Incidence of Hip Fracture in Chiang Mai

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Abstract

The reported incidence of hip fracture varies to a large extent across regions. Most studies relied on hospital data under the assumption that nearly all cases of hip fracture get access to hospital care. As in many developing countries, a number of hip fracture cases in Thailand might not seek care in hospitals due to geographical, socio-cultural and financial barriers. Therefore, using hospital data alone, could lead to under estimation of the magnitude of hip fracture. This study was undertaken to obtain such information using a combined method of hospital discharge survey and a cross sectional community survey.

It resulted in an estimated incidence of 151.2 per 100,000 (95% CI 136.7-167.2) from the hospital survey and 185.2 per 100,000 (95% CI 138.1-247.6) from the community survey. In comparison to developed countries, age-adjusted incidence of hip fracture in this study was markedly lower than that reported from developed countries. It was argued that different degree of urbanization might explain the discrepancy. This implicated promotion of physical activity as a public health measure to prevent hip fracture.

Key word : Hip Fracture, Hospital Based, Community Based, Incidence

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The reported incidence of hip fractures among Asians varies among different geographical regions[1]. During the last decade (since1990), the figure came mainly from the Far East (Hong Kong, Japan and Korea). In Southeast Asia, an incidence of 7 per 100,000 was reported from Thailand in 1994 based on retrospective hospital records[2]. However, given its limitations due mainly to under reporting of cases, the figure was considered to be an under estimate. This study was undertaken using prospective hospital discharge surveys to estimate the incidence of hip fracture in Chiang Mai, the fifth most populated province in the country with an 11.1 per cent urbanized population[3]. Owing to a concern that a number of patients might not seek care at hospitals which could lead to under estimation of the incidence, a community survey was also carried out to validate the figure from the hospital discharge survey.

METHOD

Chiang Mai is a major province in the North of Thailand with a population of 1,443,245[3]. 17.8 per cent of the population are aged over 50 with a sex ratio of 1.05 : 1 for women to men(3). The province comprise 24 districts with 2 public referral hospitals, 20 district hospitals and 9 private hospitals. The referral and private hospitals are in the urban center. In general, a patient with hip fracture could seek care at any hospital. If they presented themselves to district hospitals, they would be referred to the referral hospitals where orthopedic care was available. Nevertheless, there were some patients who refused to be referred to the referral hospitals. The referral hospitals also drew patients from nearby provinces and private hospitals. Private hospitals also provided orthopedic care to a limited number of cases who could afford the expense.

The hospital discharge survey was carried out from August 1997 - July 1998 covering all the public and private hospitals. The target population was defined as a person aged 51 and older who had lived in the province for at least 1 year. Radiological diagnosis was used to ascertain case status. Complete registration of all hip fractures was ensured through involvement of all the directors of the district hospitals and the Head of the Department of Orthopedic Surgery in the referral and private hospitals. Case detection was undertaken by checking for hip fracture patients seeking care at the emergency room, inpatient registration, and logbooks in operation units on a daily basis. A short interview was administered to each detected case by a nurse covering demographic profiles, events prior to the fracture, mechanism of fall, time and place of occurrence. Clinical and radiological diagnoses were recorded in the interview form.

The community survey was undertaken with the following details. 1) 246 sampled villages were drawn by simple random technique from 123 subdistricts in 24 districts i.e., 2 villages from each subdistrict. 2) A health worker from each responsible health center to those sampled subdistricts was trained to collect data using the standard interview schedule. 3) Data collection was undertaken from September to October 1998. 4) For each household, the number of defacto members was recorded including those who had died between August 1,1997 and the date of the survey. Household members aged 52 and over in each household were interviewed or proxy respondents were interviewed on behalf of those who had died a year earlier. Key variables included in the interview were walking abnormalities over a 2-week period at present or in the past; nature of events leading to the abnormalities; causes of the abnormalities (hip fracture, other fractures of lower extremity, other diseases) and sources of reference for the diagnosis; treatment modalities for the abnormalities; and causes of death. Walking abnormalities included normal gait with hip pain, abnormal gait with/without gait aid or with/without hip pain, inability to walk. 5) Suspected cases of hip fracture were subjects with walking abnormalities and any of the following attributes : a) a report of doctor diagnosis of hip fracture; b) a history of surgery or immobilization; c) a history of traumatic events.

Suspected cases of hip fracture which occurred between August 1, 1997 to July 31, 1998 were verified against those from the hospital discharge survey case by case. Suspected cases which could not be matched in this respect were verified using hospital records if available.

Health workers surveying each village and hospital records (refered to as interviewees) were consulted on unmatched cases from both surveys to assure validity of information.

Denominator information was obtained from the report of the National Statistical Office for the year 1997[3]. Cumulative incidence rates were

calculated as the average annual age- and sex-specific number of cases divided by the population at risk. Rates were adjusted for 5-year age groups using the direct method, with the world population[4] aged 50 years and older serving as the standard.

RESULTS

391 events of hip fractures out of 390 patients were reported during the 1 year study period from 2 public referral hospitals, 15 district hospitals and 3 private hospitals resided in 23 out of 24 districts. This resulted in an estimated cumulative incidence of 151.2 per 100,000 (95% CI : 136.7-167.2) in one year. The patients consisted of 125 males and 266 females (sex ratio of male to female: 1 : 2.1) whose mean age was 74.4 year (median = 75 years) with a range of 51-99 years. In women, the number of events peaked in the 75-79 age group which was higher than that found in men (70-74). The incidence increased steeply with age in both sexes (Table 1).

Breakdown of cases by type of fracture resulted in fracture of the neck 38.6 per cent, intertrochanteric fracture 57 per cent and only 4.3 per cent for subtrochanteric fracture.

Distribution of types of fracture were not the same for both sexes (Table 2). Distribution of types of hip fracture was slightly different between the left and the right (Table 3). Most cases (61.6%) were walking before sustaining the fracture (Table 4). Fall from a standing height was the most common mechanism (75%) leading to hip fracture (Fig. 1). Fractures reported to occur indoors had the highest frequency (67.5%) (Fig. 2).

Table 1. Age-sex specific crude incidence of hip fracture (per 100,000).

Age group (years)	Men	Women	Both sexes
51-54	27.1	9.5	18.5
55-59	35.8	59.1	47.5
60-64	35.2	88.9	62.8
65-69	77.2	147.6	113.7
70-74	144.4	360.7	256.0
75-79	226.6	657.0	452.8
80-84	420.6	898.3	679.6
≥85	726.6	605.0	657.1
All age groups	99.6	201.8	151.9

From the community survey it was found that 1) 144,135 persons were included consisting of 70,862 men and 73,273 women from 246 villages. A target population (aged 52 or over/ alive or dead) of 25,918 subjects were encountered (12,601 men and 13,317 women). 2) 3,535 subjects with walking abnormalities were found (Table 5). Among those, 66 subjects could be fitted to the criteria of suspected cases of hip fracture. All of them reported being told by a doctor that they had a hip fracture. The remaining 3,535 subjects identified other causes for walking abnormalities. 3) Out of those 66 subjects, 48

Table 2. Number of cases by type of hip fractures and sex.

Type	Men	%	Women	%	Both sexes	%
Neck	27	21.6	124	46.6	151	38.6
Intertrochanteric	86	68.8	137	51.5	223	57.0
Subtrochanteric	12	9.6	5	1.9	17	4.3
Total	125	100	266	100	391	100

Table 3. Number of cases by type and side of fracture.

Type	Left	%	Right	%	Both	%
Neck	70	35.0	81	42.4	151	38.6
Intertrochanteric	121	60.5	102	53.4	223	57.0
Subtrochanteric	9	4.5	8	4.2	17	4.3
Total	200	100	191	100	391	100

Table 4. Events leading to hip fractures.

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

suspected cases could be completely matched with those from the hospital discharge survey. 18 cases which could not be matched with those from the hospital survey were found not to have hip fractures when verified with hospital records and the health workers. Most of them suffered from bone and joint conditions such as arthritis and myalgia. Two additional cases sustained hip fracture after the specified period (after July 31, 1998). 4) As a result, 48 cases of hip fracture were found (fracture of the neck, subtrochanteric and intertrochanteric). Eight of them died. Table 6 depicts the ability of the 48 cases to walk.

In short, the community survey could not detect additional cases of hip fracture to those found in the hospital survey. It resulted in an estimated incidence of 185.2 per 100,000 (95% CI 138.1-247.6) which is higher than that of the hospital survey (151.2 per 100,000 (95% CI 136.7-167.2)).

DISCUSSION

In comparison to Hong Kong[5], the United Kingdom[5], and the United States[6], age-adjusted incidence from this study, was markedly lower than that of other countries for both sexes (Table 7). Although the difference in rate is more pronounced for women, the incidence in women is greater than in men.

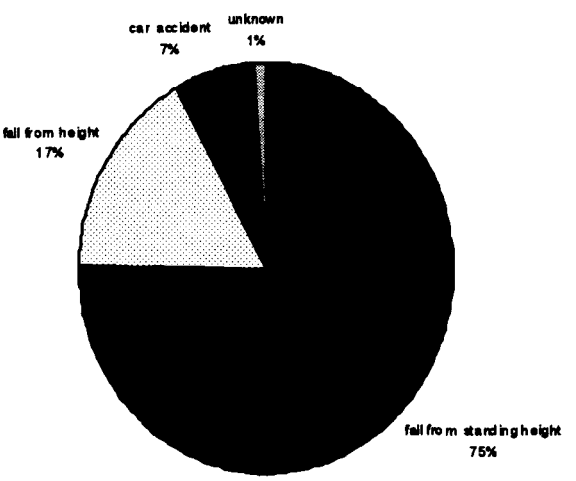

Fig. 1. Mechanisms of fracture.

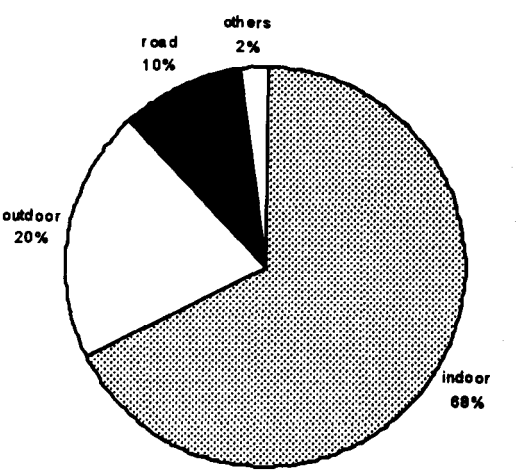

Fig. 2. Places where fractures occurred.

Table 5. Number of subjects by sex and ability to walk.

Ability to walk	M	%	F	%	Total	%
Normal	11,112	88.2	11,271	84.6	22,383	86.4
Normal with hip pain	911	7.2	1,253	9.5	2,164	8.3
Abnormal gait with/without gait aids	487	3.9	659	4.9	1,146	4.4
Wheel chair	91	0.7	134	1	225	0.9
Total	12,601	100	13,317	100	25,918	100

Table 6. Hip fracture cases by sex and ability to walk.

Ability to walk	M	%	F	%	Total	%
Normal	0	-	0	-	0	-
Normal with hip pain	2	13.3	6	18.2	8	16.6
Abnormol gait with/without gait aids	9	60	18	54.5	27	56.3
Wheel chair	4	26.7	9	27.3	13	27.1
Total	15	100	33	100	48	100

Table 7. Inter-country comparison of age-adjusted incidence of hip fracture (per 100,000).

Country	Female	Male
Hong Kong[5] (1985)	212.9	140.2
United Kindom[5] (1986)	141.5	60.9
USA[6] (1984)	120.6	56.8
This study (1998)	70.8	43.8

Urbanization (percentage of population living in urban areas) in Chiang Mai is much lower than in other countries. Even for Thailand, Chiang Mai is less urbanized than the country average (11.1% *vs* 18.4%)[3]. Urbanization means fewer less physical activities. Studies have shown that physical inactivity independently influenced hip fracture risk [7,8]. So, the relatively low incidence of hip fracture in Chiang Mai could be ascribed to more high physical activity. Physical activity in combination with muscle strength can prevent hip fracture through effects either or both of minimizing osteoporosis and the risk of fall[9].

Although, the incidence of hip fracture from the community survey was not statistically different from that of the hospital survey, the difference might still indicate that in the present setting, the hospital discharge survey could not be reliably used to estimate the magnitude of this condition. This lesson might well be applied to many other developing countries where access to hospital care is limited. However, a community survey could face the problem of validity since case ascertainment might not be adequately covered by a radiological study. Fortunately, in the present study this is not the case since all detected cases in the community survey were completely matched with those from the hospital survey.

Using the incidence from the community survey, it could be estimated that the number of hip fractures for the whole country could be as high as 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 same incidence and the projected number of the aging population[10]. This will bring an increased burden to the already over-strained health services system of the country.

Prevention of hip fracture through promoting physical activity in urban populations especially the elderly group should be considered. It is evident from our the present findings that falling from a standing height was reported to be the most common mechanism of hip fracture and that most of the events occurred indoors. Physical training should be considered to minimize the risk of falling at home (11) as evidenced from a randomized controlled trial using simple technique for training.

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อุบัติการณ์ของภาวะกระดูกสะโพกหักในจังหวัดเชียงใหม่

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อุบัติการณ์ของกระดูกสะโพกหักแตกต่างกันมากระหว่างรายงานจากภูมิภาคต่าง ๆ ของโลก รายงานส่วนใหญ่อิงข้อมูลจากโรงพยาบาลโดยมีสมมติฐานว่าผู้ป่วยกระดูกสะโพกหักเกือบทั้งหมดเข้าถึงบริการของโรงพยาบาล สำหรับประเทศไทยสมมติฐานนี้อาจไม่เป็นจริงเนื่องจากอุปสรรคทางการเงินหรือถิ่นที่อยู่ซึ่งทำให้ผู้ป่วยจำนวนไม่น้อยเข้าไม่ถึงโรงพยาบาล ดังนั้นการอาศัยรายงานของโรงพยาบาลเท่านั้นในการคาดคะเนอุบัติการณ์อาจทำให้ได้ตัวเลขที่ต่ำกว่าความเป็นจริง รายงานนี้จึงใช้การเก็บข้อมูลจำนวนผู้ป่วยกระดูกสะโพกหักทั้งที่จำหน่ายออกจากโรงพยาบาลและจากการสำรวจชุมชนแบบตัดขวาง ณ จุดหนึ่งของเวลา ผลปรากฏว่าอุบัติการณ์ของภาวะนี้เท่ากับ 151.2 ต่อแสนประชากร (ช่วงความเชื่อมั่นร้อยละ 95 อยู่ระหว่าง 136.7 ถึง 167.2 ต่อแสนประชากร) จากข้อมูลของโรงพยาบาล และพบว่าเท่ากับ 185.2 ต่อแสน (ช่วงความเชื่อมั่นร้อยละ 95 อยู่ระหว่าง 138.1 ถึง 247.6 ต่อแสนประชากร) จากการสำรวจชุมชน เมื่อเปรียบเทียบอุบัติการณ์ปรับตามฐานอายุประชากรในรายงานนี้กับของประเทศพัฒนาพบว่ามีความแตกต่างกันชัดเจน เป็นไปได้ว่าความแตกต่างของสัดส่วนของประชากรที่อาศัยในเขตเมืองระหว่างเชียงใหม่กับต่างประเทศ คือที่มาของความแตกต่างนี้ ซึ่งมีนัยยะว่าการส่งเสริมการออกกำลังกายจะเป็นกลวิธีสำคัญทางสาธารณสุขในการป้องกันโรคนี้

คำสำคัญ : กระดูกสะโพกหัก, การสำรวจชุมชน, การศึกษาข้อมูลของโรงพยาบาล, อุบัติการณ์

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