Associations of Neighborhood Environment and Walking in Korean Elderly Women: A Comparison between Urban and Rural Dwellers

Hyung-Sook Lee*
Gachon University, Korea
Eun-Yeong Park**
Joongbu University, Korea

Abstract

The purposes of this study were (1) to describe patterns in leisure time walking of Korean urban and rural senior females, (2) to examine urban-rural differences in perceived environmental variables associated with walking behavior, and (3) to explore potential effects of neighborhood attributes on walking of elderly women. This study presents the results of a cross-sectional survey of female seniors in urban (n=216) and rural areas (n=221) of Korea in 2014. A series of logistic regression analyses were performed to examine the self-reported measures of the variables associated with walking. The results found that significantly more urban females, 42.6% engaged in the "recommended" amount of walking activity compared to 29.0% of rural females. Overall, rural females had higher social support, lower intention, and lower self-efficacy than urban females. Also, rural senior females were comparatively dissatisfied with their walking environments compared to their urban counterparts. After adjusting for age, income, and education, for rural women, proximity to parks was the strongest positive association with attaining the recommended level of walking followed by street trees. For urban women, crime safety was an important environmental variable to meet physical activity recommendations. These findings support the importance of environmental influences on physical activity in older women and are useful for developing physical activity interventions to women in urban and rural communities.

Key words

Korean elderly women, perceived environment, leisure-time walking, rural women

* First Author
** Corresponding Author

Introduction

With the rise in average life-expectancy there has been a considerable increase in interest in spending towards healthy retirement. Aging of the general population is a global trend and it is expected that, by the year 2026, over 20% of the Korean population will be over the age of 65, making it a super-aged society (Lee & Park, 2014). Such an increase in the senior population has led to various health-related issues, such as increases in the morbidity rate (the proportion of sickness or of a specific disease in a geographical locality) and an increase in elderly health expenditures in the total health expenditures during the last decade (Korean Ministry of Health and Welfare, 2013). Therefore, it is important to develop measures to ensure the quality of an elderly person's life, to prevent disease, and to improve the health of the elderly (Park, 2010). According to Korean National Statistical Office data in 2011, the biggest concern for the Korean elderly population was health. Fifty-four percent of females were worried about their health as compared to 47% of males. During their later years, maintaining health was the priority in 55% of women and 48.8% of men, indicating females' stronger demands for health maintenance. Meanwhile, the average life expectancy for women (84.4 years) is longer than the average life expectancy for men (76.6 years), which implies that Korean females spend more time without their spouse. Indeed, while 87.5% of elderly males have a spouse, only 36.5% of elderly females have a spouse (Statistics Korea, 2013). The female senior population of Korea tends to be at a disadvantage in terms of finance compared to males (Korean National Statistical Office, 2014) and tends to have more health problems as shown in the prevalence rate of chronic diseases (Moon & Nam, 2001; Kim, 2006). Furthermore, previous studies have shown that the female senior population has inherent problems such as loneliness and less socioeconomic support (Kang, 2003; Sunwoo, 2003; Lee & Yoon, 2005; Park, Kwon, & Kwon, 2013). Therefore, it is important to give careful attention to the healthcare of the female senior population.

Regular physical activity, especially walking, is important in maintaining a senior's health. Walking is a simple, economical, and highly recommended form of exercise, which carries a low-risk of injury and does not require any special practice or training when compared to other

forms of physical activity (Morris & Hardman, 1997; Hootman, Macera, Ainsworth, Addy, Martin, & Blair, 2002). However, the actual percentage of females exercising (43.1%) is lower than that of males (50.8%), and the percentage of females involved in walking activities (36.7%) is lower than that of males (42.3%) (Korean Ministry of Health and Welfare, 2012). The awareness of the need for walking as a form of exercise is notably lower among the female senior population (Lee, Park, & Kim, 2010; Kim & Won, 2011). Regular walking helps maintain appropriate body weight, as well as healthy blood sugar, cholesterol, and triglyceride levels. It also helps prevent metabolic disorders such as cardiovascular diseases, neurovascular diseases, and Type 2 Diabetes, as well as various cancers such as colon and breast cancer. Furthermore, it has been reported that walking reduces psychological disorders such as depression and bipolar disorder (Kim *et al.*, 2007; Jekal *et al.*, 2009).

In order to increase walking in the female senior population, it is important to understand the factors and variables that affect walking. Previous studies have examined various determinants of walking which include personal, social, and environmental variables. In recent years, a social ecological model that emphasizes the reciprocal and dynamic interactions of personal, social, and environmental factors, has gained acknowledgement as a theoretical framework for the better understanding of physical activity (Ball, Bauman, Eva, & Owen, 2001). Personal factors, such as self-efficacy, expectations of health benefits, and socio-economic aspects (Jeon & Lee, 2012), have emerged as important influences. Social factors (Parks, Housemann, & Brownson, 2003) such as support from family or friends, and their participation in physical activity were also found as important motivations for walking. There has also been an increasing amount of research reporting the correlation between neighborhood environmental attributes and walking behavior (Saelens & Handy, 2008; Lovasi, Schwartz-Soicher, Neckerman, Konty, Kerker, Quinn, & Rundle, 2013). Residential density (Boarnet & Sarmiento, 1998; Sallis, 2009; Ewing & Cervero, 2010; Grant, Edwards, Sveistrup, Andrew, & Egan, 2010; Sallis, Floyd, Rodríguez, & Saelens, 2012), use of land (Brantingham & Brantingham, 1993; Boarnet & Sarmiento, 1998; Sallis, 2009; Ewing & Cervero, 2010; Grant *et al.*, 2010), patterns of streets (Grant *et al.*, 2010), street trees, cafes, and other appealing factors increase walking activity (Alfonzo, 2005), while risk

factors such as disorder, threatening traffic patterns, unappealing factors, inconveniences, and barriers lead to less walking activity (Cutts, Darby, Boone, & Brewis, 2009; Weiss, Purciel, Bader, Quinn, Lovasi, Neckerman, & Rundle, 2011). It has been reported that the addition of seating arrangements can help overcome disability and fear of physical activity that may arise during walking (Shumway-Cook, Patla, Stewart, Ferrucci, Ciol, & Guralnik, 2003), thus leading to increased physical activity of seniors (Eronen, Bonsdorff, Rantakokko, & Rantanen, 2014).

The amount of activity is closely associated with the existence of pavement, interesting backgrounds, frequency of traffic jams, hills, and the illumination of streets (Brownson, Baker, Housemann, Brennan, & Bacak, 2001), and the characteristics of the city or street are related to the increase or decrease in the number of pedestrians: the better a crosswalk is connected, the less crowded and narrow a street is, and the more visual attractions there are, the more pedestrians there are (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Frank, Andersen, & Schmid, 2004).

Understanding more diverse correlates, including socioeconomic status and urban/rural dwelling in walking participation, is of particular importance to develop effective intervention strategies. (Parks *et al.*, 2003) Several studies indicate that rural areas have a lower rate of physical activity, and that there is less walking activity in a low density rural area than a high density urban area (Leslie, Saelens, Frank, Owen, Bauman, Coffee, & Hugo, 2005; Cerin, Macfarlane, Hin-Hei, & Kwok-Cheung, 2007; Forsyth, Oakes, Schmitz, & Hearst, 2007). Rural residents are generally older and have lower income and education levels when compared to urban populations, which may account for part of the prevalence of physical inactivity in rural areas. In addition, walking environments in rural areas may contribute to the physical inactivity of rural residents. The study by Parks *et al.* (2003) indicated that rural residents were more likely to be physically active if neighborhood streets were available and safe for exercise. Studies have also shown that neighborhood attributes such as street lighting and sidewalks have been associated with increased walking among rural women in the United States (Wilcox, Castro, King, Housemann, & Brownson, 2000).

Few studies to date have examined the differences in the perceived walking environments among older-adults in urban/rural areas in Korea

and their influences on walking behaviors. The overall objective of this study is to provide a foundation for effective support of healthy physical activity by comparing Korean urban and rural senior females and investigating physical environments and affecting factors regarding their walking activities. The purpose of the study was: (1) to describe the patterns in leisure time walking of Korean urban and rural senior females, (2) to examine urban-rural differences in personal, social, and perceived environmental variables associated with walking behavior, and (3) to explore the potential effects of neighborhood attributes on walking among elderly women.

Methods

Design and Sample

A cross-sectional survey was conducted to elicit data from female seniors in urban (Seongnam City, population: approximately one million residents) and rural areas (South Chungnam Province, population: approximately 100,000 residents) in Korea between October 2014 and November 2014. The City of Seongnam, the urban area for the survey, is a metropolitan city that adjoins Seoul. Its population density is 7,092 people/km^2 and many of its residents live in apartment housing. The Province of Chungnam, the rural area for the survey, is a center of agriculture consisting of small villages. Its population density is 250 people/km^2 and many of its residents live in detached dwellings. The urban and rural regions for data collection were selected based on their population size, population density, and their importance for primary industry (Korean Statistical Information Service, 2012).

A total of ten trained interviewers visited senior welfare centers and community centers within the selected urban and rural areas. Once a respondent consented to participate in the study, an interviewer performed a face-to-face interview. Respondents were female senior citizens of age 65 years or greater. Two hundred and sixteen surveys were conducted in the urban area (Seongnam City) while 221 surveys took place in the rural area (Chungnam).

Demographic Variables

The demographic variables included gender, age, marital status, educational level, and household income. Marital status was categorized as currently married or unmarried. Educational level was classified as less than a middle school graduate, a high school graduate, or a college graduate or higher. Employment status was categorized as employed or unemployed. Respondents were asked to provide an estimate of their average monthly income.

Measures

Walking

The walking activities for each individual surveyed were based on the National Physical Activity Questionnaire and the Active Australia Survey. Respondents were asked how often they participated in walking activities and on average how long they walked each time. The frequency for their walking activity was multiplied by their duration in order to convert their walking activity into a weekly total. The Korean guidelines recommend 150 minutes per week of walking (Korea Council of Sports for All, 2009). A dichotomous walking variable was created by defining the walking level of those who reported engaging in 150 minutes or more per week of walking as "recommended" and of those who reported less than 150 minutes per week of walking as "not recommended."

Personal and Social Variables

Based on previous research and a Theory of Planned Behavior (TPB) questionnaire (Ajzen, 1991), the constructs of attitude, social support, self-efficacy, and intention were used as a framework to measure personal and social variables of walking. In a pilot survey, however, elderly women in rural areas were not as likely to complete a long series of repetitive questions from the TPB questionnaire. In order to reduce the number of missing responses and incomplete questionnaires, each factor was measured with a single item in order to reduce the number of ques-

tions asked based on the comments of professionals in psychology. The items were preceded by a question, "To what extent do you agree or disagree with each of the following statement?" The following statements rated the attitude, social support, self-efficacy, and intention from a scale of strongly disagree (1) to strongly agree (5). Attitude towards regular walking was assessed with responses to the statement "Participating in regular leisure-time walking is pleasant for me." Social support for exercise from family and friends was measured by responses to the statement: "My family and friends encourage me to engage in regular walking." Self-efficacy for exercise assessed the confidence of participants in engaging in walking when faced with common barriers by the following statement: "I will engage in walking activities even when I feel tired." Intention was measured with one item: "I plan to engage in walking regularly."

Perceived Environmental Variables

The perceived neighborhood environments for walking were assessed by six items obtained from the Neighborhood Environment Walkability Scale (NEWS), a pilot study, and expert meetings. Specifically, respondents were asked to indicate how much they agreed or disagreed with the following items, on a 5-point scale where 1 meant strongly disagree and 5 meant strongly agree: "Parks or walking trails are within easy walking distance of my home"; "Many shops or stores are within easy walking distance of my home"; "There are street trees on most of the streets in my neighborhood"; "It is safe to walk in my neighborhood"; "There is not much traffic on the streets"; and "There are many interesting things to look at while walking in my neighborhood."

Statistical Analyses

The differences between urban and rural respondents were examined using the chi-square analyses in the case of categorical variables (education, marital status, and recommended level), and t-tests in the case of continuous variables (age, income, total walking, attitude, social support, intention, self-efficacy, and perception of the neighborhood). Logistic regression analyses were performed using the Statistical Package

for Social Science (SPSS) for Windows. The objectives of analyses were to examine whether or not each demographic, personal, social, and environmental variable was related to meeting walking recommendations. Unadjusted and adjusted odd ratios (ORs) were estimated by the relationship between the environmental variables and walking. A two-tailed p-value of less than .05 was considered to be statistically significant.

Results

Table 1.
Basic Characteristics of Respondents

	Urban (n = 216)		Rural (n = 221)		t or $\chi 2$
	n	Mean (SD)	n	Mean (SD)	
Age	216	70.5 (7.0)	221	68.1 (6.2)	3.80***
60-69	101	46.8%	131	59.3%	
70-79	90	41.7%	85	38.5%	
over 80	25	11.6%	5	2.3%	
Monthly Income (Korean Won in million)	122	2.01(1.35)	87	1.37 (1.03)	3.73***
BMI	144	23.1 (2.2)	218	23.1 (3.2)	
Education					11.92**
Less than middle school	87	46.5%	134	60.6%	
High school	72	38.5%	73	33.0%	
College graduate	28	15.0%	14	6.3%	
Marital Status					
Married	103	49.0%	104	47.1%	15.40
Unmarried	97	51.0%	117	52.9%	
Total walking(minutes)	204	164.8 (144.8)	215	117.8 (107.1)	3.76***
Recommended level					
Active	92	42.6%	64	29.0%	8.85*
Inactive	124	57.4%	157	71.0%	

* *p<0.05*, ** *p<0.01*, ***p<0.001*

As Table 1 shows, the average ages of urban and rural respondents were 70.5 years and 68.1 years respectively. In terms of educational level

for urban females, 15% were college graduates or higher, 38.5% were high school graduates, and 46.5% were middle school graduates, which was statistically significantly higher than rural females of whom 60.6% were middle school graduates. Household income for urban females was statistically significantly higher; 201 million Korean Won (KRW) when compared to 137 million of rural females. In terms of marital status, 49.0% of urban females and 47.1% of rural females were married. Urban females walked an average of 3.6 days per week with a total average walking time of 164.8 minutes. This was significantly higher than the 2.9 days and 117.8 minutes for rural females. Those who engaged in 150 minutes or more per week of walking were categorized as "recommended" according to the Korean guidelines while those that did not meet the 150 minute or more per week criteria were categorized as "not recommended." Significantly more urban females, 42.6% engaged in the "recommended" amount of walking activity in comparison to 29.0% of rural females.

Table 2.
Differences in Personal, Social, and Environmental Variables among Urban and Rural Women

	Urban (n = 216)		Rural (n = 221)		*t*	*p*
	mean	SD	mean	SD		
Social support	2.59	1.24	2.98	1.06	-3.50**	.001
Attitude	3.53	0.84	3.58	1.10	-.52	.167
Intention	3.90	1.05	3.57	1.08	3.20**	.001
Self-efficacy	3.23	1.29	3.05	1.40	1.38***	.000
Proximity to parks	4.10	1.16	3.25	1.11	8.86***	.000
Proximity to stores	3.86	1.18	2.95	1.12	8.97**	.001
Street trees	3.81	1.16	2.92	1.00	9.18	.240
Traffic safety	3.62	1.35	3.22	1.06	3.66	.146
Street lights	3.83	1.06	3.17	0.93	7.68*	.029
Crime safety	3.97	1.23	3.71	1.21	2.39**	.003

* *p<0.05*, ** *p<0.01*, ***p<0.001*

Of the personal and social variables affecting one's walking activity, both were significantly different between urban and rural senior females

(Table 2). While rural females scored relatively higher on social support indicating support from family or friends compared to urban females, intention and self-efficacy scored significantly lower than urban females. The results for perception of walking environment showed that rural senior females were comparatively dissatisfied with their walking environments when compared to their urban counterparts. Of the 6 physical environmental variables, all other variables except street trees and traffic safety scored significantly lower for rural senior females when compared to urban senior females. Satisfaction scores of crime safety and proximity to parks for rural senior females were relatively higher at 3.71 and 3.25 respectively while street trees were lower at 2.92. Urban females were most satisfied with their proximity to parks (4.10), while least satisfied with traffic safety (3.62).

Table 3 shows the univariate association between attaining the recommended level of walking and the personal, social, and environmental variables. Most personal, social, and environmental variables significantly affected the recommended level of walking. In both urban and rural females, respondents who had higher self-efficacy, intention, and positive attitude towards walking had significantly greater odds of attaining the recommended level of walking. Social factors were more important for rural females (OR=1.34, 95% CI=1.01-1.78) while social factors did not affect walking activities of urban females.

In regards to the perceived environmental variables, most variables proved to be significantly relevant to engagement in walking exercise. For the urban group, all environmental variables were important, and, in particular, closer proximity to parks resulted in a higher participation rate of exercise (OR=2.03, 95% CI=1.22-2.80); having an accessible park doubled the likelihood to meet the recommend level. Even for the rural female seniors, proximity to parks seemed important in increasing their likelihood to meet the recommendations (OR=1.66, 95% CI=1.25-2.21). Proximity to stores, street trees, and street lighting were also associated with increased walking; however, traffic safety and crime safety did not directly affect engagement in walking activity for the rural group.

Table 3.
Unadjusted Odds Ratios for Attaining the Recommended Level of Walking for Urban and Rural Women

	Urban				Rural			
	p	Unadjusted OR	95% CI		p	Unadjusted OR	95% CI	
Age	0.78	1.01	0.97	1.05	0.81	0.99	0.95	1.04
Household Income	0.86	1.00	1.00	1.00	0.37	1.00	0.99	1.00
Education								
Less than middle school	0.97				0.11			
High school	0.98	0.99	0.42	2.33	0.13	0.42	0.14	1.30
College graduate	0.89	1.07	0.44	2.57	0.61	0.74	0.23	2.36
Social Support	0.48	1.08	0.87	1.35	**0.04**	1.34	1.01	1.78
Attitude	**0.00**	2.26	1.57	3.26	**0.00**	1.78	1.32	2.40
Intention	**0.00**	2.44	1.75	3.40	**0.00**	1.81	1.33	2.46
Self-efficacy	**0.00**	1.89	1.48	2.41	**0.01**	1.37	1.10	1.71
Proximity to parks	**0.00**	2.03	1.22	2.80	**0.00**	1.66	1.25	2.21
Proximity to stores	**0.00**	1.85	1.37	3.01	**0.03**	1.36	1.04	1.78
Street trees	**0.00**	1.83	1.24	2.68	**0.01**	1.47	1.08	1.99
Traffic safety	**0.01**	1.48	1.10	1.99	0.20	1.20	0.91	1.58
Street lights	**0.04**	1.53	1.01	2.31	**0.04**	1.40	1.02	1.93
Crime safety	**0.00**	1.99	1.36	2.93	0.24	1.15	0.91	1.46

Table 4 presents the results of the adjusted logistic regression analysis. For rural women, proximity to parks (OR = 3.02; 95% CI = 1.07–8.56) was the strongest positive association with attaining the recommended level of walking followed by street trees (OR = 2.73; 95% CI: 1.02–7.34). Few significant associations emerged among personal barrier and social variables of rural women in the multivariate logistic regression analysis. For urban women, attitude was the strongest positive association with attaining the recommended level of walking (OR = 4.91; 95% CI = 1.85–13.03). Higher education (OR = 13.59; 95% CI = 1.80–102.32) and self-efficacy (OR = 1.84; 95% CI = 1.04–3.26) were positively associated with attaining the recommended level of walking. An important environmental variable for urban women was crime safety

(OR = 2.68; 95% CI = 1.06–6.77).

Table 4.
Adjusted Odds Ratios for Attaining the Recommended Level: Simultaneous Logistic Regression Analyses for Urban and Rural Women

	Urban				Rural			
	p	Adjusted OR	95% CI		p	Adjusted OR	95% CI	
Age	0.51	1.03	0.94	1.14	0.82	0.99	0.87	1.12
Household Income	0.77	1.00	1.00	1.01	0.36	1.00	0.99	1.01
Education								
Less than middle school	**0.03**				0.17			
High school	**0.01**	16.53	1.80	151.74	1.00	0.00	0.00	
College graduate	**0.01**	13.59	1.81	102.32	1.00	0.00	0.00	
Social support	0.41	0.80	0.48	1.35	0.84	1.09	0.46	2.60
Attitude	**0.00**	4.91	1.85	13.03	0.68	1.30	0.38	4.39
intention	0.53	1.32	0.56	3.10	0.97	1.03	0.28	3.79
Self-efficacy	**0.04**	1.84	1.04	3.26	0.45	1.39	0.59	3.27
Proximity to parks	0.47	0.68	0.24	1.94	**0.04**	3.02	1.07	8.56
Proximity to stores	0.30	1.69	0.63	4.59	0.20	0.43	0.12	1.54
Street trees	0.16	2.07	0.76	5.68	**0.04**	2.73	1.02	7.34
Traffic safety	0.90	1.05	0.49	2.24	1.00	1.00	0.40	2.47
Street lights	0.28	0.61	0.25	1.51	0.29	1.73	0.63	4.79
Crime safety	**0.04**	2.68	1.06	6.77	0.74	1.15	0.51	2.56

Discussion

This study is a comparative study on the differences in self-reported walking activities between senior females in urban and rural areas. To analyze these differences in the walking activities and the subjects' recognition of their walking environments, factors that influence the walking activities of females in urban and rural areas were investigated through self-reported data. Environmental factors, along with individual and social factors, were identified as important in promoting the walking

activities of females both in urban and rural areas. Important points found from the results of this study are summarized below.

First, a relatively lower proportion of senior women in rural areas met the recommended level of walking activities when compared to those senior females in urban areas. In the comparison to individual factors, they showed weaker willingness and self-efficacy with regard to walking. This means that rural senior females' recognition of the importance of exercise in health maintenance was less than that of urban senior females. This is in line with the results of a study by Lee and Yoon (2005), which showed that elderly females in urban areas had significantly higher scores and higher self-efficacy than those in rural areas in terms of health improvement behaviors. In addition, Park (2002) and the Korean Rural Development Administration (2005) reported rural senior females' notion that they do not need to work out due to their engagement in lengthy daily labor. However, labor like farming is not considered to constitute a sufficient amount of exercise as it requires only certain muscular movements (Chun, Ryu, Han, & Park, 2013). Therefore, programs that will help them recognized that they, too, need walking activities during the off-season and in their spare time are required.

Secondly, in rural senior females, perceived environmental factors had a stronger influence on their walking activities than individual and social factors. Rural senior females showed higher perceived social support from their family and friends in comparison to urban senior females. This is thought to be due to more active neighborhood relationships, exchanges, and cohesion in rural areas when compared to urban areas (Lee, 2009; Lee, 2005), which would have led to more exchanges of information on exercise and stronger motivation (Lim, 2013). In terms of environmental factors, rural elderly females showed lower satisfaction than those in urban areas. Recent studies by Day (2008) and Korpela, Yle´n, Tyrväinen, and Silvennoinen (2010) highlighted the importance of walking environments as a factor that influence elderly persons walking activities. From this perspective, the walking environment in rural areas does not seem to provide ample support for rural elderly females' walking activities. In addition, this study has identified rural elderly females' accessibility to parks and the presence of street trees as important factors for their walking activities. In this regard, it is thought that provid-

ing a safer, more pleasant walking environment will positively influence the improvement of walking activities.

Thirdly, females in urban areas had higher self-efficacy and the intention of walking, but weaker social support when compared to senior females in rural areas. Individuals who decide to exercise at their own volition walk far more frequently (Frank, Saelens, Powell, & Chapman, 2007; Owen *et al.*, 2007). Promoting awareness and meeting the intention of walking would help raise the probability of the weekly 150 minute walking requirement being met. Since neighborhood relationships in urban areas are less active and more seniors live in solitude (Choi & Chung, 1991; Choi & Lee, 2013), urban females seemed to have weaker social support. In addition, among environmental factors, urban elderly females found crime and security to be important factors. As suggested by proceeding studies, higher crime rates lead to less walking activities (Foster, Knuiman, Hooper, Christian, & Giles-Corti, 2014). Each increment in the five-point scale for crime concern produces a 22-minute decrease in the weekly walking time (Foster *et al.*, 2014), and it is expected that providing safer street environments will help encourage more walking activities.

The present cross-sectional study has limitations because it was based on data from a survey among older female adults in senior centers. Due to the study sample, the generalizability of the results is limited. Although there were criteria for participation as being physically active and having no difficulty communicating, varying levels of physical conditions may have affected the results. Since health status or functional limitations may impact the way people perceive their environment and walking behavior, future research is needed to consider these factors.

In addition, data sources for walking activities relied on self-reported methods and respondents may have had some issues with recall and response bias. Additional studies with bigger sample sizes and objective measures for walking activities are needed to clearly explain walking behavior of the elderly and the differences between urban and rural women.

Despite these limitations, the findings of this study have proven that the use of social ecological models helps better understand walking behavior among older Korean adults, especially rural females. When considering the lack of studies available on physical activity of rural females

when compared to urban females, more research is needed to investigate a relationship between multiple variables and the physical activity of rural older adults on the basis of an ecological viewpoint. Improving the quality of life of seniors will become an important welfare policy and regular physical activity is important to maintain physical health and the quality of life for older adults. From a land planning perspective, providing more walkable environments and accessible parks is essential to promote daily walking and physical activity for older adults. In this regard, the findings of this study offer a basis to understand the important factors associated with older adults and their walking activities.

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Biographical Note: **Hyung-Sook Lee** is a registered landscape architect and associate professor in the Department of Landscape Architecture at Gachon University, South Korea. She holds a Doctoral Degree in Landscape Architecture and Urban Planning from Texas A & M University and has seven years of professional experience in Landscape Architecture, focusing on physical environment influences on public health and sustainable community design. E-mail: soolee@gachon.ac.kr

Biographical Note: **Eun-Yeong Park** is an assistant professor in the Environmental Landscape Architecture Department at Joongbu University, South Korea. She obtained her M.A. and Ph.D. degrees from Seoul National University, South Korea. Her teaching and research interests include environmental behavior, urban planning, community, and landscape design. E-mail: eypark@joongbu.ac.kr