Floor Activity Score

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Objective: *To propose an instrument to measure the amount of floor activities performed by an individual.*
Material and Method: *A list of 12 questionnaires relating to floor activities is proposed. A cross-sectional survey of the response to the questionnaires was tried on 3 communities representing rural, urban and metropolitan areas. The total number of enrolled people was 733. The scores of the questionnaires were tested for statistical difference ($p<0.05$) among the communities by Chi-square and ANOVA nonparametric tests.*
Results: *The total scores among the three communities were significantly different. The rural civilians achieved the highest score, whereas the metropolitan area had the lowest score.*
Conclusion: *The proposed instrument measuring floor activities is able to discriminate the activities of civilians in rural, urban and metropolitan areas.*

Keywords: *Floor activity, Score, Oriental*

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Degenerative joint disease has been an emerging problem in Thailand since becoming a developing country. Increased life expectancy clearly potentates the problem. The most commonly affected joints are the spine and knee. These seem to be more common in Oriental countries. Once affected, persons will have a poor quality of life for the rest of his or her life unless proper treatment is instituted. The definitive treatment of end stage degenerative spines and knees usually end up with surgical means which consumes both a health team effort and health budget, not to mention the complications that might follow[1-3]. There is no study so far mentioning the assessment of floor activities. The purpose of the present study was to explore the behavior pattern in Oriental communities that might cause the deterioration of spines and knee joints. This unique pattern is floor life or floor activity. By analysis of motion pattern of floor activity, it is obvious that flexion load was continuously repeated on both the back and knees [4-6] (Fig. 1). Life long exposure to such loads can be a significant factor in developing back and knee degeneration. However, a standard of floor activity measurement does not exist. The objective of the present paper was to propose an instrument for such a measurement.

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Objective

To verify that the proposed set of a questionnaire relating to floor activity (Floor activity score) is a valid assessment of floor activity.

Material and Method

This was a cross-sectional community survey. A set of 12 questions was constructed to cover common floor activities namely latrine, eating, mopping, laundry, cooking, ironing, meditation, leisure, sleeping, occupation, preference of floor sitting during the working and rest periods (see appendix 1). A working hypothesis was then proposed: Floor activity practice among different communities should follow this in descending order, rural>urban>city. Four hamlets Banprag district, Ayutthaya province was randomized as a sample of a rural area. Each hamlet was randomized to get one village. Altogether there were 4 villages, each village is geographically divided into 10 clusters. In each cluster, samples were chosen to meet the

Fig. 1 Resuming upright position from the floor exerts excessive back and knee flexion with loading

following criteria (Table 1).

By calculation for each village, the total samples were 60 (6 x 10). The total samples of 4 hamlets were 240 (60 x 4). The city district of Ayutthaya was chosen as a sample of an urban area. Four groups of buildings were randomized. Each group consisted of at least 10 blocks of buildings, each block represents a cluster (Table 1). The total number of samples was 240 (6 for each cluster, 10 clusters and 4 groups).

Silom, Bangkok was selected as a sample of metropolitan civilians. A big building was chosen. Each floor of the building was divided to 2-4 clusters. The total number of clusters was 40 so that the total sample was 240.

A team of surveyors was trained to standardize the questionnaires. Each surveyor will complete a cluster sampling before proceeding further. The volunteer was interviewed about his or her own floor activity for the period of the last 6 months. The frequency of the activity per week and duration of each activity per time were recorded. The duration of activity was distributed into subgroups as less than one minute, 15-30 minutes, 31-60 minutes and longer than 2 hours respectively.

Table 1. Sample characteristics in each cluster

Age	Sex		No.
	Male	Female	
21 – 30	1	1	2
31 – 40	1	1	2
41 – 50	1	1	2
Total No.	3	3	6

Sample size and statistical methods

According to the hypothesis, the difference in floor activity score between group 1 (Urban) and group 2 (Rural), where the score was expected to be maximum, would be greater than 40%

The same assumption was applied between group 2 (Rural) and group 3 (Metropolitan). With the standard deviation of 15, the sample size was equal to

$$\frac{2(SD)^2 \times (Z_{(1\text{-alpha}/2)} + Z_{(beta)})^2}{(mean1 - mean2)}$$

Where $Z_{(1\text{-alpha}/2)} = 1.96$

$Z_{(beta)} = 1.28$ (power = 90%)

So, the sample size for each group was 118. If the design effected in each cluster was 2, the total sample for each group was 2 x 118 = 236 (approximately 240). The total number enrolled in three groups would be 240 x 3 = 720.

Statistical analysis

Three models of analysis of the floor activities were proposed.

Model 1. The all or non (ever – never) response to each activity (altogether = 12 activities). The maximum score would be 12.

Model 2. Summation of all frequency of each floor activity in one week. (Each activity is multiplied by the number of frequencies per week).

Model 3. Total time consumed for each activity per week. This figure was obtained by multiplying the

score of each activity in model 2 with the average time performed for that particular activity. Since the intervals of the duration performed for each activity were recorded as less than 15 minutes, 15 – 30 minutes, 31 – 60 minutes, 1 – 2 hours and more than 2 hours, the multiplying factors would be 7.5, 22.5, 45.5, 90 and 120. By considering the distribution of data, Five intervals of floor activity scores were proposed

Percentile 1-20, the score is 1
Percentile 20-40, the score is 2
Percentile 41-60, the score is 3
Percentile 60-80, the score is 4 and
Percentile 81-100, the score is 5

Hence, the maximum score for the 12 activities would be 12 x 5 = 60

Chi-square test was utilized to analyze the difference among the three groups. The analysis of the difference between each pair for all the three models using ANOVA and the nonparametric test.

The relationship between floor activity score and other variables, namely sex, age, occupation and address were analyzed by linear regression. The activity score was regarded as a dependent variable, whereas other variables were regarded as independent variables. For simplicity, the occupation variable was classified in three groups, group 1 included academics and business, group 2 included blue collar workers and group 3 included house keepers.

Significant P value was 0.05 and 95% confidence interval, utilizing the program STATA version 7 and Epiinfo version 2002.

Results

Demographic Data

The number of people enrolled in the present study was 733 (rural 238, urban 244 and metropolitan 251) (Table 2-9). The sex and age were homogeneously distributed among the three groups. People living in the city performed the highest score in cooking, latrine, ironing, and meditation (Table 10).

Rural people performed the highest scores in the other activities and also the total scores.

Table 2. The number (%) and sex of people in each district

Sex	Rural	Urban	Metropolitan	Total
Male	107 (45.0)	108 (44.3)	122 (48.6)	337 (46.0)
Female	131 (55.04)	136 (55.7)	129 (51.4)	396 (54.0)
Total	238 (32.5)	244 (33.3)	251 (34.2)	733 (100)

Table 3. The number (%) of age distribution among the groups

Age	Rural	Urban	Metropolitan	Total
21 – 30	86 (36.1)	90 (37.3)	88 (35.1)	264 (36.2)
31 – 40	82 (34.5)	74 (30.7)	85 (33.9)	241 (33.0)
41 – 50	70 (29.4)	77 (32.0)	78 (31.1)	225 (30.8)
Total	238	241	251	730

Table 4. Marital status of samples

Marital status	Rural	Urban	Metropolitan	Total
Single	70 (29.4)	85 (34.8)	120 (47.8)	275 (37.5)
Married	158 (66.4)	154 (63.1)	126 (50.2)	438 (59.8)
Separated	2 (0.8)	1 (0.4)	1 (0.4)	4 (0.5)
Widow	4 (1.7)	2 (0.8)	2 (0.8)	8 (1.1)
Divorced	4 (1.7)	1 (0.4)	1 (0.4)	6 (0.8)
Not mentioned	0 (0.0)	1 (0.4)	1 (0.4)	2 (0.3)
Total	238 (32.5)	244 (33.3)	251 (34.2)	733 (100)

Table 5. Education level

Education level	Rural	Urban	Metropolitan	Total
No formal study	6 (2.5)	1 (0.4)	1 (0.4)	8 (1.1)
Primary school	113 (47.5)	44 (18.0)	12 (4.8)	169 (23.1)
Under graduate	29 (12.2)	55 (22.5)	24 (9.6)	108 (14.7)
Graduate or higher	26 (10.9)	61 (25.0)	196 (78.1)	283 (38.6)
Not mentioned	0 (0.0)	4 (1.6)	5 (2.0)	9 (1.2)
Total	174	165	233	568

Table 6. Occupations

Occupation	Rural	Urban	Metropolitan	Total
Professional academics	33 (13.9)	36 (14.8)	215 (85.7)	284 (38.7)
Business	49 (20.6)	111 (45.5)	8 (3.2)	168 (22.9)
Blue Collar	52 (21.8)	8 (3.3)	1 (0.4)	61 (8.3)
Technician	37 (15.5)	24 (9.8)	1 (0.4)	62 (8.5)
Communications	2 (0.8)	4 (1.6)	6 (2.4)	12 (1.6)
Unoccupied	5 (2.1)	8 (3.3)	2 (0.8)	15 (2.0)
House keeper	3 (5.5)	9 (3.7)	6 (2.4)	28 (3.8)
On Training	9 (3.8)	13 (5.3)	7 (2.8)	29 (4.0)
Others	38 (16.0)	31 (12.7)	5 (2.0)	74 (10.1)

Table 7. Average working hours

	Days/wk.		Hrs/day		Relaxation (Hous/day)	
	Mean	Median	Mean	Median	Mean	Median
Rural	6.2	7	8.8	8	1.6	1
Urban	6.5	7	9.3	9	1.6	1
Metropolitan	5.1	5	8.2	8	1.1	1

Table 8. Income / month

Baht / month	Mean	Median
Rural	6,301.29	5,000
Urban	10,695.17	8,000
Metropolitan	20,655.60	19,000

The difference of the floor activity scores between male and female was significant in only three activities, including laundry, cooking and ironing. Females performed these activities more often than males. However, no significant difference between males and females was observed when total activity scores were encountered. Analysis of floor activities in the 3 models are summarized in Tables 11-13. Differences of the score among metropolitan, urban and rural regions in any combination of the 3 models were significant ($P<0.01$) (Tables 14-16).

Discussion

This is the first instrument proposed to assess the floor activities among Thai communities. Although the sampling number is small, it sheds some light on how often Thai people still practice the ancient culture of floor life. If this instrument is accurate in weighing the amount of floor activity performed, it would be useful in various aspects. Apart from studying the changing of culture in different communities, it might be very useful to study the impact of certain behavior to a particular medical problem namely degenerative joint disease. As it is clear that one of the

Table 9. Floor activity in each group

Floor activity	Ever done (No & %)*		
	Rural	Urban	Metropolitan
Latrine use	215 (90.3)	197 (80.7)	61 (24.3)
Eating	188 (79.0)	161 (66.0)	62 (24.7)
Mopping	47 (19.7)	57 (23.4)	50 (19.9)
Laundry	134 (56.3)	94 (38.5)	74 (29.5)
Cooking	67 (28.2)	56 (23.0)	17 (6.8)
Ironing	96 (40.3)	84 (34.4)	61 (24.3)
Mediation	79 (33.2)	108 (44.3)	101 (40.2)
Leisure	174 (73.1)	144 (59.0)	114 (45.4)
Sleeping	160 (67.2)	130 (53.3)	62 (24.7)
Occupation	33 (13.9)	17 (7.0)	5 (0.4)
Working habit	58 (24.4)	27 (11.7)	3 (1.2)
Resting	102 (42.9)	31 (12.7)	14 (5.6)

* p-value <0.05 between groups in all activities

Table 10. Frequency of each floor activity

Floor activity	Frequency / week		
	Rural	Urban	Metropolitan
Latrine use	10.8	12.1	4.2
Eating	14.5	11.6	3.5
Mopping	4.9	4.9	2.2
Laundry	4.3	3.3	2.1
Cooking	22.6	25.6	3.1
Ironing	5.1	5.7	0.8
Mediation	5.0	5.5	3.9
Leisure	7.0	6.5	4.5
Sleeping	7.3	6.3	3.9

* p-value <0.05 between groups in all activities

factors influencing degenerative joint disease is activity related, practicing long term floor life might be a determining factor in deterioration of degenerative back and knee disease. Floor life usually puts more stress over the lower back (excessive bending motion) and the knee (excessive flexion on loading). On the contrary, the instrument can be regarded as one of the measurements of life quality among Asian communities (higher score means more freedom to move the lower joints). However, if it is proven that floor life had a significant impact on developing degenerative joint disease in elderly life, future adaptation of the culture in the community should be considered despite the general trend in decreasing floor activity in the developed community.

Table 11. Number of floor activities ever performed by a person (Model 1)

No. of activities	No.	%
0 - 2	213	29.1
3 - 6	354	50.8
> 6	163	20.1
Total	733	100.0

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Table 12. Frequency/wk. of Floor activities and number (%) of people engaged (Model 2)

Frequency / wk.	No.	%
0 – 5	149	20.4
6 – 15	136	19.7
16 – 30	141	19.8
31 – 50	145	19.9
> 50	144	20.2
Total	733	100

Table 13. Total (weight) Floor activity score (Model 3)

Score by weight	No. engaged	%
0 – 2	143	19.5
3 - 6	142	19.4
7 – 10	148	20.2
11 – 15	156	21.3
> 15	144	19.6
Total	733	100

Table 14. (Model 1) No. of Floor activities ever performed

	Mean	SD	Median	Min	Max
Rural	5.9	2.2	6	0	11
Urban	4.5	2.4	4	0	11
Metropolitan	2.5	2.1	2	0	10

$p < 0.01$

Table 15. (Model 2) Frequency/wk of Floor activities ever performed

	Mean	SD	Median	Min	Max
Rural	43.1	21.9	42	0	105
Urban	32.1	20.2	31	0	107
Metropolitan	8.5	9.9	7	0	82

$p < 0.01$

Table 16. (Model 3) Total Floor activities score

	Mean	SD	Median	Min	Max
Rural	13.3	6.6	13	0	35
Urban	10.8	6.6	10	0	30
Metropolitan	4.5	4.7	4	0	29

$p < 0.01$

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เครื่องมือวัดกิจกรรมบนพื้น

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นำเสนอเครื่องมือการวัดปริมาณกิจกรรมบนพื้น ด้วยแบบสอบถามกิจกรรมบนพื้นทั้งหมด 12 กิจกรรม ได้รับการทดสอบแบบสอบถาม 12 รายการ ในกลุ่มประชากรชนบท ชานเมือง และกรุงเทพมหานคร จำนวนตัวอย่างประชากรที่ได้รับการทดสอบทั้งหมด 733 ราย การทดสอบความแตกต่างอย่างมีนัยสำคัญทางสถิติ ใช้วิธีทดสอบแบบ Chi-square และ ANOVA nonparametric ประชากรทั้ง 3 กลุ่มมีความแตกต่างของปริมาณกิจกรรมบนพื้นอย่างมีนัยสำคัญทางสถิติ (P<0.01) ประชากรกลุ่มชนบท มีคะแนนกิจกรรมบนพื้นสูงสุด ในขณะที่ประชากรกลุ่มกรุงเทพมหานคร มีคะแนนต่ำสุด สรุป เครื่องวัดกิจกรรมบนพื้นที่นำเสนอสามารถบอกความแตกต่างของกิจกรรมบนพื้นในประชากรชนบท ชานเมือง และกรุงเทพมหานคร ได้อย่างมีนัยสำคัญทางสถิติ