Original article

The impact of perceived social support, loneliness, and physical activity on quality of life in South Korean older adults

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Abstract

Purpose: The purpose of this study was to propose and test a conceptual model that explains the interrelationships among perceived social support, loneliness, physical activity (PA), and quality of life (QoL) among active older adults in South Korea.

Methods: Data were collected from 332 individuals over the age of 65 using a systematic stratified convenience sampling method. Survey data were collected and analyzed using a structural equation model (SEM).

Results: Perceived social support had a significantly positive effect on PA ($\beta = 0.14$, $p < 0.01$) and QoL ($\beta = 0.28$, $p < 0.001$) while decreasing loneliness ($\beta = -0.55$, $p < 0.001$). PA had a significant positive effect on QoL ($\beta = 0.12$, $p < 0.01$), and loneliness had a negative effect on QoL ($\beta = -0.37$, $p < 0.001$). Loneliness mediated the relationship between perceived social support and QoL.

Conclusion: The SEM results of the current study support the proposed model that explained the interrelationships among perceived social support, loneliness, PA, and QoL among active older adults in South Korea. These findings suggest the importance of incorporating social support mechanisms for PA interventions in order to enhance QoL. The findings of this study can help create more effective health and physical education programs for the older generations in South Korea to enhance their QoL.

1. Introduction

According to the United Nations Population Division,[1] human life expectancy from birth worldwide is 67.2 years old. Rosenberg[2] pointed out that people in more developed countries have greater life spans than less developed countries, and that life expectancy increased significantly in the 20th century due to improvements in public health, medicine, and nutrition. However, he predicted that life expectancy will slowly advance and then reach a peak in the mid-80s.[2]

Howe et al.[3] indicated that older adults (aged >65 years) in South Korea currently represent 9% of the total population, and this population is expected to reach 38% by 2050. Thus, South Korea is projected to be one of the oldest countries in the world. In addition, the Organization for Economic Cooperation and Development (OECD)[4] noted that South Korea will experience life-expectancy increases most quickly among OECD-member countries. One of the most significant challenges related to this issue will be the lack of physical activity (PA) among the ever expanding older population. In order to improve the quality of life (QoL) among older adults and to reduce medical expenses, the South Korean government has supported programs and services designed to promote PA; however, those efforts have not yet had a significant influence on the country.[5] Thus, it is important for the country to develop more effective strategies and programs to address this problem at the local and governmental levels. Furthermore, the South Korea Department of Health and Welfare[5] has noted the need for further research on the effect of PA on the health and welfare of the older population.

1.1. Relationships among perceived social support, PA, and QoL

Due to the significance of improving health and welfare issues among the older population, a number of studies have

been conducted to explore relevant factors associated with the QoL and health for the population. Perceived social support and PA have been found to have a positive effect on the QoL among older people.[6−9]

Perceived social support can play a critical role in affecting PA among older adults and their ability to lead an independent life.[10−15] The operational definition of perceived social support in this study is a recipient's perception that the recipient is receiving affective and attitudinal assistance in caring (e.g., empathy, caring, or love) and has instrumental support available (e.g., tangible aids or companionship).[10] Chogahara et al.[10] conducted a review of 29 studies examining the relationship between social influences and PA, and found that social support was positively associated with commitment to PA participation and intention to be physically active.

Perceived social support has been found to be an important determinant for improving the QoL of older people.[6−9] As Antonucci et al.[6] noted, social support can play an important role in enhancing the psychological well-being among older adults in both western and Asian societies. Instrumental support (e.g., affection, companionship, transportation, and nursing care, etc.) has been found to play a primary role in increasing older persons' self-esteem, competency, and autonomy.[16] Especially, the support of family as well as friends can make an important contribution to older adults' well-being.[17] These social networks can give older adults a sense of belonging.[18]

PA can have a positive impact on the QoL among the older population.[19−21] McAuley et al.[22] suggested, "Physical activity interventions represent an effective behavioral strategy for attenuating functional decline, reducing risk of disability, and enhancing quality of life in older adults." (p. 99). Huh and Choi[23] found that regular PA was positively associated with psychological well-being among South Korean older adults.

1.2. Relationship among loneliness, perceived social support, and QoL

Loneliness is one of the major health issues that has been linked to depression and impaired QoL among older adults.[24,25] Tikainnen and Heikkinen[26] found that the absence of friends, spousal loss, and limited social support networks are major factors that increase loneliness in the population. However, older adults with more social support were likely to have less loneliness and depression.[27] Furthermore, Kim[28] examined the relationship between loneliness and perceived social support among South Korean older adults, suggesting that the greater the perceived social support of the older adult, the less loneliness they experience.

As Cohen-Mansfield and Parpura-Gill[29] and Oni[18] pointed out, loneliness is a strong predictor of depression. In addition to its effect on depression, loneliness can lead to several other mental and physical health problems in older adults. Iecovich et al.[25] suggested that loneliness and solitude among older male adults appeared to be a risk factor of mortality. Lee[30] explored loneliness among South Korean older adults and noted that when most people feel lonely, their motivation decreases. Consistent with the finding of this study, Park

et al.[31] investigated the relationship between loneliness, health behavior, and self-esteem among South Korean older adults, and found that loneliness was negatively associated with self-esteem. The study also found loneliness to be a significant predictor of health behavior among the population.

1.3. Purpose of the study and research hypotheses

Several empirical studies have been carried out to examine factors affecting PA and QoL among older adults in other countries. However, none of the previous studies have examined the relationships among those relevant factors simultaneously (e.g., perceived social support, loneliness, PA, and QoL) in a South Korean population of active older adults. In addition, to the best of our knowledge, there have been no studies to investigate the relationships between perceived social support and QoL through mediating factors such as PA or loneliness. Therefore, the primary purpose of this study was to propose and test a conceptual model that explains the interrelationships among those factors by using structural equation modeling (SEM). The secondary purpose was to examine the mediating roles of PA and loneliness in the relationship between perceived social support and QoL. Based on the previous literature, a conceptual model was created that explains the interrelationships among perceived social support, QoL, PA, and loneliness (Fig. 1). To test the validity of the model, we addressed the 6 research hypotheses on which it relies:

H₁. Perceived social support will have a positive effect on PA among South Korean older adults.

H₂. Perceived social support will have a positive and direct impact on QoL among South Korean older adults.

H₃. PA will have a positive influence on QoL among South Korean older adults.

H₄. Perceived social support will have a negative impact on loneliness among South Korean older adults.
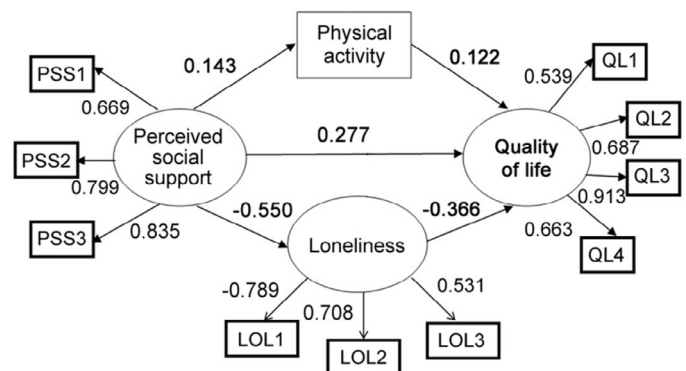

Fig. 1. Proposed model of the influence of perceived social support, loneliness, and physical activity on quality of life in older adults and structural test for the relationships among those variables. PSS1 = instrumental support (5 items); PSS2 = self-existent support (6 items); PSS3 = life emotional support (7 items); LOL1 = friendly acquaintance (9 items); LOL2 = social acquaintance (6 items); LOL3 = emotional loneliness (2 items); QL1 = physical aspect (3 items); QL2 = emotional aspect (3 items); QL3 = social aspect (5 items); QL4 = economic aspect (4 items).

H[5]. Loneliness will have a negative effect on QoL among South Korean older adults.

H[6]. PA and loneliness will serve as mediators in the relationship between perceived social support and QoL.

2. Methods

2.1. Participants and procedures

Data were collected from 332 participants over the age of 65 years who were recruited from comprehensive sports centers for older adults located in Seoul, South Korea. All participants had participated in exercise programs for the previous 12 months or more. All exercise classes took place in group settings. Exercise was performed 2 or 3 times a week at a moderate intensity for $30-60$ min. A systematic stratified convenience sampling method was used to determine participants for inclusion in the study. The Yonsei University (South Korea) Research Review Board approved this study as meeting the ethical standards of human subject research. The survey was clearly explained to the participants and then distributed to them. The participants implicitly consented to participation in the survey by completing the surveys and anonymously returning them to the researcher. In addition, the Southern Illinois University (USA) Human Subjects Committee approved the use of these data.

Data were collected from March to June 2009 (a 3-month period) through questionnaires. With the help of physical education instructors specializing in older adults, the primary investigator of this research paper contacted several large sport centers that provided exercise and recreation programs for older adults. Permission to conduct a survey of their older participants was granted by the sport managers of the sport centers.

A total of 350 questionnaires were distributed. Three hundred and thirty-two questionnaires were used for the final analysis, excluding 18 questionnaires that had insincere responses; insincerity, for this study, was defined as those questionnaires that featured all questions marked with the same response, those that skipped questions in a pattern, or those which were otherwise incomplete or contained unclear responses in some way.

2.2. Instruments

To achieve the objectives of this study, the researchers used structured questionnaires which consisted of demographic characteristics and 4 factors: perceived social support, PA, loneliness, and QoL. The construct validity was conducted in order to verify the final questionnaires. Construct validity was established by conducting reliability analysis of each of the factors including perceived social support, loneliness, and QoL. To establish content validity, the survey instruments were reviewed by 4 experts (doctoral degree holders) in the area of physical education and recreation. Based on the feedback from the experts, the survey instruments were revised and then given to the participants.

2.2.1. Perceived social support

In order to measure perceived social support of the respondents we employed a modified version of the Social Support Scale (SSS) developed by Song.[32] The perceived Social Support Questionnaire (SSQ) consisted of 18 items and was classified into 3 sub-factors: self-support, emotional-support, and instrumental-support. Each item was composed of a 4-point scale, *Not at all* (1 point) to *always* (4 point). Kim[33] measured the reliability coefficient of the modified SSS using a sample of older people, and the Cronbach's α of the study was 0.91, demonstrating high reliability. The current study utilized Cronbach's α to validate the reliability analysis for perceived SSQs. The result of Cronbach's α, ranging from a minimum value of 0.80 to a maximum value of 0.90, suggested that the questionnaire had relatively high internal consistency.

2.2.2. PA

This study utilized the Godin Leisure-Time Exercise Questionnaire (GLTEQ)[34] to assess the level of PA of participants. The questions examined the PA levels of participants based on scoring. PA scoring consisted of 1 factor that was calculated by summing the value of 3 items. Each item's value was calculated by multiplying frequencies and each item's value (strenuous movement = 9, moderate exercise = 5, light exercise = 3).

2.2.3. Loneliness

A loneliness questionnaire was utilized to assess the health behavior and loneliness of the older adults. This study used the Loneliness Scale developed by Kim[28] and Park et al.[31] This scale was a modified and complemented version of the UCLA Loneliness Scale.[35] The instrument classified 3 sub-factors with 17 items. The sub-factors were named friendly acquaintance, social acquaintance, and emotional loneliness. Each item represents the frequency of feeling of loneliness and the degree to which the older adults feel lonely. The loneliness scale demonstrated high reliability in the study by Kim[36] that used a sample of older people in South Korea (the Cronbach's $\alpha = 0.87$).

2.2.4. QoL

This study used a revised version of the World Health Organization Quality of Life (WHOQOL) scale to measure QoL of the study participants.[37] Min et al.[38] adapted the scale to account for Korean cultural characteristics. This questionnaire assesses the perceptions of individuals about their culture and value system, goals of life, standard of living, and their concerns. Specifically, the instrument was classified into 4 sub-factors with 15 items. The sub-factors were named economic aspect, social aspect, emotional aspect, and physical aspect. As with the other questionnaires, it used a Likert scale (*very dissatisfied* = 1 point, *dissatisfied* = 2 point, *neither satisfied nor dissatisfied* = 3 point, *satisfied* = 4 point, *very satisfied* = 5 point). A higher score represents a higher perceived QoL. The revised QoL scale was found to have high reliability.

2.3. Data analysis

Statistical analysis was carried out using SPSS (Version 14.0; SPSS Inc., Chicago, IL, USA) and AMOS (Version 20.0; IBM, Armonk, NY, USA). Through SPSS, frequency analysis, reliability analysis, and correlational analysis were conducted.

Moreover, by utilizing AMOS, confirmatory factor analysis (CFA) and SEM were conducted to analyze the data.

3. Results

3.1. Demographic information

Thirty-nine percent of the respondents were older males ($n = 128$), whereas 61% were older females ($n = 204$). A majority of the participants (74%, $n = 245$) were in the age range of $65-69$, 20% ($n = 68$) were in the age range of $70-79$, and 6% ($n = 19$) were over 80 years old. Most of the study participants participated in PA 2 or 3 times a week at a moderate intensity for $30-60$ min.

3.2. CFA measurement model

The CFA was used to assess the psychometric properties of the constructs investigated in this study. The purpose of CFA was to examine the construct validity of the latent variables and to determine whether the data fit a hypothesized measurement model. As indicated before, the Cronbach's α coefficients for all factors were greater than 0.70, indicating that all of the scaled measured reached satisfactory reliability levels.[39] All items loaded their respective factors, and factor loadings ranged from 0.53 to 0.91, demonstrating that the items accurately represented the respective factors.[40]

The results from analyzing the measurement model indicate a good fit of the 4 subscales of perceived social support, loneliness, PA, and QoL. The ratio of χ^2 to degrees of freedom (90.610/39) was 2.3, which falls within the acceptable range of $2-3$.[40] The reported root mean square residual of approximation (*RMSEA*) was 0.060, which was acceptable, as recommended values for RMSEA should be $0.05-0.07$.[41] Other fit indices also indicated that overall fit of the model to the data was good (the comparative fit index (*CFI*) = 0.960, the normed fit index (*NFI*) = 0.933, and the Tucker−Lewis index (*TLI*) = 0.932). The model is acceptable if each of these fit indices exceeds 0.9.[42,43] Table 1 indicates the results of the reliability analysis of each construct and the indicator loadings.

3.3. Correlation analysis for the CFA measurement model

Correlation analysis was conducted to determine the discriminant validity of each measure that validated its unidimensionality through confirmatory analysis. As indicated in Table 2, there was a significant correlation among perceived social support, PA, loneliness, and QoL. Loneliness had a negative correlation with the other 3 variables, whereas these 3 variables (perceived social support, PA, and QoL) were positively correlated with each other. All of the correlation values were below $r = 0.55$, indicating a strong support for the discriminant validity, showing that the 4 scales measure theoretically different constructs.[44]

3.4. SEM results for the structural model and hypotheses testing

Because the measurement model had been acceptable from the CFA analysis, the hypothesized theoretical model was analyzed through SEM using AMOS 20.0. SEM was performed in this study to confirm the goodness-of-fit of the structural model. As in the case of the measurement model, the global fit indices were computed to measure how well the hypothesized model fits the data. Overall, the fit indices suggested that the structural model was an acceptable fit to the data (Table 3). The ratio of χ^2 to degrees of freedom (95.583/40) falls within the acceptable range of $2-3$,[40] and *RMSEA* (0.062) value falls within acceptable values of $0.05-0.07$.[41] In addition, all of the fit indices for the structural model were above the acceptable 0.90 level (*CFI* = 0.956, *NFI* = 0.929, *TLI* = 0.928).[42,43]

The hypothesized relationships were examined through SEM (perceived social support, PA, loneliness, and QoL).

Table 1
Reliability analysis, indicator loadings of construct and fit indices for the measurement model.

Constructs	No. of item	Construct reliability (Cronbach's α)	Indicator loadings
Perceived social support			
Self-existent support	6	0.80	0.799
Life emotional support	7	0.86	0.835
Instrumental support	5	0.90	0.669
Loneliness			
Friendly acquaintance	9	0.90	−0.789
Social acquaintance	6	0.87	0.708
Emotional loneliness	2	0.70	0.531
Quality of life			
Economic aspect	4	0.85	0.663
Social aspect	5	0.80	0.913
Emotional aspect	3	0.81	0.687
Physical aspect	3	0.76	0.539
Physical activity			
Frequency, intensity, and hours	1		

Table 2
Correlations among constructs.

Index	1	2	3	4
1. Perceived social support	−			
2. Physical activity	0.132*	−		
3. Loneliness	−0.547***	−0.200***	−	
4. Quality of life	0.491***	0.219***	−0.542***	−

* $p < 0.05$; *** $p < 0.001$.

Table 3
Results of structural model testing.

	Path	Path coefficient	*SE*	*t*
H$_1$	Perceived social support → PA	0.143**	0.079	2.355
H$_4$	Perceived social support → loneliness	−0.550***	0.046	−6.724
H$_2$	Perceived social support → QoL	0.277***	0.047	3.768
H$_3$	PA → QoL	0.122**	0.026	2.332
H$_5$	Loneliness → QoL	−0.366***	0.094	−4.376

** $p < 0.01$; *** $p < 0.001$.
Abbreviations: PA = physical activity; QoL = quality of life; SE = standard error.

Table 4
Results of indirect effects of perceived social support and loneliness on QoL
(H_6).

Path	Indirect effect	Sobel's z	p
Perceived social support → PA → QoL	0.018	1.673	0.09
Perceived social support → loneliness → QoL	0.201	3.713	0.001

Abbreviations: PA = physical activity; QoL = quality of life.

Table 3 presents the estimated standardized direct effects for each of the structural model's proposed links, and all paths were found to be significant ($p < 0.05$), indicating that the 5 hypotheses were supported.

First, perceived social support had a significant positive impact on PA ($\beta = 0.143$, $p < 0.01$) (H_1); second, perceived social support had a negative direct influence on loneliness ($\beta = -0.550$, $p < 0.001$) (H_4); third, the proposed link between perceived social support and QoL was positive and significant ($\beta = 0.277$, $p < 0.001$) (H_2). Fourth, PA had a positive influence on QoL ($\beta = 0.122$, $p < 0.01$) (H_3). Fifth and finally, loneliness had a negative direct impact on QoL ($\beta = -0.366$, $p < 0.001$) (H_5). The path diagram of the SEM is presented in Fig. 1.

The Sobel test was conducted to examine the indirect effect of perceived social support on QoL (Table 4). The finding showed that the indirect effect of perceived social support on QoL through PA was not statistically significant ($p = 0.09$). The indirect effect of perceived social support on QoL through loneliness was significant ($p = 0.001$) (H_6).

4. Discussion

4.1. Theoretical implications

This study was the first attempt to investigate the relationships among perceived social support, QoL, PA, and loneliness concurrently by using SEM in a population of aging South Koreans. The SEM results of the current study supported the proposed model that explained the interrelationships among those variables in the population. This study extends the existing literature on QoL among older adults. As suggested previously, a large number of empirical studies have been conducted to investigate factors influencing health behavior and QoL among older adults (perceived social support, loneliness, PA, and QoL); however, few of the previous studies have explored the relationships among those relevant factors simultaneously.

Another important finding of this study was the mediating role of loneliness in the relationship between perceived social support and QoL. The indirect effect of perceived social support on QoL through loneliness was found to be very strong, suggesting that loneliness can play a critical role in affecting the relationship between perceived social support and QoL. This result explained in more depth the processes of how perceived social support affects QoL among the population. This finding suggests that the lack of perceived social support makes older adults feel lonely, and their loneliness can have a detrimental impact on their QoL.[45] The results of this study can help create more effective health and physical education programs for the older generations in South Korea in order to improve their QoL. While the positive influence of perceived social support on QoL has been well established, the current finding demonstrating the mediating role of loneliness between perceived social support and QoL is a major addition to the literature.

4.2. Interpreting significant results

The result of H_1 showing a positive relationship between perceived social support and PA in older South Koreans extends previous literature related to older adults in other countries.[10–12,15] H_1 suggested that older exercise participants who reported higher PA levels on the leisure time exercise questionnaire were likely to perceive higher social support from their friends and colleagues. As Bandura[46] pointed out, self-efficacy can serve as a mediator in the link between perceived social support and PA. Indeed, Kim et al.[47] found that self-efficacy and social support from family and friends for PA were related to higher levels of PA.

Choi et al.[48] indicated that consistent PA coupled with perceived social support, rather than temporary PA, can have a more positive effect on physical health as well as psychological stability and happiness. The study suggests the importance of providing the social circumstance to older exercise participants in order for them to be involved in consistent PA. At the same time, it is important to encourage older adults to participate in PA for mental health benefits as well as physical health benefits.

The result of H_2 demonstrated a direct positive relationship between perceived social support and QoL in South Korean older adults.[6,8,9] Lee and Lee[49] and Seo[50] found that perceived social support had a significant positive influence on the life satisfaction and life desire among older adults in South Korea. Perceived social support includes informational or physical supports, such as providing information for the aging individual's needs or advice for a better environment.

A significant body of research supports the result of H_3 showing that PA has a positive effect on QoL; this holds true for the older adult in South Korea. This result can be explained by the several studies revealing that PA is associated with low depressive symptoms,[51] lower anxiety,[52] and greater meaning in life. In addition, Keysor and Jette[53] and Rejeski et al.[54] suggested that older adults with diseases also benefit from PA in terms of improving their physical ability as well as QoL.

The negative relationship between perceived social support and loneliness (H_4) in South Koreans was consistent with the study by Kwag et al.[55] who found that perceived social support had a negative influence on loneliness among older adults. Cohen-Mansfield and Parpura-Gill[29] suggested that lack of financial resources can affect loneliness because limited resources can prohibit older adults from participating in social activities. In addition, Smith[56] indicated that loss of spouse or friends and loss of transportation can be attributable to loneliness due to the reduced social activity with others. Regarding the intervention strategies for loneliness, Gümüş et al.[57] showed the positive impact of exercise programs on decreasing loneliness. Thus, perceived social support of exercise

program participants, which has a negative effect on loneliness, may also help enhance PA participation.

The result of H_5 indicated that the loneliness of the study participants had a negative effect on QoL. There might be several reasons why loneliness negatively affected QoL among older adults. First, loneliness can increase blood pressure among the population. Hawkley et al.[24] found that loneliness was linked to high levels of blood pressure in middle-aged and older adults that leads to stroke and heart disease. Second, loneliness was found to be associated with low emotional support. Older adults with low emotional support tend to have low levels of life satisfaction.[58] Finally, loneliness is a determining factor that influences depression.[29] It is possible that depression might serve as a mediating factor in the effect of loneliness on QoL. This needs to be investigated further.

The finding that the indirect effect of perceived social support on QoL through PA was not statistically significant ($p = 0.09$) was somewhat surprising since most of the activity classes that the participants were involved in were group oriented. However, we believe that this finding is marginally significant and showed a positive trend. It is possible that the relationship between social support and QoL was so strong ($\beta = 0.28$, $p < 0.001$) that it may have subsumed some of the mediating effects PA between social support and QoL.

4.3. Practical implications

There are several practical implications in this study. First, the results of this study provide physical educators, fitness instructors, and sport managers in charge of sport programs for older adults with empirical evidence for the promotion of PA for older adults in South Korea in a social setting. Although the government of South Korea has developed and implemented policies related to physical education for their aging population, there is a lack of knowledge and information on factors affecting PA participation among older adults and the role of social support and loneliness. Thus, this study offers necessary and important information in order for them to develop effective physical education programs for older adults.

Second, this investigation indicates that perceived social support can reduce loneliness among the older South Korean population. Therefore, it will be important to develop recreation programs and PA programs that are accessible and can provide social interaction for older people as opposed to focusing on home based interventions that do not promote social engagement. In addition, Forbes[59] suggested diverse activities including adult education classes, involvement in community action schemes, and locally organized outings to alleviate loneliness among older people.

Third, the development of prevention and intervention programs aimed at alleviating loneliness can be very effective in enhancing QoL among older adults in South Korea. The identification of factors affecting perceived social support can provide insights on how to develop more effective intervention programs for older males and females. Smith[56] noted, "Educating widowed older adults about support groups can be another possible intervention to lessen their feelings of

loneliness. Facilitating meaningful connections among lonely older adults can greatly improve QoL while decreasing feelings of loneliness." (p. 39).

Finally, given the positive relationship between PA and QoL, it is important to increase the number of sport facilities that can provide a variety of PA programs that older adults enjoy (e.g., water aerobics, dance sports, yoga, gateball, and table tennis).

4.4. Limitations and future studies

There are several limitations that need to be considered when evaluating the current study. First, the sample size of this study was limited to an urban region in South Korea; caution should be taken when generalizing these results to more rural South Koreans. In addition, although the results provide valuable support for the development of health intervention programs for South Korean older adults, the sample consisted of one ethnic group making it difficult to generalize the results across other ethnic groups. Second, the findings of the current study that all of the hypothesized direct links were significant and loneliness acted as a mediator were based on cross-sectional data. Longitudinal studies may provide more definite information about the causal inference.

Third, all the participants in the present study were physically active; therefore, it is possible that we would see different relationships if a more heterogeneous sample were utilized. Specifically, we might expect the mediating influence of PA to become significant if it were to be studied in a population with a more varied score on the GLTEQ. In the future, a similar study with a more representative sample is suggested to generalize the results. In addition, as opposed to the quantitative research methods utilized in the present investigation, qualitative research methods may enhance future studies.

5. Conclusion

The purpose of this study was to determine the relationships among perceived social support, PA, loneliness, and QoL in active older South Koreans. The following are the conclusions of the study: in older South Koreans (1) perceived social support positively influenced PA; (2) perceived social support negatively influences loneliness; (3) perceived social support positively influences QoL; (4) PA positively influences QoL; and (5) loneliness exerts a negative effect on QoL. Furthermore, as evidenced by the mediating role of loneliness between perceived social support and QoL, there are several ways that perceived social support can impact QoL in older active South Koreans.

Authors' contributions

HWK conceived of the study, developed the research design, completed data collection, performed statistical analyses, and drafted the initial manuscript; MP contributed to the literature review and the interpretation of the SEM model and results, and drafted the manuscript; JPW provided insight into the health behavior of older adults, contributed to the

interpretation of the results, and helped in drafting the manuscript. All authors have read and approved the final version of the manuscript, and agreed with the order of presentation of the authors.

Competing interests

The authors declare that they have no competing interests.

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