

Factors Predicting Physical Activity among Older Thais Living in Low Socioeconomic Urban Communities

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Abstract: This study was conducted to determine if specific factors (physical activity self-efficacy, sense of community, social support, perceived physical and mental health, and neighborhood environment and facilities) predicted physical activity among 258 older Thais living in six registered, low-socioeconomic, urban communities across metropolitan Bangkok. The theoretical model was based on integrated concepts from Pender's Health Promotion Model and the Social Ecological Model. The hypothesized model was tested using path analysis.

The final model explained 33%, 51% and 22% of the variance in physical activity, physical activity self-efficacy and sense of community, respectively. Physical activity self-efficacy was the most powerful predictor in explaining physical activity. Sense of community and perceived physical health had a positive direct effect and a positive indirect effect, through physical activity self-efficacy, on physical activity. Perceived mental health had a negative indirect effect on physical activity, through physical activity self-efficacy, but a positive direct effect on physical activity. Social support, as well as neighborhood environment and facilities, did not significantly predict physical activity. However, social support had a positive indirect effect on physical activity through sense of community. Neighborhood environment and facilities had a positive indirect effect on physical activity through sense of community and physical activity self-efficacy.

These findings provide a greater understanding of factors that predict physical activity among older Thais living in low-socioeconomic urban communities across metropolitan Bangkok. The results may be useful in the development of effective interventions and/or guidelines for promoting physical activity for older Thais.

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Introduction

Physical inactivity, or being sedentary, is a risk factor for a number of health conditions (i.e. increased incidence of cardiovascular disease, obesity, diabetes mellitus, cancer and osteoporosis) among older adults.¹ Although evidence has shown great benefits of increased exercise and physical activity, many older adults remain physically inactive and sedentary.¹⁻² Less than half (41.4%)

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of Thais 60 years of age and older have been found to exercise.³ Sixty to seventy percent of older Thais have been found not to meet the goal of the Thai health policy that every adult perform 30 minutes of moderate physical activity 3–5 days per week.^{4–7} Thus, encouragement of older Thais to exercise and perform physical activity seems essential, particularly among those living in low socioeconomic urban communities.

Although previous investigations have been undertaken regarding exercise and physical activity among older Thais who are living in urban^{5,6} and rural⁴ areas, research has not been conducted among this population in urban communities where residents are of low income and live in poor environmental conditions.

The Thai Bureau of Social Development⁸ has identified individuals who live in unsanitary, dilapidated and disorganized conditions in high density communities with lower income families as being “poor,” and found them to have riskier behaviors, higher rates of chronic illness, more mental health problems, lower quality of life and more premature deaths than the “non-poor” who live in sanitary, well-constructed and maintained conditions in communities with families with higher incomes.⁹ Furthermore, older adults with low incomes have been found to more likely be physically inactive or sedentary than those living in “non-poor” conditions.¹⁰ Given older individuals constitute approximately 11 % of the population of low-socioeconomic urban communities in Thailand, investigation of this group appears to be warranted.¹¹

Prior findings have revealed the more individuals experience a better sense of community, the more they become physically active.¹² Even though a sense of community (one’s social and cultural environment) is known to be important to older persons,¹² research has not been conducted regarding the effect of a sense of community on the physical activity of older Thais. In addition, investigation of the effect physical environment (infrastructure and

buildings) has on physical activity of older Thais has been limited.⁴

Conceptual Framework and Review of Literature

This study was guided by the revised Health Promotion Model (HPM)¹³ and Social Ecological Model (SEM).¹⁴ The HPM explains individual characteristics and experiences, as well as behavior-specific cognitions and affect that may influence behavioral outcomes (i.e. physical activity), and represents the multi-dimensionality of individuals interacting with the environment as they pursue health. In addition, the HPM proposes: 1) individual characteristics and experiences have direct and indirect effects on health promoting behavior through behavior-specific cognitions; 2) behavior-specific cognitions and affect have direct and indirect effects on behavior through a commitment to a plan of action; and, 3) commitment to a plan of action has a direct effect on behavior. Individual characteristics and experiences that affect behavioral outcomes, according to the HPM, include prior related behaviors one possesses, as well as his/her personal characteristics (biological, psychological, and socio-cultural experiences).¹³

The SEM helps to explain the nature of individual interactions within the physical and socio-cultural environment in that one’s interactions with the environment influences his/her health behavior. According to the SEM, the environment can be described in terms of its: physical and social components; objective (actual) or subjective (perceived) qualities; and, size and/or closeness to individuals and/or groups.¹⁴ In addition, the SEM assumes: a) health is influenced by multiple aspects of the physical and social environment; b) human environmental interactions happen in varying contexts (individuals, family systems, workplace and cultural

organizations, and communities); and, c) interactions occur within and across differing levels of the environment and individuals.

Given the fact that integration of two theories can facilitate understanding of the interplay among multi-dimensional factors in relation to physical activity, selected variables from the HPM and SEM were combined in this study (See Figure 1). These variables included: sense of community (socio-cultural environment of the SEM); self-efficacy, social support and neighborhood environment and facilities (behavior-specific cognitions and affect); and, perceived physical health and mental health (personal factors of the HPM).

Older persons' ability to engage in physical activity has been shown to be influenced by their self-efficacy (confidence or belief) regarding their ability to overcome barriers to physical activity.¹⁵ Self-efficacy has been recognized, in this context, as a predictor of physical activity.^{5,6,16-18} Common activities (i.e. walking, stair climbing and carrying objects) often are difficult, due to a variety of barriers, for older individuals to perform.¹⁹ Therefore, including self-efficacy as a variable when examining physical activity, predictors of older adults, particularly older Thais residing in low-socioeconomic urban environments, was essential.

The variables, perceived physical health and perceived mental health, also have been recognized as determinants of exercise and physical activity among older individuals.²⁰ These variables are known to serve as motivational sources for the performance of actions and may be used to reinforce the value of good health. These variables also have been recognized as influencing physical activity self-efficacy²¹ in that, when individuals perceive themselves as being healthy, they are more interested in performing healthy behavior.²²

Thus, given prior research has revealed one-third of urban poor older Thais have physical

disabilities, with more than half of them having at least one health problem⁹ and a third being treated for depression,²³ the variables, perceived physical health and perceived mental health, were included in the study's model.

Social support has been viewed as one's sense of others' interpersonal influence on their behavior, belief and attitude, and defined as a subjective feeling of belonging and being loved, esteemed, valued and needed for oneself, rather than for what one can do for others.²⁴ Support from others has been noted to enhance one's self-efficacy by strengthening the individual's confidence regarding performance of physical activities and, in turn, increase his/her physical activity performance.^{17,25} Thus, social support has been recognized as a predictor of older persons' level of physical activity.¹⁷ Although the findings of prior research has supported the relationship between social support and physical activity,^{5,6} studies related to older Thais' sense of social support, when living in a socio-economically disadvantaged area, have not been conducted. In addition, an increased sense of social support may strengthen one's sense of community by reducing his/her feelings of vulnerability and exclusion.

Sense of community is known, particularly, to be important to older people¹² and defined as a feeling of: (a) commitment and obligation one feels toward community members; (b) being part of the community; and, (c) having a mutual understanding of collective values, beliefs and interests among community members.²⁶ Prior studies have found the more individuals experience a sense of community, the more physically active they become.^{12, 27, 28} Thus, one's sense of social support and community may enhance his/her self-efficacy as a source of motivation for performing physical activity. However, one's sense of community, with respect to performance of physical activity among older Thais

living in low-socioeconomic urban areas, has not yet been investigated.

The environment and facilities within individuals' neighborhoods have been identified as determinants of one's involvement in exercise and physical activity.^{16,29} The neighborhood environment and facilities have been recognized as: (a) stressors that affect one's mood, performance and physiology; (b) sources of safety, as well as potential danger; (c) enablers of health behavior; and, (d) providers of health resources.¹⁴ Negative perceptions of one's neighborhood may impede neighborhood interactions and result in one withdrawing and not participating in physical activities.¹² One's environment also has been found to facilitate, as well as restrict, self-efficacy.¹⁵ However, the effects of neighborhood environment and facilities appear to have received limited attention in prior studies of physical activity.

Therefore, the purpose of this study was to determine if specific factors (physical activity self-efficacy, sense of community, social support, perceived physical and mental health, and neighborhood environment and facilities) predict physical activity among older Thais living in low-socioeconomic urban communities across metropolitan Bangkok, Thailand. The hypothesized model is presented in **Figure 1**. The hypotheses for this study included: 1) physical activity self-efficacy will have a positive direct effect on physical activity; 2) social support and neighborhood environment and facilities will have a positive direct effect on physical activity and a positive indirect effect on physical activity through physical activity self-efficacy and sense of community; 3) sense of community and perceived physical health will have a positive direct effect on physical activity and a positive indirect effect on physical activity through physical activity self-efficacy; and, 4) perceived mental health will have a negative direct effect on physical activity and a negative indirect effect on physical activity through physical activity self-efficacy.

Method

Design: A cross-sectional descriptive survey design was used.

Ethical considerations: Approval to conduct the study was granted by the Institutional Review Board of the primary investigator's university and the Metropolitan Bangkok Health Department. Each of the potential participants were informed of the study's objectives and provided information regarding what would be involved as a participant. In addition, they were informed: their participation was voluntary; they could terminate their participation at any time without repercussions; and, their anonymity and confidentiality would be maintained. Those willing to participate were asked to sign consent before taking part in the study.

Subjects and settings: The sample was recruited from a population of 71,401 older Thais living in low-socioeconomic urban communities across Metropolitan Bangkok.¹¹ The sample size was calculated following Cochran's formula³⁰ ($p=0.414$, $d=.0621$, $\alpha=.05$) and included a 5% attrition rate, resulting in a required sample of 258. Multi-stage sampling was used to recruit 262 potential subjects living in six registered, low-socioeconomic, urban communities within metropolitan Bangkok. Three of those recruited declined to participate and one failed to complete the research protocol.

A total of 258 subjects (43 from each of the 6 selected communities) participated in the study. They included Thais who: were ≥ 60 years of age; had a score ≥ 15 (no cognitive impairment) on the Chula Mental Test;³¹ had lived in an urban poor community in metropolitan Bangkok for ≥ 1 year; and, had an income of $< 2,000$ Baht per month.

Instruments: Data were collected via use of 9 questionnaires. They included the: Demographic Data Questionnaire (DDQ); a modified version of the Self-Report Physical Activity Questionnaire for Older Thai Adults (SPAQ);³² Sense of Community

Scale (SCS), a modified version of the Sense of Neighborhood Scale (SNS);¹² Neighborhood Environment Scale (NES), a modified version of the Neighborhood Environment Walk Ability Scale-Abbreviated (NEWS-A);³³ a modified version of the Perceived Self-Efficacy for Exercise Questionnaire (PSEEQ);⁵ a modified version of the Social Support for Exercise Questionnaire (SSEQ);⁵ Physical Component Score of the Short Form-36 Health Survey, version 2 (PCS, SF-36, v.2);³⁴ Health-Related Self-Reported scale (HRSR);³⁵ and, Chula Mental Test (CMT).³¹

The original owner of each of the copyrighted instruments granted permission for use and translation, into Thai, of his/her respective instrument. The SCS and NES, both of which originally were developed in English, were translated into Thai and then back-translated into English. Each of the original instruments and their respective back-translated version was compared, by a native English language speaker, to assure no changes in meaning had occurred. In addition, all of the instruments, except the CMT, SF-36 (v.2) and HRSR, were examined, by five experts in older adult physical activity and community nursing, for content validity. The content validity index scores ranged from 0.92-0.95. Reliability of the instruments was assessed by way of a pilot study with 15 older adults who had characteristics similar to the study sample. Cronbach's alpha coefficients of the instruments ranged from 0.77-0.91.

The 12-item Demographic Data Questionnaire (DDQ) was developed by the primary investigator (PI) to obtain information regarding the subjects' socioeconomic characteristics, health status and living situations. Each subject was requested to indicate his/her: gender; age; marital status; educational level; employment status; monthly income; living arrangement; number of years lived in the community; plans to move out of the current residence; presence of any health problems; and, height and weight (in order to calculate the elders' BMI).

The Chula Mental Test (CMT)³¹ was used to screen the potential subjects' cognitive status, to determine if they met the inclusion criteria. Each potential subject, after expressing interest in participating in the study, was asked to respond to 13 questions (e.g. "How old are you?" and "What time is it?"). The item responses were coded 0 when incorrect and 1 when correct. Each subject's cognitive function score, which could range from 0-19, was tabulated by summing across all items. The level of cognitive impairment was determined by the respective scores, with a score of 0-4 = severe cognitive impairment; 5-9 = moderate cognitive impairment; 10-14 = mild cognitive impairment; and 15-19 = no cognitive impairment. Those with a score < 15 were excluded from the study. Cronbach's alpha for the CMT, in this study, was found to be 0.79.

The Self-Report Physical Activity Questionnaire for Older Thai Adults (SPAQ),³² which measures older Thais' level of physical activity, was modified for use in this study. The original version of the SPAQ contained 55 items that measured four kinds of physical activities older Thais, living in a community, engaged in over the past seven days. The SPAQ was modified, by the PI, to more accurately measure the physical activity of older Thais living in low-socioeconomic communities. The first draft of the modified version of the SPAQ, which consisted of 55 items, was examined by the five experts who recommended removal of 13 items that addressed activities (i.e. playing golf, pa-tong/ bowling, table tennis, competition badminton and miniature golf, as well as hitting golf balls on driving ranges and carrying or pulling golf equipment) that would not be appropriate for elders from low-socioeconomic areas. Thus, the final modified version of the SPAQ contained 42 items that measured the amount of physical activity (household, occupational, leisure and transportation) each subject may or may not have participated in during the previous seven days. Each subject was asked to indicate, on a Likert-like

scale, the total number of hours per week he/she was involved in, for each activity recorded. The amount of time involved was assigned a predetermined value, wherein: 0 -1 hour = 0.5; > 1 - 3 hours = 2; > 3 - 5 hours = 4; > 5 -7 hours = 6; > 7 - 9 hours = 8; and, > 9 hours =10. If the duration of involvement was not indicated, the item received a score of 0. The weekly activity score was calculated, for each activity, by multiplying the total hours of the respective activity performed over the previous seven days by the Metabolic Equivalent value (MET-Hr/wk = Total hr./wk × MET).³² The total physical activity score was determined by summing across the four weekly activity scores and categorized, based upon the obtained score, into one of three levels of activity intensity, (e.g.: < 3 METs = light activity; 3 - 5.9 METs = moderate activity; and, ≥ 6 METs = vigorous activity). The two week test-retest reliability for the modified SPAQ, in this study, was 0.98.

The Perceived Self-Efficacy for Exercise Questionnaire (PSEEQ)⁵ is a 28 item instrument used to examine older adults' confidence (perceived self-efficacy) regarding whether they would, under various situations, engage in leisure (14 items) and lifestyle exercise (14 items). Since this study focused on physical activity involved in all of daily life, the PSEEQ was modified, by the PI, based on review of the literature and recommendations of five experts in older adult physical activity and community nursing. As a result, 4 items were deleted, due to being redundant, and measurement of perceived self-efficacy for leisure and lifestyle exercise were combined and used as a measurement of physical activity self-efficacy. Physical activity self-efficacy, measured by the modified PSEEQ, encompassed daily life activities related to one's occupational, household, transportation and leisure time (exercise and recreation) activity. Thus, each subject was asked to rate, on a scale of 0 = cannot do at all to 10 =

certain can do, how sure he/she was that he/she could perform a physical activity under 12 (8 internal and 4 external) conditions (i.e. "When you were tired" and "When you had to perform alone"). A total physical activity self-efficacy score, which could range from 0 - 120, was computed by summing across all items. The higher the score, the higher one's perceived self efficacy. Cronbach's alpha of the modified PASEQ, in this study, was 0.89.

The Social Support for Exercise Questionnaire (SSEQ), used to measure family and friends' support of older adults when they are performing leisure (13 items) and lifestyle (12 items) exercises,⁵ was modified for use in this study, by the PI, based on review of the literature and recommendations of five experts in older adult physical activity and community nursing. Since this study focused on all types of physical activity involved in daily life, the PI combined the separate measurements of social support for lifestyle and leisure exercises as a single measure of social support for physical activity. The modified SSEQ was comprised of 11 items which measured emotional support (4 items), tangible support (4 items) and informational support (3 items) from each respective older adult's family and friends in regards to physical activity. Family and friends were assessed as two separate entities. Examples of the items and their respective support included: "Listened to you and gave you an encouragement when you had a problem performing a physical activity (emotional support)"; "Offered to perform a physical activity with you (tangible support); and, "Gave you a suggestion about how to manage a problem with performing a physical activity (informational support)." Each participant was asked to rate how often (1 = never to 3 = often) family and friends provided encouragement (i.e. admired you, or provided equipment or facilities) to perform a physical activity. The total social support score (combined scores for family support and friends

support), which could range from 22 - 66, was determined by summing across all items. The higher the total score, the greater one's social support for performing physical activity. Cronbach's alpha of the SSEQ, in this study, was 0.84.

The Neighborhood Environment Scale (NES), used to measure neighborhood environment and facilities, was modified, by the PI, based on the recommendations of five experts in older adult physical activity and community nursing, from the 54-item Neighborhood Environment Walk Ability Scale - Abbreviated (NEWS-A).³³ Twenty-two items of the original 54 that comprised 6 subscales of the NEWS-A were maintained. These included: 4 items regarding acreage used for mixed-access; 3 items regarding street connectivity; 6 items regarding infrastructure and safety for walking and cycling; 4 items regarding aesthetics; 2 items regarding traffic hazards; and, 3 items regarding crime. Each subject was asked to indicate his/her level of agreement/disagreement related to characteristics of his/his neighborhood (i.e. "Each intersection is not far from one another"; and, "There are many ways to go from one place to another."). Each subject was asked to respond to items in the subscales for acreage used for mixed-access, street connectivity, infrastructure and safety for walking and cycling, and aesthetics on a Likert-like scale, where 1= strongly disagree to 4 = strongly agree. Subjects also were asked to respond to items in the subscales for traffic hazards and crime on a reverse scored Likert-like scale, wherein 4 = strongly disagree to 1= strongly agree. Mean scores from each subscale were summed to provide a total NES score that could range from 6-24. Higher NES total scores indicated more favorable value of the neighborhood environment and facilities. Cronbach's alpha of the NES, in this study, was 0.78.

The Sense of Community Scale (SCS) was modified, by the PI, based on the recommendations

of five experts, from the Sense of Neighborhood Scale.¹² So as to better fit with the Thai culture, two items ("In your community, there is ritual activity that you mostly participated in"; and, "You and your neighbors get together for activities such as activity for community problem solving.") were added to the original seven item SCS. Each subject was asked to indicate what he/she thought best applied to his/her neighborhood (i.e. "You have a lot in common with people in your neighborhood"; and, "You are a good friend to your neighbor.") on a Likert-like scale (1 = strongly disagree to 5 = strongly agree). A total SCS score, which could range from 9-45, was tabulated by summing the responses. A higher score referred to a greater sense of community. Cronbach's alpha of the SCS, in this study, was 0.85.

The Short Form-36 Health Survey, version 2 (SF-36, v. 2) is an eight-scale profile, in which the scores are combined into 2 summary scores, physical component score (PCS) and mental component score (MCS), used to measure one's perceived physical and mental health status.³⁴ However, only the PCS component of the instrument was used in this study. Although the owner of the SF-36 provided a Thai version of the instrument, the Thai version of the PCS component of the SF-36, v.2, translated by Jirattanaphochai and colleagues,³⁶ was used. The PCS component contained 21 items, within four subscales, related to each respondent's: physical functioning (10 items); role limitations due to physical health (4 items); bodily pain (2 items); and, general health (5 items). Possible responses to items and their related values varied depending upon the subscale, as well as the type of question being asked. For example, in the physical functioning subscale, items (i.e. "Climbing several flights of stairs.") could be answered as: 0 = yes, limited a lot; 50 = yes, limited a little; or, 100 = no, not limited at all. In the role limitations subscale, items (i.e. "Had to cut

down on the amount of time spent on work or other activities.”) could be answered as: 0 = all the time; 25 = most of the time; 50 = some of the time; 75 = a little of the time; and, 100 = none of the time. For the bodily pain subscale, the possible responses to one item (i.e. “How much bodily pain have you had over the past four weeks?) were: 100 = none; 60 = very mild; 40 = moderate; 20 = severe; and, 0 = very severe. Lastly, four of the five general health subscale items (i.e. “I am as healthy as anybody I know.”) could be answered as: 100 = definitely true; 75 = mostly true; 50 = don’t know; 25 = mostly false; and, 0 = definitely false. The mean scores of the four subscales were summed to produce a total perceived physical health score that could range from 0–400. The higher one’s perceived physical health score, the greater one’s perception of good physical health. Cronbach’s alpha for the PCS of the SF-36, v. 2, in this study, was 0.92.

The 20-item Health-Related Self-Report Scale (HRSR), a measure of depressive symptoms among the general population,³⁵ was used, in this study, to measure the subjects’ perceived level of mental health. Sixteen of the 20 items measured depressive symptoms (i.e. poor appetite/anorexia, worry, over concern) within four symptom categories (vegetative [4 items]; motivation [3 items]; cognitive [4 items]; and affective [5 items]). Subjects were asked to mark, on a scale of 0 = never to 3 = frequent (everyday or almost every day), how often they had encountered, during the previous two weeks, each depressive symptom. Three of the 20 items assessed positive feelings of well-being (i.e. “Feeling well;” “Feel life is pleasant and meaningful;” and, “Have a feeling of self worth”) via possible responses of 0 = frequent to 3 = never. The other item assessed each subject’s level of suicidality (“Have attempted suicide”) via possible responses of 3 = yes to 0 = no. The total HSHR score, which could range from 0–60, was calculated

by summing across all items. A score of 25–29 was viewed as indicative of depression, while a score of 30 and over was viewed as major depression. Cronbach’s alpha for the HRHS, in this study, was 0.86.

Procedure: After approval to conduct the study was granted, an information letter was posted to the directors of the public health centers for the six selected communities in metropolitan Bangkok. The PI then visited with, and introduced herself to, the directors of the public health centers and the community nurses. They provided her with a list of the registered low-socioeconomic communities within each of their respective districts. Upon visiting each low-socioeconomic community, the PI met with community leaders, health care volunteers and older adult volunteers, and explained the purpose of the study and how the findings might benefit the community.

In the communities that had a list of older adults, the PI selected every third name to recruit as a potential subject. Then the PI, in coordination with the community healthcare volunteers, made an appointment with each potential subject. When a healthcare volunteer determined the home of the selected potential subject was not readily accessible, the PI randomly selected another potential subject from the name list. In communities that did not have a name list of older adults, convenience sampling was used. When a potential subject declined to participate, or did not meet the inclusion criteria, another potential subject was approached.

For convenience of the subjects and PI, data were collected without interruption in the respective subject’s home, or in a convenient place in the community, immediately after he/she consented to participate. The PI explained the questionnaires and asked each subject to verbally respond to each of the items read to him/her, as well as to ask for clarification as needed.

Administration of the questionnaires occurred during two sittings with a 5–10 minute break in between. The first sitting included administration of the: CMT; DDQ; modified SPAQ; modified PSEEQ; and, modified SSEQ. During the second sitting, the PI administered the: NES; SCS; PCS component of the SF–36, v.2; and, HRSR. Subjects answered all questionnaires within approximately 45–50 minutes. Upon completion of administration of the questionnaires, the PI placed a code number on each questionnaire, checked to assure all instruments were completed, thanked the respective subject and gave him/her a soap and soy milk in appreciation for his/her participation.

Data Analysis: Descriptive statistics were used to characterize the sample and to examine the

distribution properties of the variables. Cronbach’s alpha coefficient was used to examine the reliability of the study instruments. Path analysis was carried out, using LISREL, to test the study hypotheses.

Results

Subjects: Subjects included 190 women and 68 men (see **Table 1**) with a mean age of 69.85 years (range = 60–88 years). Most subjects: were either married or widowed; had a primary education; were unemployed; had an income of 1,500 to 2,000 baht per month; lived with offspring and grandchildren; lived in the community for more than 10 years; did not plan to move from the community; had a history of health problems; and were of normal weight.

Table 1 Demographic Characteristics of Sample (n= 258)

Items	n	%
Gender		
Female	190	73.6
Male	68	26.4
Age (mean=69.85, SD= 6.38, Range= 60–88)		
60–69	126	48.8
70–79	114	44.2
80–89	18	7.0
Marital Status		
Single	7	2.7
Married	122	47.3
Widowed	103	39.9
Divorced/ Separated	26	10.1
Education Level		
No education	24	9.3
Primary school	179	76.0
Secondary school	33	12.8
Vocational school	5	1.9
Occupation		
No	185	71.7
Yes	73	28.3

Table 1 Demographic Characteristics of Sample (n= 258) (cont.)

Items	n	%
Monthly Income in Baht (30 Baht = \$1 USD)		
<i>(mean=1,317.83, SD= 625.40, Range= 500-2,000)</i>		
0-500	69	26.7
501-1,000	45	17.4
1,001-1,500	44	17.1
1,501- 2,000	100	38.8
Living Arrangement		
By self	17	6.6
With spouse	24	9.3
With spouse and offspring	82	31.8
With offspring and grandchildren	129	50.0
With sibling	6	2.3
Number of Years Living in this Community		
<i>(mean= 33.61, SD=21.19, Range= 1-80)</i>		
1- 10	46	17.8
More than 10	212	82.2
Plan to move from current residence		
Yes	42	16.3
No	216	83.7
Health Problem History		
No	43	16.7
Yes	215	83.3
BMI (mean= 25.21, SD= 4.99, Range=11.72-44.44)		
Less than 18.5 (underweight)	14	5.4
18.5- 24.9 (Normal)	126	48.8
25- 29.9 (Overweight)	75	29.1
≥30 (Obese)	43	16.7

The majority of subjects reported engaging in some type of physical activity and being moderately healthy, as well as having: moderate confidence about their ability to perform physical activity; low

social support; moderate favorability of their neighborhood environment and facilities; a high sense of community; and, few mental health problems (see **Table 2**).

Table 2 Type and Predictors of Physical Activity (n= 258)

Items	n	%
Type of Physical Activity		
Household	243	94.2
Occupation	37	37.6
Recreation (Watching TV, Listening to radio, Reading)	256	99.2
Transportation	221	85.7
Exercise		
-Meeting the goal*	38	20.2
-Not meeting the goal	152	79.8
Total Physical Activity Score (<i>mean=81.38, SD=38.64, Range=1.25-216.75</i>)		
0-100	186	72.1
101-200	70	27.1
201 and greater	2	0.8
Physical Activity Self Efficacy (Scores) (<i>mean=51.51, SD=29.86, Range=0-120</i>)		
Low (0-40.00)	93	36.0
Moderate (40.01-80.00)	122	47.3
High (80.01-120.00)	43	16.7
Social Support for Physical Activity (Scores) (<i>mean=28.38, SD=7.05, Range=22-64</i>)		
Low (22.0-36.6)	228	88.4
Moderate (36.7-51.3)	26	10.0
High (51.4-66.0)	4	1.6
Sense of Community (Scores) (<i>mean=36.38, SD=6.76, Range=15-45</i>)		
Low (9-22)	16	6.2
Moderate (23-36)	106	41.1
High (37-45)	136	52.7
Neighborhood Environment & Facilities (Scores) (<i>mean=14.39, SD=4.35, Range=9.17-20.83</i>)		
Low (6.00-12.00)	41	15.9
Moderate (12.01-18.00)	205	79.5
High (18.01-24.00)	12	4.6
Perceived Physical Health Healthy (Scores) (<i>mean=219.98, SD=81.57, Range=22.5-387.0</i>)		
Low (0-133)	40	15.5
Moderate (133.01-267.00)	142	55.0
High (267.01-400.00)	76	29.5
Perceived Mental Health Problems (Scores) (<i>mean=10.97, SD=11.27, Range=0-56</i>)		
Low (0-20)	209	81.0
Moderate (20.01-40.00)	41	15.9
High (40.01-60.00)	8	3.1

(*Note = perform 30 min. of moderate intensity physical activity for 5 days/wk or 20 min. of vigorous intensity physical activity 3 days/wk)

Even though the vast majority of subjects indicated they performed some form of physical activity (i.e. household, recreation and transportation), only 190 actually engaged in physical exercise. Of those 190 subjects only 20.2% (n = 76) were able to meet the national health policy goal of performing 30 minutes of moderate exercise 5 days/week or 20 minutes of vigorous exercise 3 days/week.⁷

Model testing: The hypothesized model (see **Figure 1**) was found not to fit the data. Consequently, the hypothesized model was modified via use of the modification indices of the program, as well as theoretical support, by adding a path between perceived physical health and sense of community (see **Figure 2**). The modified model was found to fit the data. The standardized residuals ranged from -2.504 to 1.350.

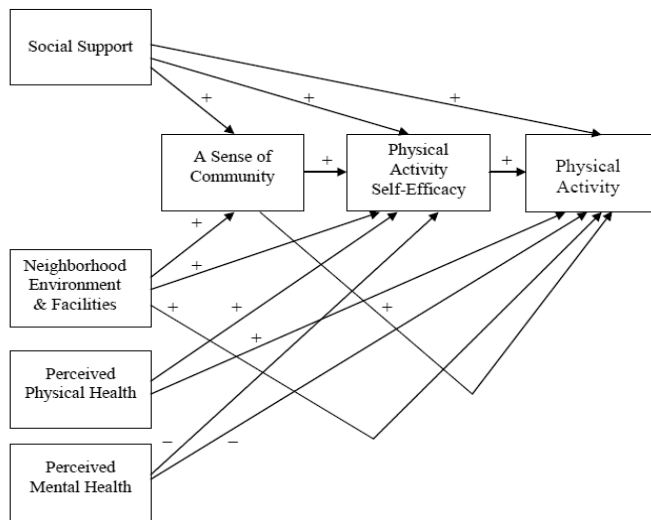


Figure 1 Hypothesized Model of Factors Predicting Physical Activity of Older Thais Living in Low Socioeconomic Urban Communities

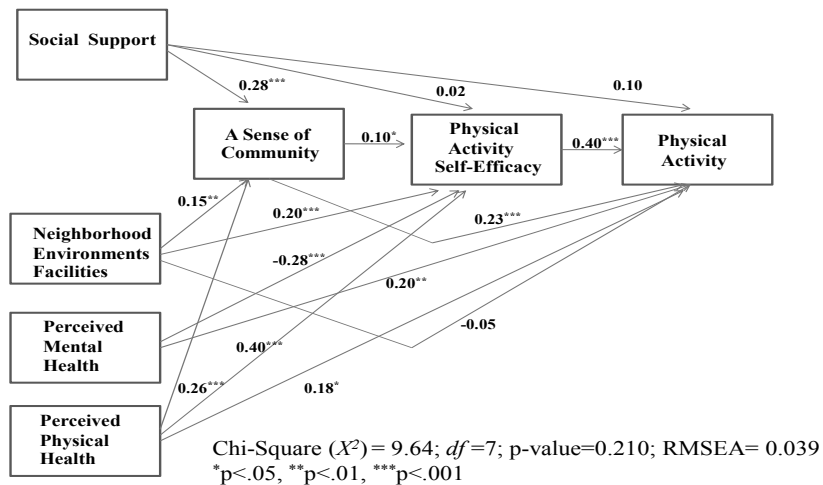


Figure 2 The Modified Model of Factors Predicting Physical Activity of Older Thais Living in Low Socioeconomic Urban Communities

The direct, indirect and total effects of causal relationship of the modified model are shown in **Table 3**. Physical activity self-efficacy was found to be the most powerful predictor in explaining physical activity. Sense of community and perceived physical health had a positive direct effect on physical activity, and a positive indirect effect on physical activity through physical activity self-efficacy. Perceived mental health had a negative indirect effect on physical activity through physical activity self-efficacy, and

a positive direct effect on physical activity. Neither social support, nor neighborhood environment and facilities, significantly predicted physical activity. Social support had a positive indirect effect on physical activity through sense of community, while neighborhood environment and facilities had a positive indirect effect on physical activity through sense of community and physical activity self-efficacy. In addition, perceived physical health had a positive direct effect on sense of community.

Table 3 Direct, Indirect and Total Effects of Causal Relationships of Factors Predicting Physical Activity of Older Thais Living in Low Socioeconomic Urban Communities

Causal Variables	Affected variables								
	<i>Sense of Community</i>			<i>Physical Activity Self-Efficacy</i>			<i>Physical Activity</i>		
	DE	IE	TE	DE	IE	TE	DE	IE	TE
Social Support	0.28***	-	0.28***	0.02	0.03	0.05	0.10	0.08	0.18
Neighborhood Environment and Facilities	0.15**	-	0.15**	0.20***	0.02***	0.22***	-0.05	0.12	0.07
Perceived Physical Health	0.26***	-	0.26***	0.40***	0.03***	0.43***	0.18*	0.23*	0.41*
Perceived Mental Health	-	-	-	-0.28***	-	-0.28***	0.20***	-0.11***	0.09***
A Sense of Community	-	-	-	0.10*	-	0.10*	0.23***	0.04***	0.27***
Physical Activity-Self Efficacy	-	-	-	-	-	-	0.40***	-	0.40***
Structure Equation Fit	R ² = 22%			R ² = 51%			R ² = 33%		

*p<.05; **p<.01; ***p<.001

DE=Direct Effect; IE=Indirect Effect; TE=Total Effect

Discussion

Subjects, in this study, reported lower average physical activity scores than 550 older Thais, living in a community in Bangkok, upon whom the physical activity scale was tested.³² Also, the physical activity score did not meet the goal of the national health policy.⁷ This finding supports the premise that older Thais who are poor and live in urban areas tend to be more sedentary than older Thais who are not poor and do not live in low-socioeconomic communities.¹⁰ This difference may be due to the fact that most subjects (83.3%), in this study, had a history of health problems. Some of their health problems, especially chronic illnesses, most likely limited their physical activity. A decline in health and decreased functional status often occurs with age, and leads to physical movement difficulties.^{2,37} In this study, 29.1% of the subjects were overweight and 16.7% were obese, therefore their physical activity may have been more limited.

Finding physical activity self-efficacy to be the best predictor for older adults' physical activity supports some prior studies.^{5-6, 16-18} This finding, however, is incongruent with prior research^{5,16,17,38} that found social support had a direct influence on physical activity. Possible reasons for this incongruence may be due to struggles with poverty. Because of work commitments, the children of the urban poor may have limited time and/or insufficient financial means to support their parents' physical activity.

The findings suggest perceived physical health had a positive direct effect on physical activity, and a positive indirect effect on physical activity through physical activity self-efficacy. This finding helps support the HPM in that perceived physical health is one component in perceived health status that acts as a motivational source for performing health related behaviors.^{20,22,38} In addition, because perceived physical health reflects self-rated subjective health status, older adults who perceive themselves to have

poor physical health may tend to engage in unhealthy lifestyle behaviors, as well as express a number of physical and mental health complaints. This, in turn, could influence their confidence levels (self-efficacy) regarding their abilities to overcome barriers to physical activity.

Consistent with prior findings, a strong sense of community was found to be associated with being physically active.^{12,27,28} Sense of community has been shown to predict volunteer activity among older adults living in poor communities.²⁸ Serving as a volunteer requires one to have a certain level of physical activity in order to meet the demands of specific activities. Sense of community also was found, in this study, to have a positive indirect effect on physical activity through physical activity self-efficacy. This finding might be related to subjects having a feeling of attachment to their community that, subsequently, led to their participation in a Senior Club and volunteer activities, both which required a certain degree of physical activity.

Different from prior research that has shown environment to have a direct influence on older adults' physical activity,^{4,14,29} neighborhood environment and facilities were found to have a positive indirect effect on physical activity through sense of community and physical activity self-efficacy. The difference in findings might be due to the fact that more than 80% of the subjects, in this study, had lived in their communities for more than ten years and, as a result, had adapted to their surroundings. Even though outsiders may have perceived the elders' environment and facilities to be insufficient, the subjects felt they were adequate and not necessarily important to their physical activity. In addition, the instrument used to assess neighborhood environment was a relatively new measurement that was developed for use in Western cultures. Therefore, the tool may not have captured the nuances of the environment within the Thai culture. It also is possible that, during translation and back-translation of the instrument, important

issues may have been misinterpreted. However, the study did find subjects who reported greater satisfaction with their neighborhood and facilities to have higher levels of self-efficacy in overcoming barriers to activity. Furthermore, finding an indirect effect of neighborhood environment and facilities on physical activity through sense of community supports the SEM premise that behavior is influenced by the interactions between the individual and his/her physical and social environment.¹⁴ Thus, if one perceives favorable facilities and a connected, harmonious and safe environment, he/she may develop supportive and neighborhood ties.

Congruent with prior findings, perceived poor mental health was found to have a negative indirect effect on physical activity through physical activity self-efficacy.^{20,39} This finding supports the HPM and further suggests perceived mental health acts as a motivational source for performing actions and influencing older adults self-efficacy.²⁰ Due to perceived mental health being a self-rated, subjective assessment, elders who perceive themselves to have poor mental health may develop an unhealthy life style and, subsequently, experience physical and mental health difficulties that may affect their physical activity self-efficacy and physical activity.

Contrary to prior findings,^{29,39} perceived mental health was found to have a significant positive direct effect on physical activity, rather than a negative direct effect. In addition, 10.9% of the subjects were found to experience depressive symptoms, with 1.5% of them having a major depression. These findings are significant when recognizing that even though mildly depressed elders may report feeling fatigued and have markedly diminished interest/pleasure in activities, they remain capable of carrying out essential daily activities.³⁹⁻⁴⁰

Similar to prior findings,⁴¹ perceived physical health was found to have a positive direct effect on sense of community. The subjects may have limited

their mobility and interactions with others when they perceived having poor physical health, which, in turn, may have contributed to them having a reduction in their ability, and opportunity, to participate in community social activities.

Limitations

Like all study's, the findings have limitations. The study focused only on older Thais living in registered urban poor communities in Bangkok, Thailand. Thus, the findings cannot be generalized to elders living in non-registered urban areas or rural poor communities in other cities, or to older Thais living in affluent communities. In addition, data were not gathered in residential areas the healthcare volunteers considered to be unsafe. Thus, sampling bias may have occurred. It is possible, since the SCS and NES had to be translated and back-translated, that important issues, inadvertently, may have been altered. Also, since the SCS and NES originally were developed within a Western context, it is possible the items may have been incongruent with various aspects of the Thai culture.

Conclusions and Recommendations

The findings support the belief, held by both the HPM and the SEM, that interactions among individuals and their environments influence their physical activities. However, there is a need for further exploration of physical activity within the three domains of the SEM, including: (a) intrapersonal (demographic, biological and psychological); (b) social and cultural environment (family, peers, organizations, neighbors, communities, institutions and public policies); and, (c) physical environment (characteristics, access and facilities). In addition, so as to strengthen generalizability of the model, the model needs to be tested within different contexts

and tested using a longitudinal design. The SCS and NES also need to be modified to assure the items adequately address various aspects of the Thai culture.

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ปัจจัยทำนายกิจกรรมการเคลื่อนไหวออกแรงของผู้สูงอายุไทยที่อาศัยอยู่ในชุมชนแออัด เขตเมือง

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บทคัดย่อ: การวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์เชิงสาเหตุของ การรับรู้สมรรถนะในตน ด้านการทำกิจกรรมการเคลื่อนไหวออกแรง ความรู้สึกเป็นส่วนหนึ่งของชุมชน การสนับสนุนทางสังคม การรับรู้สุขภาพกาย การรับรู้สุขภาพจิต และ การรับรู้สภาพสิ่งแวดล้อมละแวกบ้าน ต่อการทำกิจกรรมการเคลื่อนไหวออกแรงของผู้สูงอายุไทย จำนวน 258 คนที่อาศัยอยู่ในชุมชนแออัด จำนวน 6 ชุมชน ในกรุงเทพมหานคร โดยผสมผสานแนวคิดการส่งเสริมสุขภาพของเพนเดอร์ และแนวคิดเชิงนิเวศวิทยาวิเคราะห์โมเดลด้วยการวิเคราะห์อิทธิพล

ผลการศึกษา พบว่า แบบจำลองสุดท้ายทำนายความผันแปรของการทำกิจกรรมการเคลื่อนไหวออกแรง การรับรู้สมรรถนะในตน และความรู้สึกเป็นส่วนหนึ่งของชุมชนได้ 33%, 51% และ 22% ตามลำดับ การรับรู้สมรรถนะในตนทำนายการทำกิจกรรมการเคลื่อนไหวออกแรงได้ดีที่สุด ความรู้สึกเป็นส่วนหนึ่งของชุมชน และการรับรู้สุขภาพกายมีอิทธิพลโดยตรงทางบวกต่อการทำกิจกรรมการเคลื่อนไหวออกแรง และมีอิทธิพลโดยอ้อมทางบวกต่อการทำกิจกรรมการเคลื่อนไหวออกแรงผ่านการรับรู้สมรรถนะในตน การรับรู้สุขภาพจิตมีอิทธิพลโดยอ้อมทางลบต่อการทำกิจกรรมการเคลื่อนไหวออกแรง ผ่านการรับรู้สมรรถนะในตน แต่มีอิทธิพลโดยตรงทางบวกต่อการทำกิจกรรมการเคลื่อนไหวออกแรง แม้ว่าการสนับสนุนทางสังคม และการรับรู้สภาพสิ่งแวดล้อมละแวกบ้านไม่มีผลโดยตรงต่อการทำกิจกรรมการเคลื่อนไหวออกแรง แต่การสนับสนุนทางสังคมมีอิทธิพลโดยอ้อมทางบวกต่อการทำกิจกรรมการเคลื่อนไหวออกแรงผ่านความรู้สึกเป็นส่วนหนึ่งของชุมชน ส่วนการรับรู้สภาพสิ่งแวดล้อมละแวกบ้านมีอิทธิพลโดยอ้อมทางบวกต่อการทำกิจกรรมการเคลื่อนไหวออกแรง ผ่านความรู้สึกเป็นส่วนหนึ่งของชุมชน และการรับรู้สมรรถนะในตน

ผลการศึกษาครั้งนี้ทำให้สามารถเข้าใจถึงปัจจัยที่มีอิทธิพลต่อการทำกิจกรรมการเคลื่อนไหวออกแรง ของผู้สูงอายุที่อาศัยอยู่ในชุมชนแออัด เขตเมือง และสามารถนำไปสู่การพัฒนาโปรแกรม และหรือ คู่มือในการส่งเสริมการทำกิจกรรมทางการเคลื่อนไหวออกแรงที่มีประสิทธิภาพ และเหมาะสมกับบริบทของผู้สูงอายุไทย ต่อไป

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คำสำคัญ: กิจกรรมการเคลื่อนไหวออกแรง ผู้สูงอายุไทย ชุมชนแออัด เขตเมือง ความรู้สึกเป็นส่วนหนึ่งของชุมชน การรับรู้สมรรถนะในตนด้านการเคลื่อนไหวออกแรง

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