Hip fracture among elderly people: a single cohort study from Kurdistan of Iraq

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ABSTRACT

Background: Hip fracture is considered a major health problem worldwide. The current study aimed to investigate hip fracture characteristics among older people in Iraq and factors involving postoperative mortality.

Method: A single cohort study was carried out in Sulaimani and Shar Teaching hospitals in Sulaimani from the 1st of July 2018 to 30th of June 2019. Hip fracture was diagnosed by a specialist physician using X-Ray. The data collected by the researcher through direct interviews and filling a prepared uniform questionnaire. The data was analyzed by SPSS and p-value<0.05 was significant.

Results: From the total of 100 hip fracture patients included, the average age of patients was 74.45±8.18 years. Fifty-nine patients aged 60 to 75 years, while the rest were older than 75 years. Female consisted of 59.0% of the total samples. Non-mechanical falls accounted for (84%) of all falls. Most patients had intertrochanteric fractures (65%), while 35% had femoral neck fractures. The Proximal femoral nail (PFN) operation was the primary type of operation (77%) performed. Most patients (94%) were discharged after two days. There was a significant association between gender and postoperative mortality; female patients had worse prognosis and higher mortality, relative risk (95%CI) 0.18 (0.0424 to 0.7788). Older patients aged 75 and more had a remarkably poorer prognosis than younger patients, relative risk (95%CI) 0.30 (0.10 to 0.93). There was a strong relationship between poor cognitive function (moderate to severe depression) and postoperative mortality rate with relative risk (95%CI) 0.04 (0.006 to 0.36). Finally, patients on three or more medications also had an outstanding worse prognosis, relative risk (95%CI) 0.022 (0.001 to 0.37).

Conclusion: Hip fracture was more common among women and people aged above 75 years. The prevalence of intertrochanteric fractures was nearly double the femoral neck fractures. Age, female, depression, and polypharmacy had a statistically significant association with three-month mortality in hip fracture patients.

Keywords: hip fracture, elderly, geriatric depression scale (GDS)

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INTRODUCTION

The global size of the elderly population is significantly increasing, and the burden of non-communicable disease is rising concordantly. However, falls can happen at any age, the severity and frequency of fall-related injury and fracture increase with age. People over the age of 65 are more prone to falls; the incidence of falls increases from 25% at 70 to 35% at 75. Falls are responsible for more than 90% of hip fractures. Moreover, researchers have concluded that hip fracture incidence is similarly growing and that hip fracture will remain a major public health problem worldwide.

Studies have shown geographical variation in the incidence and characteristics of hip fracture across the continent and different parts of each region over the last few decades. The frequency of hip fracture in North America and Europe is higher, with seven-fold higher rates than in Southern European countries. Similarly, the prevalence of hip fracture is lower in Asian and Latin American populations. However, as three-quarters of the world populations live in Asia, it is expected that Asia will contribute more to the pool of hip fracture in the coming 25 to 30 years. Furthermore, it is predicted that by 2050 more than 50% of osteoporotic fractures will occur in Asia.

Postoperative mortality varies between the continent and in between countries within each continent. A study from Argentine has shown that increasing age, type of operation (hemiarthroplasty) and comorbidities had worse prognosis. Additionally, a study from North America has highlighted that poor cognitive function, mainly depression, and advancing age have a negative impact on mortality in patients with hip fracture postoperatively. In this study, one-year mortality was 15%.
Most data for hip fractures come from western societies. Sulaimani is a town located in Kurdistan, an autonomous region from the Iraqi central government since 1991. This paper explores the risk factors and characteristics for hip fractures and mortality related risk factors in elderly patients within this population. In obtaining a more clear apprehension of hip fracture causes in this group, a more relevant prevention strategy can be established in developing countries instead of relying upon western guidelines.

Patients and Methods

A single cohort study design was carried out in Sulaimani and Shar Teaching hospitals in Sulaimani from 1st of July 2018 to 30th of June 2019. A convenient sample of 100 patients with hip fractures was taken. Patients with hip fractures were admitted to Sulaimani and Shar Teaching hospitals in Sulaimani. The data was collected by the researcher through direct interviews and filling a prepared uniform questionnaire. Patients were diagnosed as having hip fractures by a specialist physician using X-Ray. Multiple fractures, pathological fractures and patients who underwent organ transplants were the main exclusion criteria for the current study.

Regarding history taking, if the patients were unable to give information, history was taken from relatives and patients chart. Moreover, a 3-month follow-up for all patients was done to determine the mortality rate among all participants. They were asked questions about sociodemographic characteristics, medical history, history of hip fracture and psycho-social characteristics. Verbal consent was taken from each patient and/or their relatives to be included in the study. Confidentiality was taken into consideration. The researcher was responsible, along with other colleagues, for providing full examination and treatment of the patients. Data were collected and coded. The collected data were reviewed and analyzed using Statistical Package for Social sciences (SPSS version 22). Descriptive statistics, such as frequency and percentage, were calculated. P-value was obtained for a categorical variable using chi-square. P-value was considered significant if it was less than 0.05.

RESULTS

A total of 100 hip fracture patients were included in the current study. The average age of patients was 74.45±8.18 years. Fifty-nine patients were between 60 to 75 years of age, and the rest were older than 75. Of 100 cases, 59 were females. Most of the patients (82%) were city residents, and most of them (75%)
were illiterate. Only 24 patients were smokers, and 6 of them consumed alcohol (Table 1).

**Medical history of the patients**

Out of 100 cases, 48% of the patients had diabetes mellitus, while 43% had hypertension, and 15% had ischemic heart diseases. Additionally, a significant proportion (75%) of the samples have used 4 or more medications for chronic diseases (Table 2).

**History of hospitalization**

A remarkable fraction of patients (84%) were admitted with a history of non-mechanical fall. Most had intertrochanteric fractures (65%). At the same time, 35% had femoral neck fractures. A significant number of the patients had proximal femoral nail (PFN) operation. Almost all patients had been operated on within the last 48 hours (Table 3).

**Psycho-social characteristics of the patients**

It was found that a small number of patients were living alone (6%). Additionally, most of the patients were living without any aid (69%). 45% of the patients did not develop depression according to the Geriatric Depression Scale (GDS) on admission (Table 4).

**Mortality and follow-up of the patients after three months**

It was cleared that after 3-month follow-ups, 13% of the patients died. Also, the depression among the patients decreased after three months (62%) according to the Geriatric Depression Scale (GDS) (Table 5).

**Mortality related factors**

Table 6 summarizes the correlation between hip fracture patients’ mortality after three months with some risk factors. There was statistically strong association between gender and mortality of hip fracture patients’ relative risk (95%CI) 0.18 (0.0424 to 0.7788). Female candidates had higher mortality and worse prognosis. Additionally, older patients aged 75 years and more had a remarkably worse prognosis, relative risk (95%CI) 0.30 (0.10 to 0.93). Moreover, patients with moderate to severe depression had high mortality, relative risk (95%CI) 0.04 (0.006 to 0.36). Finally, patients on four or more medications had substantially higher death rate, relative risk (95%CI) 0.022 (0.001 to 0.37) (Table 6).

**DISCUSSION**

This is the first study investigating hip fracture characteristics among older people in Iraq and factors involving postoperative mortality. In this study, we have discovered that 65% of the cases with hip fracture were females, and the samples selected were obtained from patients above the age of 60 years with 41 patients above 75 years. Several descriptive characteristics identified in this study were consistent with previous studies.12-15 Old age

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**Table 3. Hospitalization history of hip fracture patients (n= 100)**

| Medical history          | Frequency | Percent |
|--------------------------|-----------|---------|
| Cause of fall            |           |         |
| Mechanical               | 16        | 16.0    |
| Non-Mechanical           | 84        | 84.0    |
| Type of fracture         |           |         |
| Right intertrochanteric  | 32        | 32.0    |
| Left intertrochanteric   | 33        | 33.0    |
| Right femoral neck       | 17        | 17.0    |
| Left femoral neck        | 18        | 18.0    |
| Type of operation        |           |         |
| Proximal femoral nail (PFN) | 77    | 77.0    |
| Bipolar Hip arthroplasty | 23        | 23.0    |
| Duration admission to operation | |         |
| ≤ 2 days                 | 96        | 96.0    |
| >2 days                  | 4         | 4.0     |

**Table 4. Psycho-social characteristics of the patients (n= 100)**

| Functional capacity | Frequency | Percent |
|---------------------|-----------|---------|
| Independent         | 69        | 69.0    |
| With aid            | 31        | 31.0    |
| Lives alone         |           |         |
| Yes                 | 6         | 6.0     |
| No                  | 94        | 94.0    |
| Geriatric Depression Scale (GDS) on admission | | |
| 0 – 4               | 45        | 45.0    |
| More than 5         | 55        | 55.0    |

**Table 5. Mortality and depression after three months**

| Mortality after three months | Frequency | Percent |
|-----------------------------|-----------|---------|
| Mortality                   |           |         |
| Live                        | 87        | 87.0    |
| Died                        | 13        | 13.0    |
| GDS                         |           |         |
| 0 – 4                       | 62        | 62.0    |
| 5 – 15                      | 25        | 25.0    |
Table 6. Factors associated with mortality

| Factors                  | Mortality after 3 months | Relative risk (95% CI) * |
|-------------------------|--------------------------|--------------------------|
|                         | Live                     | Died                     |                     |
| Sex                     |                          |                          |                     |
| Male                    | 39(44.82)                | 2(15.38)                 | 0.18                |
| Female                  | 48(55.18)                | 11(84.62)                | (0.0424 to 0.7788)  |
| Age                     |                          |                          |                     |
| 60 – 75                 | 55(63.21)                | 4(30.76)                 |                     |
| > 75                    | 32(36.78)                | 9(69.23)                 | 0.30 (0.10 to 0.93) |
| GDS                     |                          |                          |                     |
| 0 – 4                   | 62(71.26)                | 1(7.69)                  | 0.04 (0.006 to 0.36) |
| More than 5             | 25(28.74)                | 12(92.31)                |                     |
| Polypharmacy medications|                          |                          |                     |
| Yes                     | 62(71.26)                | 13(100.0)                | 0.022               |
| No                      | 25(28.74)                | 0(0.0)                   | (0.001 to 0.37)     |

*CI: confidence interval

and female sex were identified as essential hallmarks of hip fracture cases by a few studies. Old age is usually accompanied by loss of musculoskeletal and vestibular functions with the ultimatums, such as loss of balance, coordination, and strength, leading to fall and fracture. A population-based study from California showed that males were half as likely to have hip fractures as females. Most of the cases (65%) had intertrochanteric fractures, and the rest had femoral neck fractures (35%). Proximal Femoral Nair (PFN) was the modality of treatment in 77% of the cases, and 23% received bipolar hip arthroplasty. A similar study from Pakistan established higher incidence of intertrochanteric fracture. Likewise, Frisch et al. revealed that intertrochanteric fractures were more common and had higher mortality than femoral neck fractures.

Hypertension was the most common comorbidity among our cases, followed by diabetes. Similar studies also identified hypertension and diabetes as the most prevalent comorbidities among hip fracture cases. Similarly, Tebé et al. highlighted the association between hip fracture and type 2 Diabetes Mellitus (DM) indicated worse prognosis. On the other hand, a study from China revealed a 53% higher risk of hip fracture for patients with cardiovascular diseases (CVDs). A registry-based survey of the entire population of Norway aged 60 years and above showed that antihypertensive medications reduced hip fracture risk. Other factors identified by similar studies regarding hip fracture were age, gender, body mass index, cognitive impairment, cardiovascular disease, smoking status, antidepressants, anxiolytics, hypnotics and anticholinergic drugs.

In this study, most of the patients (69%) with hip fracture were independent. A few studies tried to show the association between being independent and better functional status as a fracture predictor. Independent old age individuals ambulate frequently and try to perform every activity by themselves, which may increase fracture risk compared to dependent individuals. This hypothesis may not work with the fully functional and independent portion.

In this study, the three-month post-fracture mortality was 13%, which is lower than 3–6-month mortality (15.8%) reported from a meta-analysis study, and the three-month mortality reported from Pakistan (22%). However, the present study’s mortality rate is higher than the loss of life rate revealed in Korea (7.3%) and Italy (10.3%). This difference might be due to the differences in the quality of care. It may also indicate better patient care in the Kurdistan region than in other middle-income countries. Mainly, this might be explained by the short waiting time for surgical operation.

In the current study, age, gender, depression, and polypharmacy drug use showed a statistically significant association with mortality after three months. Several factors were identified by similar studies that affect the risk of mortality up to 12 months: cognitive impairment, age, body mass index, pre-fracture mobility, gender, intra-capsular fracture type, smoking status, high ASA grade, high Charlson comorbidity score on admission, cardiovascular disease, diabetes, antidepressants, anxiolytics, hypnotics and anticholinergic drugs.

The main limitations of this study emanate from its small sample size and retrospective nature. The small sample size hampers thorough investigation of different management modalities’ effect on patient mortality and performs fundamental statistical analysis to identify mortality predictors. This study shares all the limitations of retrospective studies, like the low level of evidence, difficulty ascertaining the data’s authenticity, and confounding.

CONCLUSION

This study highlighted that hip fracture was more common among women and people aged above 75 years. The prevalence of intertrochanteric fractures was nearly double the femoral neck fractures. Hip fractures were common among functionally independent geriatrics. Chronic illnesses like hypertension and diabetes were more common in hip fracture patients. Age, sex, depression and use of multiple medications had a statistically significant correlation with three-month mortality in hip fracture patients.

DISCLOSURES

CONFLICT OF INTEREST

The authors do not have any conflict of interest.
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ETHICAL CONSIDERATIONS

Ethical approval was obtained from the University of Sulaimani/ethic committee/ Ministry of Higher Education and Scientific Research, Kurdistan, under the ethical clearance 4586/2018/05/08.

AUTHOR CONTRIBUTION

Asso Amin, Hersh H Ali, Saman A Faraj, Sara N Ghafoor, Saman H Shareef; research design, data collection. Saman Sadeq, Soran Noori, Khalid Anwar Hama ghareeb, Mohammed I.M. Gubari; data analysis, writing. Asso Amin; article editing

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