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30-day mortality rate following hip fractures in elderly patients admitted to a tertiary care center

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RESEARCH

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ABSTRACT

Background
The incidence of hip fractures in elderly people is steadily rising. Hip fractures sometimes cause mortality especially within 30-days of the injury/incidence. Mortality varies according to the regions or institutes and its determination is clinically or socially important.

Aims
We attempted this cross-sectional study to determine the 30-day mortality rate and its associated factors in elderly patients (>65) admitted to a tertiary center of Saudi Arabia for hip fractures.

Methods
A non-probability consecutive sampling technique was used and determined the 30-day mortality rate and its associated factors on 130 patients.

Results
A 30-days mortality rate of 15.4 per cent (n=20). Patients (n=130) backgrounds were as follows. Male: female; 57.7 per cent (n=75) and 42.3 per cent (n=55) respectively, with age of 79.6 (SD: 8.5; range 65–88). Comorbidities were present: diabetes mellitus70 per cent (n=91), hypertension 81.5 per cent (n=106), and dyslipidaemia (n=43).

Conclusion
Mortality was 15.4 per cent. Male gender, dementia, and place of fall influenced the 30-days mortality rate. Fracture-type, medical comorbidities, and the causes of fall did not affect the mortality.

Key Words
Hip fracture, elderly, 30-day mortality

What this study adds:

1. What is known about this subject?
The mortality rate is high in falling, especially in the first 30 days, and it is estimated to be between 3.5 per cent and 10 per cent.

2. What new information is offered in this study?
The 30-day mortality rate in our study was found to be 15.4 per cent and male gender, dementia, and place of fall influence the 30-days mortality rate.

3. What are the implications for research, policy, or practice?
We recommend a thorough home assessment for seniors by a specialist to identify fall risk factors and provide suggestions that reduce the risk of fall.

Background

As medical care advances, so does the population's average life span, thus increasing the elderly population. The

incidence of hip fractures amongst the elderly is increasing, and the estimated incidence is expected to reach 6.3 million by 2050 worldwide.[1] This increase in incidence is due to age-related difficulties that elderlies face due to poor balance, weakening of the bones as they age, medication side effects, and difficulties in dealing with environmental hazards. Ninety-five percent of hip fractures are due to falls, mainly by falling to the sides, and 90 per cent of the time, they fall from a standing position.[2] Almost one-third (101,800) of hip fracture patients required a hip replacement. An estimated 40 thousand dollars per patient is being spent on treating hip fractures in the United States.[3]

The mortality rate is high in falling, especially in the first 30 days, and it is estimated to be between 3.5 per cent and 10 per cent in multiple studies.[4,5] Many risk factors contribute to increased mortality rate, such as female gender, presentation to the hospital, the mechanism of fall, and length of stay.[1,6,7] Moreover, these factors are not the only causes of increased risk of mortality, but also advanced age, pre-existing comorbidities like diabetes, ischemic heart disease, atrial fibrillation, and neurovascular diseases play an important role.[8]

There are two main anatomical types of hip fractures, either intracapsular or extracapsular. For the intracapsular type, the fracture occurs between intertrochanteric regions and the articular surface of the femoral neck, while the extracapsular fractures consist of intertrochanteric and subtrochanteric regions. There are substantial differences in terms of outcome between the type of hip fractures, particularly extracapsular-intertrochanteric and intracapsular hip fractures.[9] As a result, our study aims to explore the 30-day mortality rate in elderly patients admitted to King Abdulaziz Medical City in Jeddah, Saudi Arabia, for hip fractures.

Method

This study is a cross-sectional study using a non-probability consecutive sampling technique. The study identifies and explores the 30-day mortality rate in elderly patients admitted for hip fractures to King Abdulaziz Medical City in Jeddah, Saudi Arabia. The research project was approved by King Abdullah International Medical Research Center, Jeddah, Saudi Arabia, and the Institutional Review Board. Data was collected from hard files and soft files (BestCare) at medical records. All consecutive male and female elderly patients above 65 years who presented with hip fractures were admitted to the orthopedic department between January 2015 and January 2020 were included in the study. The data collection sheet includes the patient's demographics, living conditions, date of diagnosis, mechanism of fracture, vital sign readings on admission, comorbidities, radiological classifications, presentation to the hospital, and mortality. The classification of fractures was intracapsular, extracapsular, intertrochanteric, and subtrochanteric types.

For the analysis, categorical variables were summarized by frequencies and percentages, and continuous variables by means and standard deviations or medians and interquartile ranges if their distributions were skewed. A p-value less than 0.05 was considered significant. All results were computed using IBM SPSS version 23 (IBM Corp., Armonk, NY).

Results

Our sample size included 130 patients. Among our population, 57.7 per cent (n=75) were males, 42.3 per cent (n=55) were females and the age of population in this study ranged from 65 to 88 years with a mean age of 79.6 years (SD=8.5 years). Some of their comorbidities included diabetes mellitus 70 per cent (n=91), hypertension 81.5 per cent (n=106), and dyslipidaemia 33.1 per cent (n=43). Demographics and other risk factors are shown in Table 1 and 2.

The most common cause of fall in elderly was found to be slipping 42.3 per cent (n=55) followed by others 16.9 per cent (n=22), tripping 10.8 per cent (n=14), postural hypotension 7.7 per cent (n=10), rolls off 7.7 per cent (n=10), and stairs 6.2 per cent (n=8).

Most common place of fall was found to be home 85.4 per cent (n=111), followed by hospital 6.2 per cent (n=8), unknown place 4.6 per cent (n=6) and outdoor 3.8 per cent (n=5). There was no association found between the risk factors and the cause of fall or place of fall.

After the fall, 16.9 per cent (n=22) presented to the hospital within 1–2 hours, 44.6 per cent (n=58) presented within 2-12 hours and 38.5 per cent (n=50) presented to the hospital after 12 hours when they fell. Based on the classification of hip fracture, 50 per cent (n=65) diagnosed with intertrochanteric fracture, 43.1 per cent (n=56) diagnosed with intracapsular fracture, 14.6 per cent (n=19) diagnosed with subtrochanteric fracture, and 1.5 per cent (n=2) diagnosed with extracapsular fracture. The classification is shown in figure 1.

After the diagnosis of hip fracture, our population is presented with a 30-days mortality rate of 15.4 per cent

(n=20) and the complications after hip fractures that lead to mortality were 15 per cent pneumonia, 15 per cent septic shock, 15 per cent pulmonary embolism, 10 per cent myocardial infarction and 45 per cent others.

There was an association between mortality and male gender by 22.7 per cent, with a p-value of 0.007. There was no statistical association between past medical history and mortality except for dementia (62.5 per cent), which was significant with a p-value of 0.002. After a hip fracture diagnosis, the mortality rate increased by 62.5 per cent if the fall was at the hospital with a p-value =0.007. There was no association between the classification of hip fractures and mortality in our study.

Discussion

The increase of life expectancy in the general population, especially in the elderly, is associated with increased morbidity and medical and surgical intervention.[10] In elderly patients, hip fracture is very common, and its morbidity and mortality are significantly higher when compared to younger populations.[11] The 30-day mortality rate in our study was found to be 15.4 per cent which is similar to multiple studies.[12,13,14] In contrast, a local study showed a different 30-day mortality rate of four per cent, which is slightly lower than most literature.[15] There are many risk factors associated with mortality after hip fracture, and one of them is the male gender which has a strong association with mortality by 22.7 per cent. Similarly, other studies, including systematic reviews, show that male gender increases the risk of mortality and is a well-established determinant of mortality following hip fracture.[12,16,17] However, a local study did not show any statistical significance regarding male gender.[15]

Medical comorbidities such as hypertension, diabetes, heart failure, chronic obstructive pulmonary disease, and renal disease have been linked with an increased 1-year mortality rate.[18,19] However, our study shows no statistical significance with these risk factors, and it might be due to the low sample size of our population. Cognitive impairment like dementia has a high impact on mortality following hip fracture with a 62.5 per cent greater risk than those without cognitive impairment on admission following a hip fracture. Another study also shows that the elderly with cognitive impairment presented with a 91 per cent greater risk of mortality than those who were not cognitively impaired.[20]

Hip fracture in hospitalized elderly patients following a fall significantly increased the risk of mortality by 62.5 per cent, consistent with another study that had a similar outcome that links serious fatal events such as death with falls in hospitalized elderly patients.[21] In our study, the classification of hip fracture is not associated with mortality; however, the neck of femur fracture showed significant mortality in another study.[15]

Our study has many limitations, it is a retrospective cross-sectional study, and it is a single-center study, which may affect its conclusion's generalizability. Another limitation is the small number of patients where a significant number of our patients were excluded due mainly to incomplete clinical data and follow-up, which limited the interpretation of the risk factors. Since the most common place of fall is home, we recommend a thorough home assessment for seniors by a specialist to identify fall risk factors and eliminate them and provide suggestions that will improve stability and reduce the risk of fall. We also recommend around-the-clock monitoring of hospitalized elderly patients since their risk of mortality is significantly high.

Conclusion

Our results support the conclusion that male gender, dementia, and place of fall can influence the 30-days mortality rate. However, the classification of fracture, medical comorbidities, and the causes of fall does not affect the mortality rate. Large and multicenter studies with prospective study designs are required to determine other risk factors that affect the mortality rate in our population.

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PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

King Abdullah International Medical Research Center, institutional review board. Study number: SP20/511/J Ref. No. JED-20-427780-174022.

Figures and Tables

Table 1: Demographic Characteristics of (N= 130) patients

Variables	N (%) or mean±SD
Demographic Characteristics	
Gender	
· Male	75 (57.7%)
· Female	55 (42.3%)
Age (years)	79.6±8.5
Weight (kg)	64.7±14.9
Height (m^2)	1.57±0.1
BMI (kg/m^2)	
· Underweight	10 (7.7%)
· Normal	50 (38.5%)
· Overweight	37 (28.5%)
· Obese	33 (25.4%)

Figure 1: Classification of hip fractures

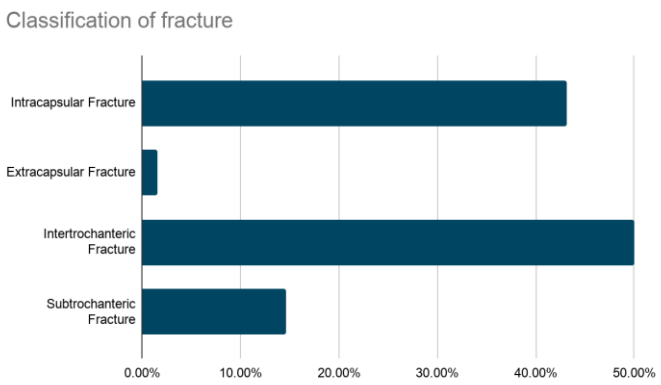

Table 2: Medical history of (N=130) patients

Medical History	
Variables	N (%) or mean ± SD
Smoking	9 (6.9%)
Diabetes Mellitus	91 (70%)
Hypertension	106 (81.5%)
Dyslipidaemia	43 (33.1%)
Osteoporosis	24 (18.5%)
Anaemia	7 (5.4%)
Polypharmacy	29 (22.3%)
Ischemic heart disease	24 (18.5%)
Heart failure	5 (3.8%)
Atrial fibrillation	3 (2.3%)
Brain tumour	3 (2.3%)
Alzheimer's disease	5 (3.8%)
Dementia	8 (6.2%)
Cerebrovascular accident	14 (10.8%)
Parkinson's disease	6 (4.6%)
Hypothyroidism	10 (7.7%)
psychiatric disorders	9 (6.9%)
History of fall	29 (22.3%)
use of walking aid	30 (23.1%)
History of previous surgeries	51 (39.2%)
Other diseases	27 (20.8%)
living conditions	
· with family	127 (97.7%)
· alone	3 (2.3%)