

Epidemiology of Hip Fracture in Chiang Mai

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The incidence of hip fracture varies worldwide. From 1997 to 1998, the incidence of hip fracture in Chiang Mai was 151.2 and 185.2 per 100,000 from the hospital survey and the community survey respectively. The mortality rate in hospital following hip fracture was 2.1% and the one-year mortality rate rose steadily to 37%. In addition, morbidity after hip fracture may also carry serious implications on the functional independence and quality of life. Concerning the costs for treatment, hip fracture is also a great burden for the health service in Thailand. The risk factors for hip fracture include age, medical co-morbidities, current use of antihistamine, history of fracture, alcoholic consumption, low calcium intake and lack of physical activity, whereas calcium intake and physical activity were demonstrated as important protective factors against hip fracture. Improved understanding for epidemiology of hip fracture in Thailand could enhance the effectiveness for prevention of the fracture.

Keywords: Hip fracture, Thailand

J Med Assoc Thai 2005; 88(Suppl 5): S105-9

Full text. e-Journal: <http://www.medassocthai.org/journal>

Hip fractures have been considered to be a major problem for public health not only in Thailand but also in many Western countries. The fracture is one of the most important causes of morbidity and mortality. Among elderly victims, approximately 20% die within 3 to 6 months of injury^(1,2) and 28% die within 1 year⁽³⁾. Due to increased life expectancy and population growth, the incidence of hip fractures has been increasing exponentially over time. Several studies have demonstrated that there is substantial variation in the incidence of hip fracture in different regions of the world. According to the studies, the incidence of hip fracture in Asian countries was found to be much lower than in Europe and North America. It has been projected that by the year 2050, 50% of all hip fractures in the world will occur in Asia⁽⁴⁾. However, most studies on epidemiology of hip fractures have been reported from developed countries. The authors carried out a review of the literature concerning the incidence, mortality and quality of life, cost, protective factors, risk factors, mechanism, place for the injury and prevention of hip fractures in Thailand.

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Incidence

There were an estimated 1.66 million hip fractures around the world in 1990, with incidence rates varying worldwide⁽⁴⁾. Gullberg et al projected the total number of hip fractures worldwide will increase from 1.66 million in 1990 to 2.6 million by the year 2025 and 4.5 million by the year 2050⁽⁵⁾. In 1990, a multicenter study on hip fractures was conducted in Thailand and Suriyawongpaisal demonstrated that the age-adjusted incidence of hip fractures was 7.45 per 100,000 populations. Hip fracture incidence for men was 6.68 per 100,000 populations per year, whereas for women it was 14.93 per 100,000 populations per year⁽⁷⁾. At present, there are patients with hip fractures in Latin America and Asia approximately one-fourth of the patients around the world. Additionally, the rate has been projected to rise to one-half by the year 2050. Asia will, therefore, be the continent to have the most patients with hip fractures over the period. One study of the incidence of hip fractures in Ubonrachathanee Province, Thailand, by Songpatanasilp et al in 1995 showed the incidence was 10.3 fractures per 100,000 population per year⁽¹⁹⁾. From 1997 to 1998, Phadungkiat et al reported the incidence of hip fractures in Chiang Mai was 151.2 per 100,000 from a hospital survey and 185.2 per 100,000 from the community survey. Using the incidence from

the community survey, it could be estimated that the number of hip fractures for the whole country could be 10,600 cases or more in the year 1998. This figure will rise to 14,132 cases per annum in the year 2020 based on the projected number of the aging population⁽⁸⁾.

The incidence of hip fracture has been also studied in some Asian countries. Lau et al demonstrated the age-adjusted rates for men and women (per 10,000) as the following: Hong Kong, 180 and 459; Singapore, 164 and 442; Malaysia, 88 and 218; Thailand, 114 and 289; compared with US (White) rates of 187 in men and 535 in women, published in 1989⁽⁶⁾.

Mortality

Hip fractures have long been considered a major threat to the survival of elderly people. From 1997 to 1998, Chariyalertsak et al described the survival experience of 330 elderly hip fracture patients who were seen at hospitals in Chiang Mai, Thailand. The mortality rate during hospitalization was 2.1%. The 3-, 6-, and 12-month survival rates after hip fractures were 91%, 88% and 83%, respectively. The authors also found that the significant predictors of mortality were male sex, age over 80 years, presence of chronic illnesses, poor pre-fracture walking ability and non-operative treatment⁽⁹⁾. From 1995 to 1997, Jitapunkul et al showed that Thai women aged 50 years and over with hip fracture had a mortality rate higher than those without hip fracture⁽¹⁰⁾. The authors also demonstrated that there was a statistically significant difference in survival rate after hip fracture between the cases and controls (p -value < 0.05) (Fig. 1).

Quality of life

Hip fracture can have a great impact on the functional independence and quality of life for older patients. Jongjit et al performed a study in 2000 among the subjects living in the central region of Thailand to assess the quality of life and functional independence after hip fracture, compared with a population of the same age in community dwellers of both sexes without hip fracture⁽²⁰⁾. The authors demonstrated the detrimental impact of hip fracture on both the quality of life and functionality in a group with clinical symptoms.

Similarly, Suriyawongpaisal et al conducted a study in Chiang Mai province and found that patients with hip fracture experienced a significant deterioration in health-related quality of life⁽²¹⁾. There were substantial decreases in the activities of daily living and comorbidities were associated with deficits in health-

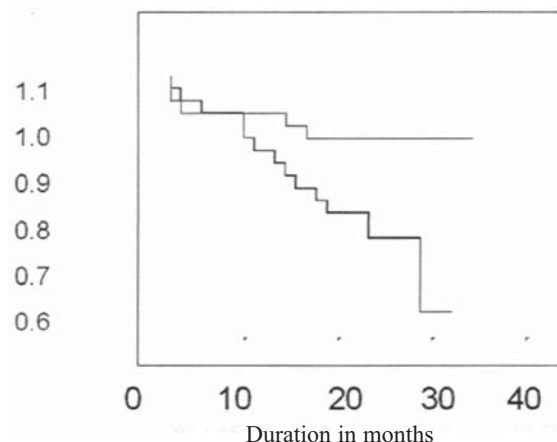


Fig. 1 Survival rate after hip fracture

related quality of life.

Cost

According to a multicenter study on hip fracture in Thailand (1994) by Suriyawongpaisal et al, they reported the average length of stay in hospital for the cases was 22.69 days with a median of 17 days. It was also found that the patients paid 11,896.33 baht (\$475.85) on average for orthopedic care (median = 11,205.00 baht), over one fourth of the national income per capita (36,563 baht)⁽⁷⁾. The results of the study confirm that the economic burden associated with hip fracture is substantial, highlighting the need for strategies to prevent this type of fracture. Haentjens et al conducted a prospective study for hip fractures at four Belgian hospitals between 1995 and 1996, and they showed that the total mean costs of the initial hospitalization were \$9,534 for the hip fracture patients. The total direct cost during the year after discharge averaged \$13,470 for the hip-fracture patients and \$6,170 for the control subjects. The largest cost differences were attributable to nursing-home stays (31%), rehabilitation-center stays (31%), hospitalizations (16%), and home physical-therapy services (14%)⁽¹¹⁾.

Mechanism of injury

Phadungkiat et al demonstrated that a fall from a standing height was the most common mechanism (75%) leading to hip fracture (Fig. 2)⁽¹²⁾. Most cases were walking before sustaining the fracture (Table 1). Concerning places where hip fractures occurred, indoors was the most common place for the hip fracture (68%) (Fig. 3).

Risk factors and Protective factors

There were numerous factors that could af-

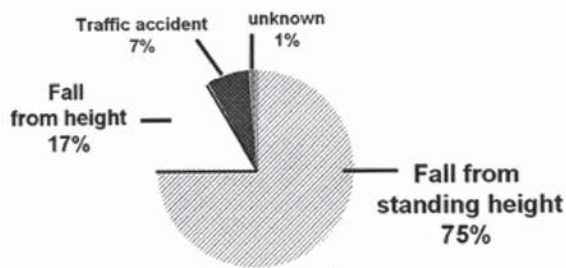


Fig. 2 Mechanisms of fractures

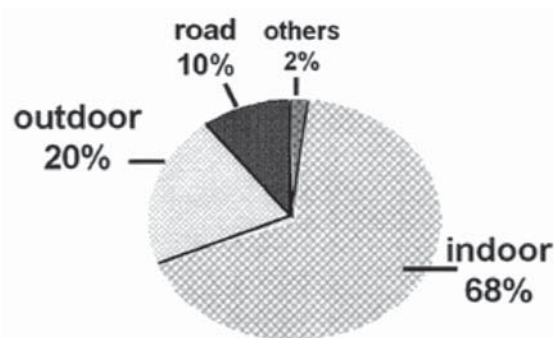


Fig. 3. Place where fractures occurred

fect the risk of hip fracture. Boonyaratavej identified that history of antihistamine use increased the risk about 14-fold (OR = 13.96, 95% CI = 1.38-141.13). The following risk factors were also found to increase the incidence of hip fracture: traditional medicine, underlying cerebrovascular diseases, history of fracture, parental Chinese racial background, and any alcohol assumption⁽¹³⁾. Odds ratio and 95% confidence interval are shown in Table 2. Jitapunkul et al performed a case-control study and found that a low number of pregnancy was a risk factor for hip fracture⁽¹⁷⁾. In addition, they reported that low serum calcium was an independent risk factor⁽¹⁷⁾. Similarly, Lau et al showed that low dietary calcium intake was a risk factor in both men and women, whereas recent physical activity reduced the risk to about two-thirds (OR = 0.33, 95% CI = 0.19-0.60)⁽¹⁸⁾. Moreover, they identified alcoholism, cigarette smoking, a history of falls and fractures to be risk factors for hip fracture. Given that the dietary calcium intake in most Asian countries is low, calcium supplement should have a considerable impact on the reduction of fracture risk. As shown in Table 3, breastfeeding was identified to be a protective factor. Therefore, calcium intake and physical activity were important protective factors against hip fracture in the studies.

Gallagher et al observed that hip fracture in-

Table 1. Events leading to hip fractures (N=391)

Events	Number	%
Walking	241	61.6
Standing	86	22.0
Sitting	27	6.9
Traffic transport	26	6.6
Lying down	7	1.8
Running	2	0.5
Spontaneous	2	0.5
Total	391	99.9

Table 2. Risk factors for hip fractures

Risk factors	Odd ratio (95% CI)
Current use of antihistamine	13.96 (1.38-141.13)
Current use of traditional medicine	7.66 (2.71-21.63)
Cerebrovascular disease	6.53 (2.10-20.34)
History of fracture	4.04 (1.26-12.99)
Parental Chinese racial background	2.52 (1.49-4.23)
Alcoholic consumption	2.30 (1.04-5.09)

Table 3. Protective factors for hip fractures

Protective factors	Odd ratio (95% CI)
Recent physical activity	0.33 (0.19-0.60)
Breast feeding	0.87 (0.80-0.94)

cidence doubles for each decade of life after age 50⁽¹⁴⁾, whereas Hedlund et al reported that this figure doubles every 7 to 8 years in women and every 5 to 6 years in men after age 50⁽¹⁵⁾. It has been postulated that the association of increased hip fracture incidence with advancing age is related to the increased co-morbidities of population. Cooper et al reported that 72% of the 1.66 million hip fractures in 1990 occurred in women⁽⁴⁾. Melton attributed the disparity in hip fracture risk to women's lower bone mass, lower bone density, and high frequency of falling⁽¹⁶⁾.

Conclusion

The authors believe that the main factors contributing to the increasing prevalence of hip fractures in Thailand included increased life expectancy and population growth. Morbidity and mortality were considerable for patients with hip fractures as well as the costs of treating a hip-fracture were substantial. Hip fracture could also lead to crippling consequences with considerable impact on the quality of life. Thus, it was important to analyze factors that could affect hip fracture risk such as age, medical co-morbidities, current

use of antihistamine, history of fracture, alcoholic consumption, low calcium intake and a lack of physical activity. By improved understanding of hip fracture epidemiology and risk factors, effective preventive strategies could be undertaken for the rising prevalence of hip fracture.

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ระบาดวิทยาของภาวะกระดูกสะโพกหักในเชียงใหม่

สตีเวีย โรจนเสถียร, ศิริชัย ลีอวิฑูรเวชกิจ

อุบัติการณ์ของกระดูกสะโพกหักแตกต่างกันในแต่ละภูมิภาคของโลก อุบัติการณ์กระดูกสะโพกหักของจังหวัดเชียงใหม่ ระหว่างปีพ.ศ. 2540 - 2541 เท่ากับ 151.2 ต่อแสนจากข้อมูลของโรงพยาบาล และเท่ากับ 185.2 ต่อแสนจากการสำรวจชุมชน มีการเสียชีวิตในโรงพยาบาลร้อยละ 2.1 และเพิ่มขึ้นเรื่อย ๆ ตามระยะเวลา โดยสูงถึงร้อยละ 37 เมื่อผ่านไป 1 ปี ผู้ป่วยสูงอายุได้รับผลกระทบที่รุนแรงทั้งด้านการพึ่งพาผู้อื่นและคุณภาพชีวิต ปัจจัยเสี่ยง ได้แก่ อายุ ปัญหาสุขภาพร่วม การใช้ยาแก้แพ้ ประวัติกระดูกหัก การดื่มสุรา การบริโภคแคลเซียมในระดับต่ำ กระดูกสะโพกหักเป็นปัญหาใหญ่ของประเทศในเรื่องค่าใช้จ่าย การออกกำลังที่พอเพียงเป็นปัจจัยสำคัญในการป้องกัน ความเข้าใจที่ดีขึ้นในเรื่องระบาดวิทยาของภาวะกระดูกสะโพกหักจะสามารถเพิ่มประสิทธิภาพในการป้องกัน
