Disability Assessment in Elderly Orthopedic Patients

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Objective: *To assess the disability level in elderly patients with orthopedic conditions.*
Material and Method: *All possible patients aged more than 60 years, who attended the Out-patient Clinic of Orthopedic Department, Siriraj Hospital, between October and December 2005, were recruited. They were assessed for the disability level by using a Brief Disability Questionnaire (BDQ), Thai version. It is a simple and practical tool for assessing disability levels. It is an eight-item scale with the total score ranging from 0 to 16. A higher score indicates a greater disability.*
Results: *Two hundred and thirteen patients participated in the study. The mean age was 69.4 years and 64% had degenerative joint diseases. The affected parts were the lower extremity and back (56.8% and 26.8% respectively). The three most common limited activities were vigorous activities, long distance walking, and stair climbing or walking uphill (55.9%, 51.6%, and 42.7% respectively). The mean BDQ score of the subjects was 7.9 $\pm$ 3.8. Patients with lower extremity problems including back problems had the highest BDQ score (8.2 $\pm$ 3.7). According to the BDQ, the number of patients with a moderate-to-severe degree of disability was 79%.*
Conclusion: *The majority of elderly patients with orthopedic problems had moderate-to-severe disability as assessed by the BDQ. Physicians and other health care personnel should consider the management of the principal diseases, and the assessment of the disability level to improve the patients' quality of life, which is the ultimate goal of the treatment in clinical practice.*

Keywords: *Disability, Assessment, Elderly, Orthopedic, Function*

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Nowadays, the number of elderly is increasing. As they age, physiologic deterioration of their multi-organ systems occurs; for example, a decrease in aerobic capacity, a decrease in muscle strength, bone loss and a diminution in homeostatic regulation of plasma glucose concentration[1]. Some elderly develop multiple and chronic diseases which are mostly from the degenerative process. All these chronic diseases can lead to functional decline, functional limitations and finally, functional loss or disability. According to the WHO's definition, disability is the restriction or lack of ability, to perform an activity in the manner or within the range considered normal[2].

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Cambois et al[3] studied the influence of functional limitations on activity restriction at older ages. They found that half of the people aged 55 and older had functional problems and 20% of them also reported personal care activity restrictions. The probability of restrictions increased after the age of 70. Another study surveyed women with disabilities in the United States and found that aging disability was amongst the highest rank of interest[4]. Disability is the most common problem among aged patients and is a burden to individuals and society[5]. Moreover, it also has an impact on the quality of life[6,7]. Therefore, early detection of disability in the elderly patients should be performed in order to develop effective disability treatment and prevention strategies[8]. The aim of the present study was to assess the disability level in Thai elderly patients.

Material and Method

All possible patients aged more than 60 years old who attended the Out-patient Clinic of Orthopedic Department, Siriraj Hospital between October and December 2005 were recruited in the present study. They were interviewed for demographic data and assessed the disability level using the Thai version of the Brief Disability Questionnaire (BDQ).

The BDQ is an eight-item scale adapted from the Medical Outcomes Survey short form[9]. The Cronbach's Alpha coefficient of the Thai version of BDQ was high (0.82)[10]. It has moderate correlation with the General Health Questionnaire-12 ($r = 0.45$, $p < 0.001$)[10]. It is a simple, practical, and less-time consuming tool for assessing disability levels. Subjects were asked whether they had limitation in the following activities because of health problems in the previous month; BDQ1: vigorous activities such as lifting heavy objects, running, or sports; BDQ2: moderate activities such as moving a table, carrying groceries or goods; BDQ3: climbing stairs or walking uphill; BDQ4: light activities such as bending, lifting, or stooping; BDQ5: walking long distances; BDQ6: daily life activities such as eating, dressing, bathing or using the toilet; BDQ7: cutting down or stopping activities they used to do, such as hobbies; and BDQ8: being unable to do things that the family expected as part of the daily routine. Each item was rated as not at all, sometimes or a little, or moderately/definitely, and was scored as 0, 1, or 2 respectively. The total BDQ score ranged from 0 to 16. A higher score indicated a greater disability.

The scores were categorized into four disability levels (0-2 = none, 3-4 = mild, 5-9 = moderate, 10-16 = severe) according to the study of Ormel et al[11].

Statistical analysis

Descriptive statistics were generated for continuous variables including means, standard deviations, with 95% confidence intervals (CI), and relative frequencies for categorical variables. One-way ANOVA were analyzed as measures of difference between clinical characteristics and outcome. Bonferroni for *post hoc* was used to compare between the affected parts. A p-value of less than 0.05 was considered statistically significant. Statistical analysis was carried out using SPSS 10.0 (SPSS Inc, Chicago, IL).

Results

Table 1 demonstrates the demographic data of the patients. The mean age of all subjects was 69.4 years and the body mass index (BMI) was 26.2 $\pm$ 18.1 kg/m^2. The majority of them were female (78%) and married (61%). Most of them had sufficient income (88%) and low education (63%). The three most common underlying diseases were degenerative joint diseases, hypertension, and hypercholesterolemia (63.8%, 45.5%, and 26.8% respectively). One-fourth of the patients could not work. Half of them needed assistance in transportation in daily living. Most of them were taking medication. Thirty percent of the patients used gait aids or a wheelchair for ambulation. Very few of them smoked cigarettes or drank alcohol regularly. The most commonly affected part involved in the provisional diagnosis was lower extremity (56.8%) and back (26.8%).

Table 2 exhibits the prevalence of limited activities. The three most common limited activities

Table 1. Demographic data of 213 older subjects

Variables	N (%)
Age (years)	69.4 $\pm$ 6.3
BMI (kg / m^2)	26.2 $\pm$ 18.1
Sex: female	166 (77.9)
Marital status: Married	131 (61.5)
Income: Sufficient	187 (87.8)
Educational levels: Less than 6 years	134 (62.9)
Underlying diseases: [a]	
Degenerative joint disease	136 (63.8)
Hypertension	97 (45.5)
Hypercholesterolemia	57 (26.8)
Diabetes Mellitus	39 (18.3)
Heart disease	22 (10.3)
Others	22 (10.3)
Vocations:	
Unable to work	50 (23.5)
Not necessary to work / Retired	121 (56.8)
Still working	42 (19.7)
Need Assistance:	
None	107 (50.2)
Some	73 (34.3)
Moderate and much	33 (15.5)
Taking medication	193 (90.6)
Ambulation: using gait aids or wheelchair	63 (29.6)
Smoking cigarette	8 (3.7)
Drinking alcohol	16 (7.5)
Affected parts in provisional diagnosis	
Upper extremity	22 (10.3)
Lower extremity	121 (56.8)
Back	57 (26.8)
Others[b]	13 (6.1)

Note (a) some patients had more than 1 underlying disease
(b) Osteoporosis, fracture, muscle pain

Table 2. Rated disability of each item of BDQ

Items	Rated disability		
	Not at all	Sometimes or a little	Moderately or definitely
Vigorous activities	16 (7.5)	78 (36.6)	119 (55.9)
Moderate activities	56 (26.3)	98 (46.0)	59 (27.7)
Climbing stairs or walking uphill	31 (14.6)	91 (42.7)	91 (42.7)
Light activities	57 (26.8)	114 (53.5)	42 (19.7)
Walking long distances	37 (17.4)	66 (31.0)	110 (51.6)
Daily life activities	132 (62.0)	72 (33.8)	9 (4.2)
Cut down activities they used to do	82 (38.5)	109 (51.2)	22 (10.3)
Unable to do part of the daily routine	91 (42.7)	96 (45.1)	26 (12.2)

Table 3. BDQ score classified according to the affected parts

Affected parts	N	BDQ score	95% CI for BDQ score	p-value[@]
Upper part[g]	22	5.5 ± 4.2[e]	3.6, 7.3	<0.006*
Lower part[j]	178	8.2 ± 3.7[e]	7.7, 8.7	
Others[#]	13	7.6 ± 3.7	5.4, 9.8	

[g] included shoulder, neck, arm and hand; [j] included back, hip, knee, leg, foot; [#] included osteoporosis, fracture, muscle pain
[@] One-way ANOVA
[e] Significant difference by Bonferroni comparison

Table 4. Level of disability

Level of disability	Score of BDQ	N	%
No	0-2	20	9.4
Mild	3-4	25	11.7
Moderate	5-9	95	44.6
Severe	10-16	73	34.3

were vigorous activities, walking long distances, and climbing stairs or walking uphill (55.9%, 51.6%, and 42.7%, respectively). The least limited item was daily life activities.

The mean score (BDQ1-BDQ8) of the subjects in the present study was 7.9 ± 3.8. Table 3 reveals the BDQ sum score classified according to the affected parts. Patients with pathology of the lower extremities including the back had the highest score of 8.2 ± 3.7. Considering the level of disability, 44.6% and 34.3% of the subjects were in the moderate and severe levels, respectively (Table 4).

Discussion

The musculoskeletal system problems including osteoarthritis, fractures due to osteoporosis, and chronic muscle pain are common orthopedic diseases in the elderly. The prevalence of musculoskeletal conditions are derived from the Health and Retirement Survey. They found that in 1992, 62.4% of people aged between 51 to 61 years reported at least one musculoskeletal condition and the rate increased to 70.5% by the year 1994[12]. Musculoskeletal diseases are one of the major causes of disability around the world[13]. Among these diseases, rheumatoid arthritis, osteoarthritis, and back pain are important causes of disability in both developed and developing countries. Another study from the Health Survey in England reported that the most commonly reported cause of long-term illness or disability among the population aged 65 and over was disorder of the musculoskeletal system[14]. There was a report that of all persons receiving disability pension or taking long-term sick leave, 60% had a diagnosis related to the musculoskeletal system[15]. It affected patients' functions in activities of daily living, transfer, and ambulation. Inability to perform these activities can lead to disability and a dependency state, especially amongst the elderly patients, which causes a burden to their families. Eighty percent of in-home services for the aged patients are given by family

members[16]. Disability is a major public health issue, but, unfortunately, physicians usually make diagnoses and prescribe treatments without assessment of the patients' functions.

Degenerative joint disease (DJD) is the most common disorder occurring in the older patients and is characterized by chronic pain and limitation of activity[17]. Arthritis is the leading chronic condition for middle-aged and older adults[18]. It has been identified as a disease with the highest rate of co-morbidities, which may increase the likelihood of disability[19]. As revealed in the present study, the common affected parts of the patients were lower extremities and back. COPCORD (Community-Oriented Program for the Control of Rheumatic Diseases) studied in over 17 countries around the world have identified back and knee pain as common in the community and are likely to increase with the ageing population[20-23]. Joints in these two parts are weight-bearing and thus responsible for a great number of activities listed in the BDQ; for examples, lifting objects, running, walking and climbing stairs. Additionally, subjects in the present study were overweight, which increased the workload of these joints.

The present study revealed that the three most common activities rated as being moderately or definitely limited were vigorous activities (e.g. lifting heavy objects, running, or sports), walking long distances, and climbing stairs or walking uphill. Wolinsky et al studied 998 senior subjects living in the community and reported that the top five limited activities were stooping-crouching-kneeling (39.8%), walking a half-mile (32.3%), climbing steps (27.9%), doing heavy housework (26.1%) and lifting or carrying 10-lb objects (17.8%)[24].

In the present study, the least affected activity was the daily life activity; and this is probably due to the fact that most daily life activities require functions of the upper extremities and few patients had problems with these parts of the body. Two items listed in the BDQ; cutting down activities they used to do and being unable to do part of the daily routine were not significantly affected. It may be due to these two activities being affected not only by physical limitations (e.g. chronicity, deconditioning, and disabling) but also psychological conditions (e.g. depression or anxiety). De Ronchi et al[25] found that a community-based group of 216 elderly people who had symptoms of depression was at a very high risk for functional disability. Therefore, psychological evaluation should be performed as well as evaluation of their physical condition.

The mean score (BDQ1-BDQ8) of the subjects in the present study was classified as moderate disability. Patients with back and lower extremity problems had the highest BDQ score. This is because most activities involved in the BDQ are related to the lower extremity functions such as running, bending, climbing stairs, or walking long distances. The prevalence of patients with a moderate-to-severe disability in the present study was 79%, which was moderately high number. Therefore, physicians should be concerned about the patients' function as well as diagnosis. Likewise, the Third National Health and Nutrition Examination Survey (NHANES III)[26] conducted during 1988-1994 in 6,866 cases aged 60 and older revealed that the prevalence of disability was increased significantly with age for each measure: i.e., lower-extremity function, instrumental activities of daily living, basic activities of daily living, needing help with personal and routine daily activities, and the use of assistive devices for walking. Carriere et al[27] studied the incidence of dependency in a cohort of 545 older women aged 75 years and older and found that the proportion of women reporting disability increased from 22.1% to 52.1% throughout the 7-year follow-up. They also reported that the strong predictors of disability were increasing age, lower performances in mobility and balance tests, badly perceived health, weak muscle strength, high body mass index (BMI), low educational level, and low level of physical activity reported. The scope of the present study did not cover the predictors of disability. However, the results of the present study may encourage physicians to consider not only the diagnosis but also the level of disability, to ensure functional capability and quality of life of the patients.

Conclusion

Disability assessment was performed in 213 orthopedic patients using the Thai version BDQ. Seventy-nine percent of the subjects had moderate-to-severe disability, with mean BDQ score of 7.9 ± 3.8. The three most common limited activities were vigorous activities, walking long distances and climbing stairs or walking uphill.

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การประเมินความบกพร่องในการทำกิจกรรมในผู้สูงอายุที่มีโรคทางระบบออร์โธปิดิกส์

วิไล คุปต์นิรัติศัยกุล, อภิญญา สมรรถจิตต์, พรทิพย์ ด่านพุฒิพงศ์, พิมพร รัตนโชติ, นิรมล ไกรสร, ศิริพร มากท้วม, พงศ์สุดา ไพนุพงศ์

วัตถุประสงค์*: เพื่อประเมินระดับความบกพร่องในการทำกิจกรรมในผู้สูงอายุที่มีโรคทางระบบออร์โธปิดิกส์ โดยใช้แบบสอบถาม Brief Disability Questionnaire (BDQ)*

วัสดุและวิธีการ*: ทำการศึกษาในผู้ป่วยที่มีอายุมากกว่า 60 ปี ที่มารับบริการ ณ คลินิกผู้ป่วยนอก ภาควิชาศัลยศาสตร์ออร์โธปิดิกส์ โรงพยาบาลศิริราชระหว่างเดือนตุลาคม – ธันวาคม พ.ศ.2548 ผู้ป่วยทุกรายจะได้รับการประเมินระดับความบกพร่องในการทำกิจกรรมโดยใช้แบบสอบถาม BDQ ฉบับภาษาไทย BDQ เป็นเครื่องมือที่ใช้ในการประเมินระดับความบกพร่องในการทำกิจกรรมซึ่งทำได้ง่ายและมีความสะดวก โดยมีหัวข้อการประเมินทั้งสิ้น 8 หัวข้อ และมีพิสัยคะแนนตั้งแต่ 0-16 โดยคะแนนที่มากบ่งถึงระดับความบกพร่องในการทำกิจกรรมที่มาก*

ผลการศึกษา*: ผู้ป่วย 213 รายมีอายุเฉลี่ย 69.4 ปี ในจำนวนนี้ร้อยละ 64 มีโรคข้อเสื่อม ปัญหาที่มาพบแพทย์ พบว่าเป็นบริเวณขาและหลังร้อยละ 56.8 และ 26.8 ตามลำดับ กิจกรรมสามอันดับต้นที่ผู้ป่วยมีข้อจำกัด คือ กิจกรรมที่ต้องใช้แรงมาก การเดินระยะทางไกล และการขึ้นบันไดหรือเดินขึ้นทางลาดในอัตราร้อยละ 55.9, 51.6, และ 42.7 ตามลำดับ ค่าคะแนนเฉลี่ย BDQ ในประชากรที่ศึกษามีค่าเท่ากับ 7.9 $\pm$ 3.8 โดยผู้ป่วยที่มีปัญหาบริเวณขาและหลังมีคะแนน BDQ มากที่สุด (8.2 $\pm$ 3.7) ในจำนวนนี้พบว่าผู้ป่วยร้อยละ 79 มีระดับความบกพร่องในการทำกิจกรรมระดับปานกลางถึงรุนแรง*

สรุป*: ผู้สูงอายุที่มีโรคระบบทางออร์โธปิดิกส์ส่วนใหญ่พบว่ามีความบกพร่องในการทำกิจกรรมระดับปานกลางถึงรุนแรง เมื่อประเมินโดยใช้แบบสอบถาม BDQ ดังนั้นแพทย์และบุคลากรทางการแพทย์ควรตระหนักทั้งในแง่การรักษาโรคหลักและการประเมินความบกพร่องในการทำกิจกรรมเพื่อพัฒนาระดับคุณภาพชีวิตของผู้ป่วยซึ่งเป็นเป้าหมายสำคัญในเวชปฏิบัติ*