig 7).**

There is a significant relationship between the site of injury, survival duration, and the level of fall ($p<0.05$). 70% of cases who fell from high level ≥ 6 meters showed injuries at multiple anatomical sites. 46.7% of cases who fell from high level ≥ 6 meters died within one day versus 17.4% fell from< 6 meters, and 26.1% of cases died from fall <6meter survived more than one month versus 3.3% of cases fall from ≥ 6 meters. Central nervous system impairment was the cause of death in 73.6% of cases, followed by CVS failure (15.1%) and finally respiratory system failure in 11.3% of cases. No significant relationship was found between the cause of death and the level of fall **(table3).**

The most common chest injuries detected were combined injuries (26.4%), followed by hemopneumothorax (15.1%), while lung contusion (13.2%) was the least common chest injury among studied cases. Intracranial hemorrhage (35.9%) was the most predominant head injury, followed by combined head injury (30.2%) then the least common was skull fracture (7.5%). The combined abdominal injuries were the most common abdominal injuries (11.4%), followed by intraabdominal fluid collection (9.4%). 9.4% of cases had limbs fracture, and 22.6 % had a vertebral fracture. There was a statistically significant difference between types of recorded chest and abdominal injuries and level of falls, where all types of recorded chest and combined abdominal injuries were more common in cases that fell from high level (≥ 6 meters). There was no statistically significant relationship between types of head, spine, and limb injuries and level of fall **(table 4).**

There is a highly significant relationship between the Glasgow coma scale (GCS), survival duration, and cause of death ($p<0.01$). Where 47.4% of patients who had a Glasgow coma scale below 8 died within 24 hours of admission. Also, 66.7% of cases who had Glasgow coma scale 13 and more lived for more than one month. In addition, 84.2% of cases with a Glasgow coma scale below 8 died due to CNS impairment. While all cases who had Glasgow coma scale 13 and more died due to CVS and respiratory causes. There is a significant relationship between the Glasgow coma scale and the level of fall ($p<0.05$). 68.4% of cases with a Glasgow coma scale below 8 fell from a high level ≥ 6 meters **(table 5).**

Table 1: Sociodemographic pattern of studied cases.

		N	%
Age	<7y	11	20.8
	7-<18	2	3.8
	18-<40	22	41.5
	40- <60	8	15
	≥60	10	18.9
Sex	male	39	73.6
	female	14	26.4
Residence	rural	24	45.3
	urban	29	54.7
	Total	53	100

Table (2): Correlation between scene of falls and both age and sex. .

		Scene of fall								X^2	P value
		Home		workplace		Others		Total			
		N	%	N		N	%	N	%		
Sex	Male	20	60.6	12	100	7	87.5	39	73.5	7.964	**0.019**
	Female	13	39.4	0	0.0	1	12.5	14	26.4		
	Total	33	100	12	100	8	100	53	100		
Age	<7y	9	27.2	0	0.0	2	25	11	20.7	8.170	0.417
	7-<18	0	0.0	1	8.3	1	12.5	2	3.7		
	18-<40	12	36.3	7	58.3	3	37.5	22	41.5		
	40-<60	5	15.1	2	16.6	1	12.5	8	15.09		
	≥60	7	21.1	2	16.6	1	12.5	10	18.8		
	Total	33	100	12	100	8	100	53	100		

P<0.05: Significant p<0.01: Highly significant P>0.05: non-significant.

Table (3): Correlation between site of injury, survival duration, cause of death and level of fall in studied cases.

		level				Total		X^2	P value
		Low (<6m)		High (≥6m)					
		N	%	N	%	N	%		
Site of injury	Head	10	43.5	6	20.00	16	30.2	10.156	**0.038**
	Chest	0	00	2	6.7	2	3.8		
	Spine	3	13.0	0	0.0	3	5.7		
	Multiple	10	43.5	21	70.00	31	58.5		
	Extremities	0	00	1	3.3	1	1.9		
	Total	23	100	30	100	53	100		
Survival duration	within 24hours	4	17.4	14	46.7	18	34		
	>1day-<1week	6	26.1	10	33.3	16	30.2		
	1week-1month	7	30.4	5	16.7	12	22.6	9.705	**0.021**
	>1month	6	26.1%	1	3.3%	7	13.2		
	Total	23	100	30	100	53	100		
Cause of death	CNS	18	78.3%	21	70.0%	39	73.6	0.481	0.786
	CVS	3	13.0%	5	16.7%	8	15.1		
	Respiratory	2	8.7%	4	13.3%	6	11.3		
	Total	23	100.0 %	30	100.0 %	53	100		

P<0.05: Significant p<0.01: Highly significant P>0.05: non-significant

Table (4): Correlation between level of fall and types of injuries.

		Level of fall						X^2	P value
		Low (<6m)		High (≥6m)		Total			
		N	%	N	%	N	%	9.770	**0.021**
Types of Chest injuries	Hemopneumothorax	2	8.7	6	20.0	8	15.1		
	Lung Contusions	2	8.7	5	16.7	7	13.2		
	Combined Injuries	3	13.0	11	36.7	14	26.4		
	No	16	69.6	8	26.7	24	45.3		
	Total	23	100	30	100.0	53	100.0		
Types of Head injuries	Skull Fracture	2	8.7	2	6.7	4	7.5	2.229	0.526
	Intracranial Hemorrhage (ICH)	6	26.1	13	43.3	19	35.9		
	Combined	9	39.1	7	23.3	16	30.2		
	No	6	26.1	8	26.7	14	26.4		
	Total	23	100.0	30	100.0	53	100.0		
Types of abdominal injuries	Hemorrhage	4	17.4	1	3.3	5	9.4	7.385	**0.025**
	Combined	0	0.0 %	6	20.0	6	11.4		
	No	19	82.6	23	76.7	42	79.2		
	Total	23	100.0	30	100.0	53	100.0		
Types of spine injuries	Fracture	6	26.1	6	20.0	12	22.6	0.275	0.420
	No fracture	17	73.9	24	80.0	41	77.4		
	Total	23	100.0	30	100.0	53	100.0		
Types of extremities injuries	Fracture	2	8.7	3	10.0	5	9.4	0.026	0.627
	No	21	91.3	27	90.0	48	90.6		
	Total	23	100.0	30	100.0	53	100.0		

P<0.05: Significant p<0.01: Highly significant P>0.05: non-significant

Table (5): Correlation between Glasgow coma scale (GCS) and Survival duration, cause of death and level of fall.

		Glasgow coma scale (GCS)								X2	P value
		≥13		8-12		<8		Total			
		N	%	N	%	N	%	N	%	19.181	**0.004**
Survival duration	within 24hours	0	0.0	0	0.0	18	47.4	18	34.0		
	>1day-<1week	0	0.0	5	41.7	11	28.9	16	30.2		
	1week-1month	1	33.3	4	33.3	7	18.4	12	22.6		
	>1month	2	66.7	3	25.0	2	5.3	7	13.2		
	Total	3	100	12	100	38	100	53	100		
Cause of death	CNS	0	0.0	7	58.3	32	84.2	39	73.6	13.500	**0.009**
	CVS	2	66.7	2	16.7	4	10.5	8	15.1		
	Respiratory	1	33.3	3	25.0	2	5.3	6	11.3		
	Total	3	100	12	100	38	100	53	100		
Level of fall	Low(<6 m)	2	66.7	9	75.0	12	31.6	23	43.4	7.701	**0.021**
	High (≥6m)	1	33.3	3	25.0	26	68.4	30	56.6		
	Total	3	100	12	100	38	100	53	100		

P<0.05: Significant p<0.01: Highly significant P>0.05: non-significant.

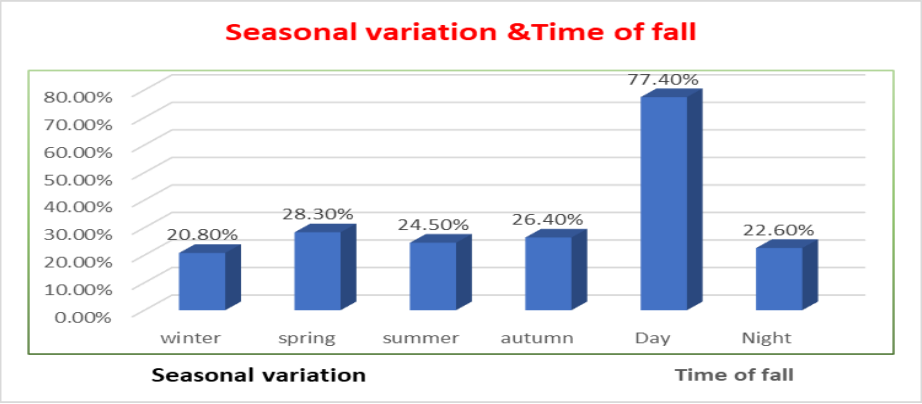

Figure 1: Distribution of studied cases as regards seasonal variation and time of fall.

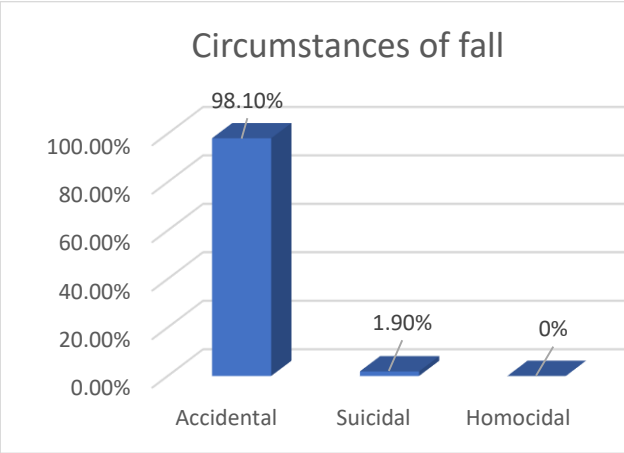

Figure 2: Circumstances of fall.

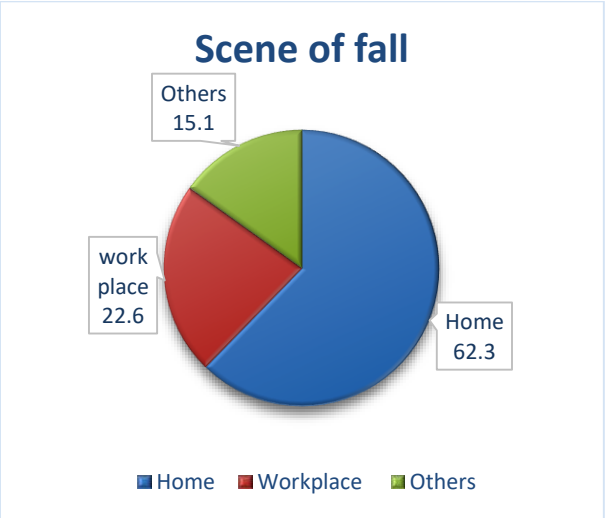

Figure 3: Scene of fall.

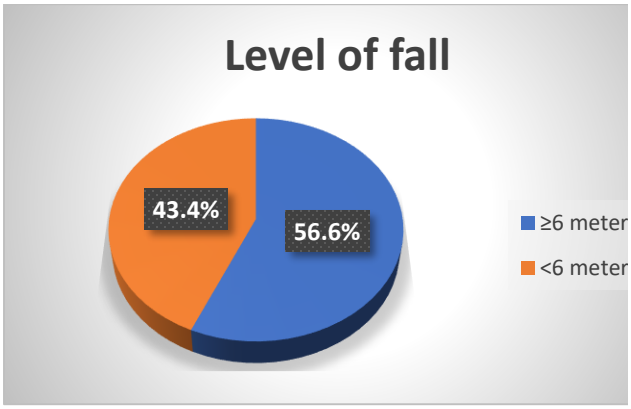

Figure 4: Distribution of studied cases as regards level of fall.

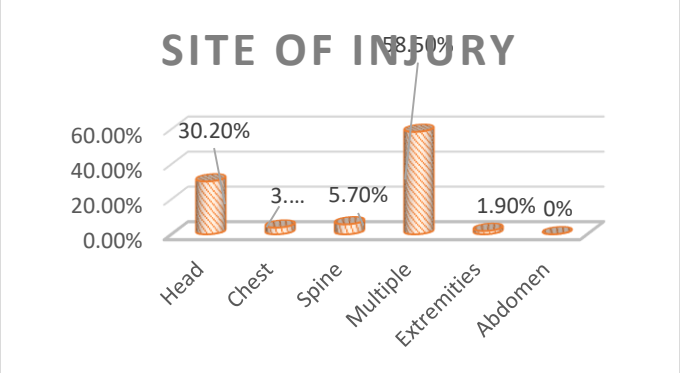

Figure 5: Distribution of studied cases according to site of injuries.

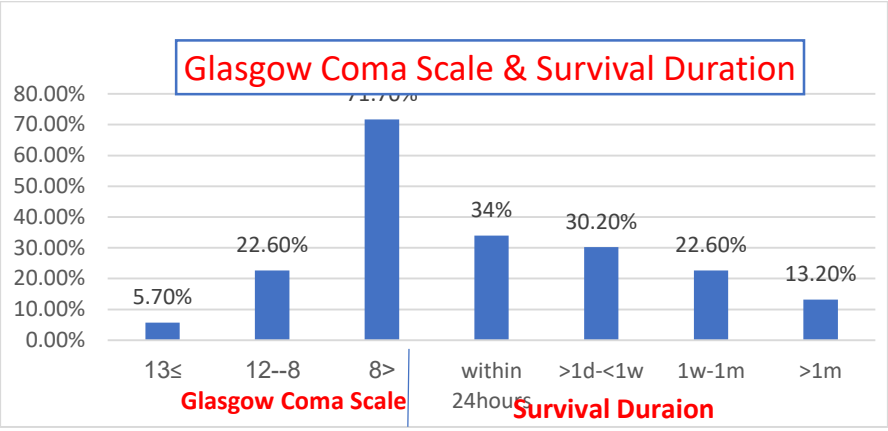

Figure 6: Distribution of studied cases according to Glasgow coma scale & survival duration.

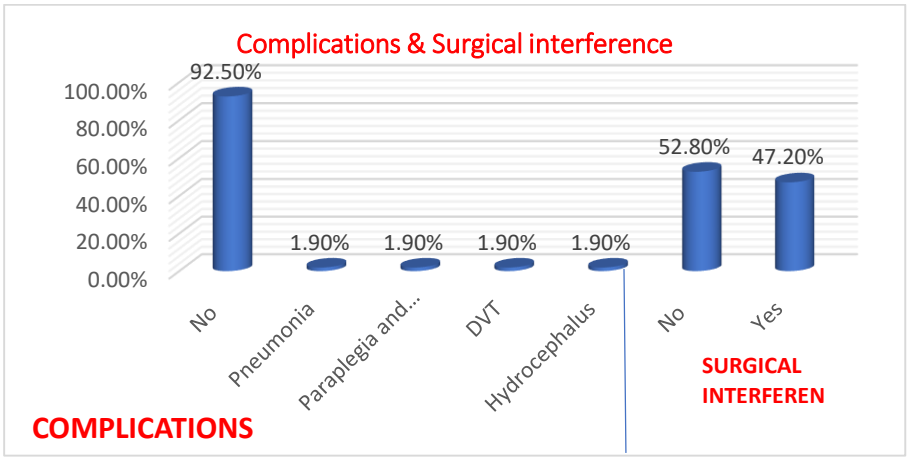

Figure 7: Distribution of studied cases according to surgical interference.

DISCUSSION

Death from falls is considered one of the common causes of traumatic death, especially in developed countries **(Peng et al.,2014).** With the increase in urbanization, tall buildings have been commonly present. So, people living in these buildings are at more risk of falling from a height or among those working on their construction **(Behera et al., 2014).**

This study was done on 53 fatal fall cases admitted to Menoufia university hospitals over 5 years period.

The highest number of falls was in the age group between 18-<40 (41.5%) years, which is the age of high activity and the age of working make them more susceptible to accidental fall from higher places. Cases below 7 years comprise about 20.8% of fatal falls included in the study. These age groups could explain this is related to the very dynamic nature of children and lack of protection. This was in accordance with **Haggag et al., 2016** who found that the majority of involved cases in their study belong to the age group (19-40) year. **Mirza et al., 2013** observed that two-third of the studied cases were in the age group 15-45 years.

In contrast to the current work, **Turgut et al., 2018** found that the highest number of falls in their study was in the 0–5-year group. **Con et al., 2014** reported in their study that the highest number of falls of patients was in the age group ≥66 y.

Regarding gender, the present study suggested that most cases were males (73.6%). Generally, men are more likely than women to be subjected to trauma and fall (**Turgut et al., 2018**), as men are most engaged in household tasks such as changing a light bulb, trimming down gardens and trees than females. Besides, men are more liable to work-related injuries due to falls from heights than women **(Yokota et al., 2020)**.

This result was in agreement with most other studies**; Yavuz et al., 2004, Dickinsonet al., 2012, Icer et al., 2013, Jain et al., 2014 and Turgut et al., 2018,** found that males constitute a higher incidence of falls in comparison to females**.**

However, in contrast with the present study, **Bekele et al., 2020** recorded a higher incidence of falls in females (57.8%). They described this finding by biologically females are physically more vulnerable to falling due to less amount of lean mass as compared to males.

The present work revealed that falls in urban areas (54.7%) exceeded that of rural areas (45.3%). It is suggested that it is related to the work activity developed throughout life in the urban environment. This result agreed with the study of **de Arruda et al., 2018.** While conversely with this result, **Zhang et al., 2019** in China found that falls occurred in rural areas than urban areas**.** However, they revealed that the fall risk factors do not vary significantly between urban and rural areas.

Considering the time of fall occurrence, 77.4% of falls involved in this literature occurred during the daytime. The peaks in the daytime are related to hours when most activities are performed, including domestic tasks, shopping, and visiting. These findings were in accordance with previous studies that reported a higher rate of falls during the daytime **(Johansson 1998; Hu et al., 2015; Yokota et al., 2020).**

Concerning the circumstances of falls, 98.1% of cases included in this study were accidental, only one case was suicidal, and there were no homicidal cases. Suicide is generally considered relying on different factors, involving the used method in suicide, the existence of self-injury, a history of suicide attempts or thoughts, or relatives who suspect suicide **(Venkatesh et al., 2007)**. Classification of cases into suicidal, homicidal, and accidental in this study depended on relatives' vignettes who suspected suicide depending on their knowledge of the victim. The only case of suicide in this study was diagnosed as a COVID-19 patient. The relatives said he gave up and jumped from a high level (≥6 meters). This is agreed by **Venkatesh et al., 2007** who mentioned that person intent on taking their own life is more likely to fall from a greater height than those who fall accidentally.

Nearly the same result was concluded by **El Gohary et al., 2016,** who declared that only three cases included in their study were considered suicidal and attributed this lower suicidal rate in their study to the religious banning of suicide in Egypt. In contrast, a higher suicidal rate was reported by **Türk and Tsokos, 2004** which accounted for 50% of the studied cases.

As regards the place of falls, the home was the most commonplace (62.3%). **Haggag et al., 2016; Hakkenbrak et al., 2020** found near results. They found that the home was the place of fall in most cases included in their study**.** In contrast**, Mirza et al., 2013** found that fatalities due to falls were substantially accidental while working on heights, without preventive safety measures in Karachi.

The current study found that about 56.6% of cases were fallen from level ≥ 6 meters. This result was consistent with **Haggag et al., 2016** who revealed that the majority of fatal falls were from high levels >20 feet (>6 meters). **Turgut et al., 2018** found that 41.7% of fatal falls in their study were from levels more than 4 meters.

In contrast, with the current study, **El Gohary et al., 2016** recorded a lower level of fall as 51% fell from a height of one meter or less. However, this study was done on all cases of falls, not only the fatal cases.

Murthy et al., 2012 recorded in their study that in 48.07% of cases, the height of fatal fall was 0-20 feet followed by 21-40 feet. **Liu et al., 2009** concluded that the height of fall was a major factor for the prognosis of these cases. The greater the fall distance, the greater the velocity and impact on hitting the ground. **Goodacre et al.**, **1999** estimated that falls from more than 2 meters are a significant factor for the occurrence of serious injury. In contrast, **Lapostolle et al., 2005** concluded that the level of fall is an independent prognostic factor.

The falling level in adults > 20 feet (6 meters) was considered as a critical threshold by the American College of Surgeons Committee **(Haggag et al., 2016)**.

Regarding injuries, multiple injuries were most common (58.5%), followed by isolated head injury (30.2%) among the studied cases. These results were in accordance with **Haggag et al., 2016**. While in the study done by **El Gohary et al., 2016**, combined multiple injuries were the most common injuries, followed by isolated extremities injuries.

Goren et al., 2003; Behera et al., 2010; Türkoğlu et al., 2019 and Yokota et al., 2020 noted that head injuries were the most predominant among falls from height.

Intracranial hemorrhage was the most frequent head injury considering the type of injury. Combined injuries were predominant in the chest and abdominal injuries.

Turgut et al., 2018 in their study reported that the most common chest injury is rib fracture.

Overall, this disparity between studies regarding injuries may be owed to differences in many factors, including the severity of the studied cases, circumstances, body position at the time of impact with the ground, reaction time, and type of landing surface **(Con et al., 2014; Yokota et al., 2020).**

The highest percentage of patients died within one day of admission (34%). Besides, there was a highly significant relationship between the level of fall and survival duration. As 46.7% of cases who fell from high level ≥ 6 meters died within one day. This reflects the severity of injuries from this high level. **Türkoğlu et al., 2019** mentioned that most of the cases in their study died within the first 24 hours.

Head injury was the most common cause of death in the studied cases. This was in accordance with **Behera et al., 2010 and Çakı et al., 2021**. While **Türkoğlu et al., 2019** observed that polytrauma was the most common cause of death, followed by solely head/neck injury.

Most patients (71.7%) involved in the current study had a Glasgow coma scale below 8. In contrast, **Lohanathan et al.,2020** found that 3.8% of patients included in their study had GCS below 8. However, this study was done on all cases of falls from height. In addition, the present study revealed that there is a highly significant relationship between the Glasgow coma scale (GCS) and survival duration and cause of death ($p<0.01$). 47.4% of patients who had a Glasgow coma scale below 8 died within 24 hours of admission. Besides, 84.2% of cases with a Glasgow coma scale below 8 died due to CNS impairment. While all cases who had Glasgow coma scale 13 and more died due to CVS and respiratory causes. So, we concluded that GCS could be used to assess brain injuries or conscious levels in patients with head injuries due to falls, and it can also be used to predict the cause of death and survival duration.

Also, there is a significant relationship between the Glasgow coma scale and the level of fall ($p<0.05$). 68.4% of cases who had a Glasgow coma scale below 8 fell from high level ≥ 6 meters. Also**, Turgut et al., 2018; Hsieh et al., 2020 and Nau et al., 2021** found that the Glasgow Coma Scale (GCS) was significantly lower in patients fell from the high level.

Complications were found in 7.5% of cases of the current study in the form of Pneumonia, DVT, hydrocephalus, and paraplegia (1.9% of cases for each)

While **Hakkenbrak et al., 2020** noted that about 17.1 % of cases were complicated by infectious diseases such as pneumonia, sepsis, and urinary tract infection.

Surgical interference was done in 47.2% of cases of the present study in the form of removal of intracranial hemorrhage (18.9), insertion of a chest tube (13.2), fixation of bones (7.5%), and abdominal surgery (7.5%).

Lallier et al., 1999 in his study noted that surgical intervention was done in 43% of intracranial trauma, 60% of facial trauma, 50% of spine fractures, and 39% of musculoskeletal injuries.

CONCLUSION

most cases were accidental, males, occurred at home, with multiple injuries. The level of fall significantly affected survival duration and types of chest and abdominal injuries.

RECOMMENDATIONS

As the home was the most commonplace of fall from height (roofs, windows, and balconies), safety measures of buildings as high parapet wall for the rooftops, stairs and balconies (appropriate railing and grab bars) grills on windows should be ensured.

Children fall mainly during their playing in dangerous high places without parental supervision. So, to avoid these catastrophic scenarios, parents need to warn their children about these dangerous places and take necessary precautions to prevent accidental falls in children from such risky places**.**

Safety measures for construction workers and window cleaners are mandatory.

Further studies with a larger scale of victims are recommended.

Conflict of interest

The authors have no conflict of interest.

Limitations

There was no clear data from the patient's hospital records about the cause and circumstances of falling, type of landing surface, and the part of the victim's body that struck the ground first; these are non-negligible factors affecting mortality.

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الملخص العربي

السقوط المميت من علو: نمط الإصابات وتأثير ارتفاع السقوط

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تمثل الإصابات الناتجة عن السقوط نسبة كبيره لا يمكن تجاهلها من المرضى وفحوصات ما بعد الوفاة هناك عده عوامل تؤثر علي نواتج السقوط منها: ارتفاع السقوط، والطبيعة في موقع التأثير، وعمر الضحية، وهيكل الجسم، وموضع الهبوط، وكثافة العظام، والاعتلال المشترك المصاحب..

الهدف من هذه الدراسة هو تقييم نمط الإصابات وتأثير مستوى السقوط بين حالات السقوط المميتة من ارتفاع التي أدخلت إلى مستشفى جامعة المنوفية من 1 يونيو 2016 إلى نهاية مايو 2021.

المرضى وطرق البحث: تم الحصول على بيانات هذه الدراسة بأثر رجعي من التقارير الطبية للمرضى ومن سجلات المستشفيات الخاصة بالمرضى باستخدام استبيان خاص أعد لهذا الغرض. تم جمع البيانات بما في ذلك البيانات الاجتماعية والديموغرافية، وشملت خصائص السقوط وقت ومكان حدوثه، وارتفاع السقوط الذى تم تصنيفه إلى مرتفع (أكثر من أو يساوي 6 أمتار)، ومنخفض (أقل من 6 أمتار)، والظروف والدوافع التي أدت ألي السقوط ، ونمط الإصابة (مكان ونوع الإصابات) ، ومدة البقاء على قيد الحياة ، ومستوى الوعي وفقًا لمقياس غيبوبة غلاسكو والسبب المحتمل للوفاة .

نتائج البحث: كانت الفئة العمرية الأكثر تمثيلاً هي 18 الى أقل من 40 سنة (41.5%). و معظم الحالات كانت من الذكور (73.6٪)، وكان السقوط عرضيا (98.1٪)، من ارتفاع 6 متر وأكثر (56.6٪)، وقد حدث السقوط في المنزل (62.3٪) ، نهاراً (77.4) ، وبالنسبة لأماكن الإصابات فقد كان الأكثر شيوعا حدوث أصابات متعددة في نسبة 58.5 ٪ من الحالات . أثر مستوى السقوط بشكل كبير على كل من مدة البقاء على قيد الحياة وأنواع إصابات الصدر والبطن. كان توقف مراكز المخ الحيوية هو السبب الأكثر لحدوث الوفاة في 73.6٪ من الحالات. كان لدى معظم المرضى (71.7٪) مقياس غلاسكو للغيبوبة أقل من 8

ويوصي بأخذ الاحتياطات الضرورية اللازمة لمنع حدوث السقوط العرضي من الأماكن المرتفعة للعامة وللعمال المكلفين بأعمال البناء في الأماكن المرتفعة.