

Geriatric Hospitalizations Due to Fall-Related Injuries

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Background: Fall is a preventable condition associated with disability and mortality in elders. The overall data regarding admission rates and its impact in Thai elderly are lacking.

Objective: To identify admission, mortality rates of older persons with fall, its causes and consequences.

Material and Method: Information on illness of inpatients and casualties came from hospitals nationwide and from hospital withdrawals from the 3 health insurance schemes in fiscal 2010. The data included 96% of the population. The data were analyzed by age groups in older patients with fall.

Results: There were 311,132 falls of all admissions; accounting for admission and mortality rates of 423.4 and 11.1/100,000 older persons. The number rose with age. Slipping, tripping were the major causes. The average length of stay (LOS) of fallers with and without fractures was 8.1 and 6.4 days. The average hospital costs in these same groups were 25,728 and 19,419.3 Baht.

Conclusion: The increasing age is related to an increased admission and mortality rates of fall. Slipping, tripping was the frequent causes. Greater LOS and hospital charges were found in fallers with fractures. Allied-healthcare workers should routinely implement a fall assessment and educate modifiable factors to elders to prevent future fall.

Keywords: Falls, Clinical epidemiology, Elderly

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Fall is one of the common geriatric syndromes and is a major factor threatening the independence of older individuals. Its prevalence has been increasing in relation to increasing age⁽¹⁻³⁾. The estimated fall rate is 0.3-1.6 per person annually. This rate doubles in people aged over 75 years and the rates are higher in nursing home residents^(3,4). Among urban Thai elders, about 24% in female and 12% in male reported having at least one fall over the past 6 months⁽⁵⁾. Fall frequently results in a minor soft tissue injury and about 1 out of 10 results in a serious injury such as fracture, head

trauma and major laceration⁽⁶⁾. Fracture occurs in 75% of serious injury, hip fracture accounts for 1-2% of falls⁽⁷⁾. Consequences of falls can lead to poor quality of life resulting from the disability and increased mortality in the elderly, outcomes which increase with age. Additionally, fall-related hospitalization leads to substantial health care costs⁽⁸⁾. A recent study has reported that hospitalized elders with fall who were aged 75 years or over had short-term mortality of 6% and median hospital charges of \$11,000 with predictive factors which included cardiac disease, anemia, major orthopedic and neurosurgical procedures, pneumonia, and intubation⁽⁹⁾.

The causes of falls in the elderly are usually multi-factorial which are intrinsic factors including aged-related changes and pathology affecting the system of sensori-neuromuscular function and medications and extrinsic factors including hazardous

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activities or risky environment of fall. The more risk factors, the greater risks of fall can occur^(7,8).

Objective

As fall is a preventable geriatric syndrome, early risk identification and appropriate management should prevent future fall or reduce complication post fall^(1,7,8). Currently, the overall prevalence of fall-related hospitalization that includes general hospitals, common causes of fall, and consequences of fall at this level of care are not yet known. Thus, the primary objective of the present study was to identify the admission rates of older patients with fall as the prevalence rate cannot be identified from the current database. The secondary objective was to identify the common causes of older hospitalization due to fall-related injury, the impact of fall in the context of mortality rate, length of hospital stay and healthcare costs.

Material and Method

Patient population

Data included inpatient Medical Expensing Forms for fiscal year 2010 (October 1, 2009 and September 30, 2010) from the National Health Security Office (NHSO), Thailand, and inpatient data from the Civil Servants Benefit System from the Comptroller General's Department and the Social Security Office.

Data received from the analyst team were checked for accuracy by looking for (a) overlapping information (b) visit dates (c) missing items (d) incorrect coding and (e) dated with the correct fiscal year.

Patients were classified mainly into 2 groups: older persons who were aged 61 years old or over with fall (ICD-10-W00-W19) who had either fracture (ICD-10-S02, S12, S32, S42, S52, S62, S72, S82, S92, T02, T08, T10) or no fracture as a primary or secondary diagnosis.

Patient demographics and clinical characteristics

Baseline characteristics of older patients including age, gender, admission rate, mortality rate, type of fracture, and common causes of hospitalization were captured from enrollment data.

Outcome measures

The present study outcomes were admission rates and mortality rates per 100,000 population in the same age groups; 61-70, 71-80, and over 80 years, and causes of hospitalization due to fall-related injuries. Length of stay in days and healthcare costs in Baht were compared between patients who fell classified as patients with fracture and those without fracture.

Statistical analysis

The explanation of variables, tables of frequency enumeration and interrelationships were written using the SPSS program and checked before analyzing. After analyzing the data, the research team passed the primary analysis to ten medical specialists in order to check the validity of the information. Upon confirmation of validity, the data were compared to the Ministry of Public Health's Statistics Report 2010 for trend congruence as well as the hospital's mortality reporting for each age and disease group for comparison with the National Death Registration of the Registry Administration, Ministry of Interior Affairs⁽¹⁰⁾.

Ethics approval was provided by the Ethic Committee of Medicine Faculty, Khon Kaen University under the respect of Helsinki Declaration.

Results

Epidemiology of geriatric hospitalization due to fall-related injuries

Older persons hospitalized with falls 311,132 times contributing to the admission rates of 424.3 per 100,000 older persons. The admission rates increased in relation to increasing age (Fig. 1). The majority of falls were due to slipping, tripping or stumbling which female was the predominant gender. The average female-to-male ratio was 1.8 and was 1.5, 1.9 and 1.8 at age group of 61-70, 71-80 and over 80. The top 5 causes of falls are shown in Fig. 2. Femur fracture was the leading cause of hospitalization due to fall-related injury with the admission rates per 100,000 persons by age of 7.7, followed by the fracture of lumbar spine and pelvis (5.6), fracture of ribs, sternum, thoracic spine (5.2) and

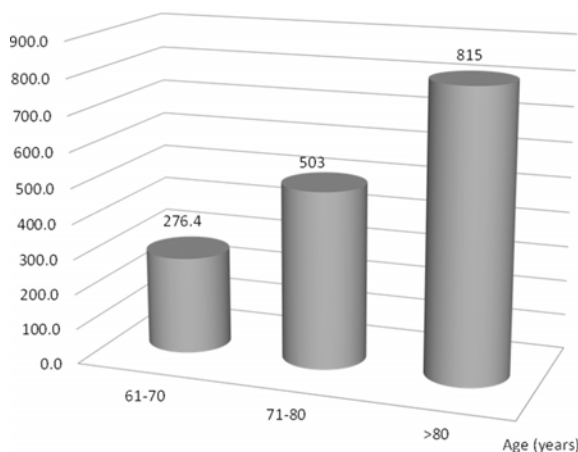


Fig. 1 Admission rate per 100,00 older persons with falls by age group

fracture of forearm (5.1).

Consequences of falls among geriatric hospitalization

A) Fall and fracture

The overall admission rates of falls with fracture were 36.4 in female and 29.9 in male per 100,000 older persons. The figures in females rose considerably with increasing age, while for male this was relatively low as shown in Fig. 3.

B) Falls and length of stay and healthcare costs

The average length of stay in older persons

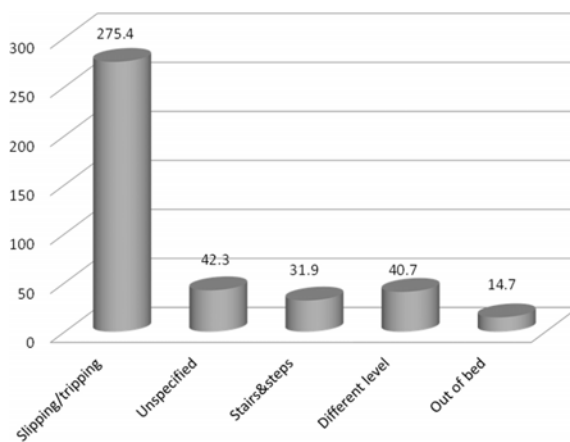
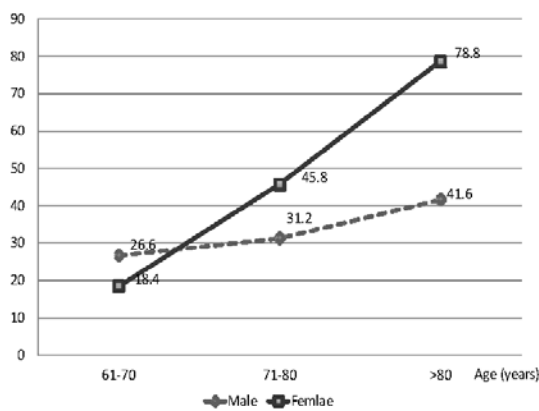


Fig. 2 Common causes of geriatric hospitalization due to fall-related injuries per 100,000 older persons



Note: admission rate per 100,000 persons

Fig. 3 The comparison of the admission rate of falls of geriatric hospitalization with fractures by age group and sex in 2010

hospitalized with falls with and without fractures was 8.1 and 6.4 days. Similarly the healthcare costs were greater in older persons with fractures (25,728.00 Baht and 19,419.30 Baht in persons with and without fractures, respectively)

C) Falls and mortality rate

The average mortality rate of hospitalized older persons with falls was 11.1 per 100,000 older persons. It was 5.7, 13.7 and 27.2 per 100,000 older persons by age for the age group of 61-70, 71-80, and over 80 years, respectively.

Discussion

The findings from the present study indicated that fall-related injury hospitalization rates were highest among older persons aged over 80 years and increased with age, supporting the published studies^(1,11,12). The leading causes of fall related-injury hospitalization were slipping, tripping or stumbling. The frequent diagnoses of these clinical clues are gait and balance problems, visual disturbance and environmental hazard⁽³⁾. Additionally, falls are usually a result from interactions between long-term and short-term predisposing factors and environmental situation that predisposes to fall⁽⁶⁾. Therefore, treatment only the consequences of falls such as fractures and soft tissue injury is not appropriate. Assessment of falls by obtaining a thorough medical history and physical examination including environmental factors, an activity of the faller at the time of falling and associated symptoms such as dizziness, imbalance, palpitation and lightheadedness, medication review focusing on psychotropic medications, sedative hypnotics, antidepressants and antihypertensive medications in addition evaluation of gait, balance, visual problems and cognitive status should be performed in the routine assessment^(3,7,11).

The finding showed post fall fracture rate was rising in regard to increasing ages especially in females. One possible explanation is an increased risk of osteoporosis in older females than males and that females are physically smaller than males since osteoporosis and low body weight are contributing factors of a fracture post fall^(8,13,14). The present study also confirms that hospitalization due to fall-related injury in older persons is associated with an increased length of stay and healthcare costs. However, these figures might be underestimated^(7,8).

Fall prevention by early identification of fall risks should be done in older persons to reduce an occurrence of fall and minimize serious outcomes as a

result of fall. Implementing a simple question strategy of fall screening by asking older persons regarding any experience of at least a fall in the past 12 months is an effective way to obtain current fall related data, which has a positive likelihood ratio of 2.3-2.8 to identify risky person⁽¹⁾. Other indicators of requiring comprehensive fall assessment are older persons with abnormal gait and balance, with presenting symptoms that require medical attention such as dizziness and fear of falling. Hence, a comprehensive fall risk assessment should be performed. It includes the multi-factorial risk evaluation including orthostatic vital signs, visual acuity testing, balance and gait assessment using a short- and simple-tool such as Timed Get Up and Go test, a review of medication, an evaluation of activities of daily living, cognitive function, and environmental hazards^(1,8). Subsequently, implementation of the intervention in high risk persons by targeting to multi-factorial fall prevention strategies of individuals has shown to be effective in fall prevention and a reduction of recurrent fall^(1,8,15). Moreover, encouraging continuous exercise in particular balancing exercise in all older persons if possible would be beneficial in fall prevention, and environmental modification to elderly-friendly environment may reduce falls especially in a high risk group^(6,15).

Study limitations

Several limitations of the present study were found. Firstly, because of the limited data, it is difficult to analyze prevalence rates of fall but only admission rates. Additionally, these figures may include falls during hospitalization. Secondly, there is the potential misclassification of data collection wherein some patients were either inappropriately included or excluded based on ICD-10 codes. Thirdly, many data associated with risk factors of fall are unavailable such as history of falls, balance and gait, associated medications and cognitive assessment. Finally, the impact of falls on some aspects is lacking, such as functional capacity in activities of daily living post fall and post-hospital costs. Therefore the results of the present study need to be interpreted in the context of its limitations.

Conclusion

The admission rates and mortality rates of fall-related injury increased with age. Slipping, tripping or stumbling were the common causes of hospitalization with fall. Comprehensive fall assessment should be done in these elders including gait and balance problems,

visual disturbance, and environmental hazard. The elderly with falls and fractures were associated with an increased length of stay and health care costs. Allied-healthcare workers need to routinely inquire about fall risks to elders, address and educate modifiable underlying risk factors to elders and their families such as home hazard modifications, avoidance of medication interactions and side effects, and the use of proper protective equipments during daily activities.

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Potential conflicts of interest

None.

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การนอนพักรักษาในโรงพยาบาลเนื่องจากภาวะหกล้มในผู้สูงอายุ

ปณิตา ลิ้มปะวัฒน์นะ, สุमितรา สุตรา, ยุพา ถาวรพิทักษ์, จาริญญ์ จินดาประเสริฐ, พิศาล ไม้เรียง

ภูมิหลัง: ภาวะหกล้มเป็นกลุ่มอาการที่พบบ่อยในผู้สูงอายุและสามารถป้องกันได้ ภาวะนี้ส่งผลกระทบต่อ การเกิดภาวะทุพพลภาพและเพิ่มอัตราการเสียชีวิตในผู้สูงอายุ ปัจจุบันข้อมูลภาพรวมอัตราการนอนพักรักษา ในโรงพยาบาลด้วยภาวะหกล้มในผู้สูงอายุ สาเหตุของภาวะหกล้ม และผลกระทบของภาวะหกล้มที่เป็นสาเหตุ ของการนอนพักรักษาในโรงพยาบาลของประเทศไทยยังมีไม่มาก

วัตถุประสงค์: เพื่อทราบอัตราการนอนพักรักษาในโรงพยาบาลในผู้สูงอายุไทยที่มีภาวะหกล้ม สาเหตุและผลกระทบ ของภาวะหกล้ม

วัสดุและวิธีการ: ข้อมูลการเจ็บป่วยของผู้ป่วยในและผู้เสียชีวิตในโรงพยาบาล มาจากข้อมูลที่โรงพยาบาลส่งเบิกจ่าย จากรบบประกันสุขภาพ 3 แห่งคือระบบประกันสุขภาพถ้วนหน้าระบบ ประกันสังคมและระบบสวัสดิการรักษายาบาลข้าราชการ ในปีงบประมาณปี พ.ศ. 2553 ซึ่งครอบคลุมประชากร 62 ล้านคน (ร้อยละ 96 ของประชากร ของประเทศ) ข้อมูลที่ได้ถูกวิเคราะห์ตามกลุ่มอายุและปัญหาสุขภาพในผู้ที่มีภาวะหกล้ม

ผลการศึกษา: ผู้สูงอายุนอนพักรักษาในโรงพยาบาลด้วยภาวะหกล้ม 311,132 ครั้ง คิดเป็นอัตราการนอนพักรักษา ในโรงพยาบาลเท่ากับ 423.4 ครั้งและอัตราการเสียชีวิตเท่ากับ 11.1 คนต่อประชากร 100,000 คนโดยพบอัตรา ดังกล่าวสูงขึ้นเมื่ออายุมากขึ้น สาเหตุหลักของภาวะหกล้ม ได้แก่ การลื่น หรือ สะดุดล้ม ผู้สูงอายุที่หกล้ม และมีกระดูกหักมีอัตราการนอนพักรักษาในโรงพยาบาลเท่ากับ 36.4 ครั้งในเพศหญิงและ 29.9 ครั้ง ในเพศชายต่อประชากร 100,000 คน ระยะเวลาเฉลี่ยในการนอนพักรักษาในโรงพยาบาลในผู้ที่มีกระดูกหักเท่ากับ 8.1 วัน ส่วนผู้ที่ไม่มีการหักกระดูกด้วยเท่ากับ 6.4 วัน ค่ารักษาพยาบาลเฉลี่ยในกลุ่มที่มีการหักและไม่มีการหัก เท่ากับ 25,728.00 บาท และ 19,419.30 บาท ตามลำดับ

สรุป: อัตราการนอนพักรักษาในโรงพยาบาลและอัตราการเสียชีวิตในผู้สูงอายุที่มีภาวะหกล้มสูงขึ้นเมื่ออายุมากขึ้น สาเหตุหลักของภาวะหกล้มคือการลื่นหรือสะดุดล้ม ผู้ที่มีการหักกระดูกด้วยมีระยะเวลาการนอนพักรักษา ในโรงพยาบาลและค่าใช้จ่ายในการดูแลสูงกว่ากลุ่มที่ไม่มีการหักกระดูกด้วย บุคลากรทางการแพทย์ควรประเมิน ความเสี่ยงในผู้สูงอายุทุกรายในเวชปฏิบัติทั่วไป เพื่อหาปัจจัยเสี่ยงต่อการหกล้ม และให้ความรู้เกี่ยวกับการปรับเปลี่ยน ปัจจัยที่แก้ไขได้แก่ผู้สูงอายุและผู้ดูแลเพื่อป้องกันการหกล้มหรือลดภาวะแทรกซ้อนจากภาวะหกล้ม
