Factors Determining Hospital Admission of Thai Elderly by a Mailed Survey

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Objective: To study risk factors of hospital admission among older Thai adults

Material and Method: Nationwide observational cross-sectional survey by mailed questionnaires. 1801 older adults who attended senior citizen clubs organized by local hospitals from 66 provinces of Thailand.

Results: 28.1% of subjects had been admitted to a hospital. Independent factors determining hospital admission were lung disease (adjusted OR 2.13), history of fall (adjusted OR 1.73), poor global self-rated health (adjusted OR 1.62), taking calcium tablets (adjusted OR 1.61), preferring fatty food (adjusted OR 1.59), being former smokers (adjusted OR 1.56), low body mass index (adjusted OR 1.52), hypertension (adjusted OR 1.37) and poor mobility abilty (adjusted OR 1.16).

Conclusion: Prevention of hospital admission among the elderly should involve preventing cigarette smoking, promoting healthy dietary habit, fall prevention and screening for hypertension.

Keywords: Hospital admission, Elderly, Thai

The increasing number of older people around the world has been focused especially by health care policy makers and workers in view of more budget and work load which has to be increased due to the fact that older people tend to suffer from various degenerative disorders. Meanwhile, hospitalization is not only the most expensive health care service, but also inevitably leads to subsequent physical and mental discomfort to the sick older patients and their relatives alike. Getting to know the associated factors of hospitalization of the older adults will shed light on the priority setting of disease prevention that should receive national attention as well as targeting at risk older people to receive more medical care and support to prevent hospitalization[1]. Interestingly, older adults at risk of heavy hospital use can be identified prospectively through their responses to a brief, mailed, self-administrated questionnaire[2]. A mailed survey also achieved a high response rate and gave rise to an effective model predictive of hospitalization even in those who were older than 80[3].

Material and Method

The structured questionnaires including detailed instructions were distributed to the provincial health authorities nationwide under the cooperation of The Secretariat of the House of Representatives and the Ministry of Public Health during June 1999 to August 1999. The sample population was the elderly aged 60 years and over who attended elderly clubs organized by local community hospitals. Local health personnel directly interviewed the elderly and filled out the questionnaires which were later posted back to the authors at Siriraj Hospital. The recruitment was done on the basis of randomization. Sixty-six provinces out of the total of 76 provinces participated in the present survey and 1801 subjects were recruited. Apart from background characteristics and detailed medical data, self-perceived health, quality of life and activity of daily living were also included in the questionnaire. Poor financial status was defined as not being able to earn enough money to cover living

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expenses. Those who had had a fall over the last 6 months were classified as fallers. One of two kinds of diet preference had to be chosen by the interviewees i.e. fatty food vs vegetable-rich food. Poor near vision meant those who could not read a book properly even wearing glasses while poor far vision meant those could not see any other person at the opposite side of road even wearing glasses. Low body mass index was defined by those whose body mass index was less than 18.5 kilogram/meter^2. Regarding the impact of unhealthy life-style upon hospital admission, those who were former smokers were compared to those who either did not smoke or were current smokers. Since those who still engaged in smoking may have not yet suffered from the consequence of smoking. Their current health status may not be bad enough, as seen in non-smokers, to cause hospital admission. This same criteria was also applied to alcoholic drinking during statistical analysis.

Global self-perceived health was assessed by the question "How would you judge your present health in general?". The answer choices were: very poor, poor, fair, good, very good, no answer/don't know[4]. Those who chose the choices: very poor, poor or fair were categorized as having poor global self-perceived health. Relative self-perceived health was determined by the question "If you compare your health with that of other persons you know of your age, is your own health worse, about the same, better, don't know?"[4]. Those whose answered was either worse or about the same were categorized as having poor relative self-perceived health. Quality of life was surveyed by an instrument based on the international study carried out by the World Health Organization in 11 countries in 1979[5]. Global quality of life was assessed by the question "Are you happy and content with your everyday life?". The choices of answer were, not hardly ever, yes now and then, yes most of the time, and don't know. Those whose answers were either, not hardly ever or yes now and then were grouped as having poor global quality of life. Self-sufficient quality of life was judged by the question "Do you feel well enough to do what you want to do?". The answer choices and the classification was the same as it was for global quality of life.

In addition, activities of daily living designed by the Survey in Europe on Nutrition and the Elderly, A Concerted Action (SENECA) was used[6]. Each item of daily living activities was measured on a 4-point scale namely; being unable to do the activity completely (4 points); can do only with help (3 points);

can do with difficulty but without help (2 points); and can do independently without difficulty (1 point). This structured test could be divided into three indicators i.e. mobility index (MI), self-care index (SI) and instrumental activities of daily living (iADL). The walking ability of the subjects or mobility index ranging 4-16 was calculated by the sum of the following 4 items, namely, going outdoors, using stairs, walking at least 400 metres and carrying a heavy object for at least 100 metres. The SI index (range 7-28) was calculated when the following items were added together; walking between rooms, toilet use, grooming and bathing, dressing, getting in and out of bed, cutting toe-nails, and eating. The other five items of the test (i.e. ability to use the telephone, take own medication, manage finances, do light housework, and do heavy housework) could be summed up as iADL (range 5-20).

The SPSS statistical package version 10.0 was used to analyze the data. The level of statistical significance was set at p value less than 0.05. Multiple logistic regression analysis was used to determine the independent risk factors of hospital admission.

Results

The proportion of 1801 older adults subjects according to 6 regions of the country was 29.9% from the northeastern region, 22.3% from the central region, 17.7% from the southern region, 13.4% from the northern region, 10.3% from the eastern region and 6.4% from the western region. The mean and range of age were 69.26 ± 6.21 and 60-98 years with female to male ratio of 898: 903 or 1: 1.006. Around sixty five percent were married while 30.7% were widowed. Among the widowed group, more than three-quarters (76.9%) were elderly females. The actual number of the family members living in the same house was 3.7 ± 2.2 people and only 0.8% lived alone. The majority (76.4%) stayed with their children, followed by staying with grandchildren (65.5%) and staying with their spouses (59.3%). As far as the education was concerned, the majority (59.3%) achieved only primary school or lower and up to 11.1% had never attended a formal class in school. The majority had past occupations in agriculture 50.7%, 18.6% were retired government officials. 65.1% revealed their financial status to be fair, 13.5% had some savings while 20.8% were not able to make ends meet.

The most common chronic diseases listed in order were joint pain 30.8%, hypertension 23.9%, diabetes mellitus 13.2%, dyspnea on exertion 14.0%, sleeping difficulty 14.0%, memory impairment 11.5%,

constipation 8.8% and heart disease 7.2%. Falling, another geriatric syndrome, was found in up to 27.9% during the previous 6 months and mostly occurred during the daytime (62.6%), and outside the residential area (62.5%), whereas the common sites of falls which occurred in the residential area were in the toilet (46.1%) and stairs (41.4%). About 28.2% of fallers were recurrent fallers. The common sites of fall-induced injury were legs(41.0%), back (18.7%) and forearm (16.5%). Regarding cigarette smoking, 13.0% were current smokers while 21.9% had already quit smoking. Likewise, 13.6% were current alcoholic drinkers and 23.5% had quit drinking. The majority of older Thai adults (88.7%) preferred spicy salad and other vegetable-containing food rather than fatty food. One-third of them (33.2%) drank milk on a regular basis. Only 8.8% were vegetarians. Even though the survey was done in senior citizen clubs, only 46.9% did regular exercises. As a conflicting result, the prevalence of hospitalization was not different between those who did regular exercises and those who either did occasional exercises or no exercise at all (p = 0.399).

The overall prevalence of hospitalization was 28.1%. A number of factors were found to be different between those who had and had not been admitted to hospital. Univariate analysis of qualitative and quantitative variables are shown in Table 1 and 2 respectively. Independent predictors of hospitalization are shown in Table 3. These factors could be listed in order of their adjusted odds ratio as follows; history of chronic lung disease (2.13), fall (1.73), poor global self-perceived health (1.62), taking calcium tablets (1.61), preferring fatty food (1.59), being former smokers (1.56), low body mass index (1.52), hypertension (1.37) and poor mobility index (1.16). Further subgroup analysis revealed significant association between a history of chronic lung disease and quitting smoking (p < 0.001). Those who had a history of falls had a significantly worse mobility index score (6.1 ± 2.8) compared to those who did not (5.2 ± 2.1) with the p value of < 0.001. Those who were taking calcium tablets also had a significantly worse mobility index score (5.8 ± 2.6) compared to those who were not (5.3 ± 2.2) with the p value of < 0.001.

Table 1. Univariate analysis of factors associated with hospital admission of the elderly

	Those who were admitted	Those who were not admitted	Crude OR (95% confidence interval)	p value
Poor financial status	123 (32.9%)	251 (67.1%)	1.33 (1.04-1.70)	0.026
Diabetes mellitus	87 (36.7%)	150 (63.3%)	1.59 (1.20-2.12)	0.002
Hypertension	139 (32.4%)	290 (67.6%)	1.32 (1.04-1.67)	0.025
Heart disease	62 (47.7%)	68 (52.3%)	2.53 (1.76-3.63)	<0.001
Arthralgia	184 (33.2%)	370 (66.8%)	1.44 (1.16-1.79)	0.001
Lung disease	27 (46.6%)	31 (53.4%)	2.31 (1.36-3.91)	0.002
Memory complaint	86 (41.5%)	121 (58.5%)	2.00 (1.48-2.69)	<0.001
Constipation	61 (38.4%)	98 (61.6%)	1.68 (1.20-2.36)	0.003
Insomnia	93 (37.1%)	158 (62.9%)	1.63 (1.23-2.15)	0.001
Edema	18 (54.5%)	15 (45.5%)	3.16 (1.58-6.32)	0.001
Fall	133 (43.2%)	175 (56.8%)	2.33 (1.80-3.00)	<0.001
Former smoker	128 (33.4%)	255 (66.6%)	1.36 (1.07-1.74)	0.016
Former alcohol drinker	138 (33.8%)	270 (66.2%)	1.41 (1.11-1.78)	0.006
Drinking milk	184 (32.0%)	391 (68%)	1.32 (1.06-1.64)	0.015
Preferring fatty food	61 (34.5%)	116 (65.5%)	1.43 (1.03-1.99)	0.040
Poor near vision	45 (40.9%)	65 (59.1%)	1.85 (1.25-2.75)	0.003
Poor far vision	52 (36.6%)	90 (63.4%)	1.55 (1.08-2.21)	0.022
Taking herbal pills	108 (32.6%)	223 (67.4%)	1.32 (1.02-1.71)	0.041
Taking calcium tablets	104 (33.8%)	204 (66.2%)	1.40 (1.08-1.82)	0.015
Low body mass index	89 (34.0%)	173 (66.0%)	1.39 (1.05-1.85)	0.025
Poor global self-perceived health	347 (34.3%)	664 (65.7%)	2.09 (1.68-2.60)	<0.001
Poor relative self-perceived health	268 (32.6%)	554 (67.4%)	1.54 (1.25-1.90)	<0.001
Poor global quality of life	291 (33.4%)	580 (66.6%)	1.67 (1.36-2.06)	<0.001
Poor self-sufficient quality of life	294 (32.2%)	618 (67.8%)	1.55 (1.25-1.91)	<0.001

Table 2. Comparison of quantitative variables between those who were admitted in the hospital over the last year and those who were not by Student t test

	Those who were admitted		Those who were not admitted		p value
	mean	SD	mean	SD	
Age	69.78	6.14	69.06	6.22	0.027
Mobility index	6.07	2.67	5.11	1.97	<0.001
Self-care index	8.14	2.44	7.64	1.94	<0.001
Instrumental ADL	6.86	2.72	6.01	1.91	<0.001

Table 3. Multivariate analysis of factors determining hospital admission of the elderly

	B	SE	Sig.	Adjusted OR	95%CI for OR
Poor mobility index	0.149	0.030	<0.001	1.16	1.10-1.23
Poor global self-perceived health	0.481	0.140	0.001	1.62	1.23-2.13
Falls	0.546	0.160	0.001	1.73	1.26-2.36
Former smokers	0.442	0.150	0.003	1.56	1.16-2.09
Taking calcium tablets	0.478	0.164	0.004	1.61	1.17-2.23
Lung disease	0.758	0.333	0.023	2.13	1.11-4.10
Preferring fatty food	0.465	0.210	0.027	1.59	1.06-2.40
Low body mass index	0.421	0.171	0.014	1.52	1.09-2.13
Hypertension	0.312	0.149	0.036	1.37	1.02-1.83

Discussion

Although the present study was conducted in 1999, these results and their applications are still valid because there has been no major change of health-related vital statistics in Thailand. With the nine independent predictors of hospitalization for older Thai people, four groups of health problems could be established as significant issues. First, due to its highest adjusted odds ratio, histories of chronic lung disease and former smokers could be linked together. As smoking causes chronic obstructive airway disease, those who once smoked and had adverse effects such as an intractable productive cough and dyspnea might have to be admitted to hospital. Chronic obstruction to airflow was a risk factor of hospitalization (OR: 1.57) in older persons[7]. They had to quit smoking, otherwise they could not survive to be included in the survey. Although Miller JE et al found that risk of hospitalization was higher for current but not former smokers, their sample subjects were those aged 45 years and older; they were much younger and, therefore, healthier than the presented subjects[8]. Subgroup analysis also supported this concept that there was a significant association between histories of chronic lung disease and former smokers (p < 0.001). Preventive strategies of hospitalization for former Thai smokers can be achieved by early diagnosis e.g. by a screening questionnaire or screening mini-peak expiratory flow[9,10] and influenza vaccination[11].

Secondly, history of falls, taking calcium tablets and poor mobility index could be considered together. The present results showed that those who had a history of falls and those who were taking calcium tablets had significantly worse mobility indices compared to those who did not and were not. Since those who had poor walking ability probably had poor balance with subsequent falls. Meanwhile, the prevalence of falls inducing body injury, according to the present results, also corresponded with the common sites of osteoporosis-related fractures i.e. neck of the femur, vertebrae and distal end of the radius. 3.5-6% of falls gave rise to osteoporosis-related fractures[12]. As a result, calcium tablets, a weak and cheap anti-resorptive agent, would have been prescribed for older fallers to prevent further possible fracture. Limited physical independence requiring the help of a person or mechanical aid to get around was seen as an independent predictor of hospitalization in other studies.[3] A preventive strategy of hospitalization due to falls among the Thai elderly could be simply achieved by repeated campaigns to alert them to the risk of falling[13].

Screening for and treating hypertension is the next preventive strategy in preventing hospitalization. Not only is hypertension one of the most important risk factors of metabolic syndrome and subsequent atherosclerosis, but is also the second common chronic medical problem for older people (23.9%). This conclusion was also supported by the national vital statistics reported by Heath System Research Institute in the year 2000 that circulatory disorders was the number one killer of older Thai adults both in the group aged 60-74 and 75 years old and over in women and age group 75 years old and over in men[14].

According to World Health Organization criteria of malnutrition based on body mass index, a value of less than 18.5 kilogram/meter^2 implied protein energy malnutrition[15]. Under-nutrition certainly poses many adverse effects upon body systems e.g. defense mechanism, physical fitness, altered body composition and so on. Therefore, increased prevalence of infection, fall, adverse drug reaction etc. would bring about hospitalization[16]. On the other hand, indulging in fatty food as revealed in the present results would lead to dyslipidemia and obesity. Both of which are significant factors of metabolic syndrome and atherosclerosis. Promoting healthy dietary habit must involve prevention of either under- or over-nutrition.

Poor global self-perceived health was another significant predictor for hospitalization with adjusted OR 1.62 (95%CI: 1.23-2.13). This finding was also consistent with that found by Perez MA, et al whose adjusted OR was 1.37[7]. This indicator should, therefore, be employed by local health personnel in view of its validity and simplicity in predicting hospitalization among older people.

Acknowledgements

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ปัจจัยที่มีผลต่อการเข้ารับการรักษาในโรงพยาบาลของผู้สูงอายุไทย

ประเสริฐ อัสสันตชัย, นันทา มาระเนตร์

การเข้ารับการรักษาในโรงพยาบาลของผู้สูงอายุนับวันจะมีสัดส่วนมากขึ้น เนื่องจากจำนวนผู้สูงอายุไทยที่เพิ่มขึ้นอย่างรวดเร็ว รวมทั้งเป็นกลุ่มประชากรที่มีปัญหาสุขภาพมากกว่ากลุ่มอื่น นำมาซึ่งค่าใช้จ่ายและความทนทุกข์ทรมานทั้งต่อผู้ป่วยและญาติ การวิเคราะห์หาปัจจัยเสี่ยงต่อการต้องเข้ารับการรักษาในโรงพยาบาลจึงมีความจำเป็นเพื่อนำมาซึ่งมาตรการในการป้องกันภาวะดังกล่าว การศึกษาครั้งนี้ได้ทำการส่งแบบสอบถามทางไปรษณีย์ไปยังชมรมผู้สูงอายุที่จัดตั้งภายในโรงพยาบาลชุมชนทั่วประเทศ เพื่อหาข้อมูลทางด้านสุขภาพรวมทั้งข้อมูลส่วนบุคคลโดยให้เจ้าหน้าที่ของโรงพยาบาลประจำชมรมทำการสุ่มตัวอย่างและดำเนินขั้นตอนตามรายละเอียดที่แนบไปด้วยแล้วส่งกลับทางไปรษณีย์ มีผู้สูงอายุจำนวน 1,801 รายจาก 66 จังหวัดได้ส่งแบบสอบถามกลับมา พบว่าร้อยละ 28.1 ของผู้สูงอายุเคยต้องเข้ารับการรักษาในโรงพยาบาล ปัจจัยเสี่ยงอิสระที่ทำนายการต้องเข้ารับการรักษาในโรงพยาบาลได้แก่ การมีโรคปอด (adjusted OR 2.13) ประวัติเคยหกล้ม (adjusted OR 1.73) การประเมินสุขภาพ ด้วยตนเองว่าไม่ดี (adjusted OR 1.61) การรับประทานแคลเซียมเม็ดเสริม (adjusted OR 1.61) การชอบรับประทาน อาหารมัน (adjusted OR 1.59) ผู้ที่เคยสูบบุหรี่แต่หยุดแล้ว (adjusted OR 1.56) การมีดัชนีมวลกายที่ต่ำผิดปกติ (adjusted OR 1.52) ความดันโลหิตสูง (adjusted OR 1.37) และการสูญเสียความสามารถในการเดิน (adjusted OR 1.16) ดังนั้นการป้องกันการต้องเข้ารับการรักษาในโรงพยาบาลของผู้สูงอายุควรประกอบด้วย การรณรงค์ให้หยุดสูบบุหรี่ การบริโภคอาหารตามหลักโภชนาการ การป้องกันการหกล้ม และการตรวจคัดกรองและควบคุมโรค ความดันโลหิตสูง