

The effect of 12-week Pilates exercises on wellness in the elderly

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The purpose of this study is to examine the efficiency of 12-week Pilates exercises on wellness in the elderly. Before Pilates exercises training, the 88 elderly (63 females, 25 males) were given and completed a Wellness Scale. Then, the elderly participated in Pilates exercises and completed the same scale afterwards. Results of paired *t*-test showed that participants in 12-week Pilates exercises experienced significant im-

provement in physical ($t=2.762, P<0.01$), social ($t=3.362, P<0.001$), spiritual ($t=2.307, P<0.05$), and emotional wellness ($t=2.489, P<0.05$). Consequently, Pilates exercises helped improve wellness of the elderly.

Keywords: Pilates exercise, Elderly, Wellness

INTRODUCTION

Population ageing is a global phenomenon. In the mid-21st century, the number of older persons was 202 million which consisted of 8% in the whole population, but it reached about 841 million which is 4 times higher than that in 1950. In addition, this phenomenon takes place anywhere in the world. Fukuoka et al. (2016) predicted that the number of the older persons will triple by 2,050 to attain 2 billion, reaching 21% of world population.

South Korea is one of the great examples of the phenomenon. This country has shown the fastest growing rate of the ageing population in the world. For instance, while other advanced countries such as France, the United States, and Japan have taken 115 yr, 73 yr and 24 yr, respectively, Korea has taken 18 yr to enter the aged society (Ahn et al., 2014). In addition, the proportion of population who are over 65 yr in Korea will be reached to be nearly 37% by 2050 (Choi et al., 2016). The dramatic increase of the numbers of older persons in the population of Korea has brought about a variety of social issues such as physical and mental health, social relationship, and financial problem.


Of those issues, most elderly people face various and serious

health problems which can hugely affect their lives (Spar and La Rue, 2002). Indeed, health problems in the elderly can cause enormous economic damage at the level of the government and can lead to the huge losses of their autonomy and independence at the level of the individual. Therefore, health is the most important issue not only for the elderly, but for the government.

Campos (2011) argues that "it is difficult to define or discuss health without mention of wellness because the two terms are closely interwoven." In the words, the definition of health includes wellness which implies a sense of welling in all aspects of life. Anspaugh et al. (2006) define wellness as:

A lifelong process that at any given time produces a positive state of personal well-being, of feeling good about yourself; of optimal physical, psychological, and social functioning; and the control and minimization of both internal and external risk factors for both diseases and negative health conditions. Wellness is a process rather than a goal. It implies a choice, a way of life. It means integrating the body, mind, and spirit. It symbolizes acceptance of yourself. It suggests that what you believe, feel and do have an influence on your health.

In the same vein, Hoeger and Hoeger (2007) assert that "wellness implies a constant and deliberate effort to stay healthy and

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achieve the highest potential for well-being.” Based on both definitions, Kim (2000) classifies wellness into five dimensions: (a) physical wellness can be defined as the ability to carry out daily tasks through physical activity and proper nutrition; (b) social wellness can be the ability to build healthy, nurturing and supportive relationships and to foster a strong connection with others; (c) spiritual wellness can be characterized as a guiding sense of meaning or value in life; (d) intellectual wellness can be the ability to learn knowledge and skills and apply them to daily tasks; and (e) emotional wellness can be defined as the ability to handle emotions and express them appropriately and comfortably. The improvement of wellness for the elderly may play an important role in increasing overall quality of life (Liao and Brunner, 2016).

For the elderly, however, aging may lead to gradual loss of physical, mental, social and intellectual functions and in turn, it may affect their wellness. In recent, sport and physical activity has been recognized as an important agent in improving wellness in the elderly (Kim and Lee, 2011; Stephenson et al., 2007). Considering the positive effects of physical activities in wellness for the elderly, in this study researcher introduces a new form of exercise known as Pilates developed by Joseph Pilates in the early 20th century that contributes to improving the balance, muscle strength and coordination. Pilates emphasizes the mind-body connection and it is also getting popular in Korea. Moreover, it is not necessary to have the open space to practice it (Mokhtari et al., 2013). The exercise can be performed on a mat or with equip-

ments such as the reformer, Cadillac, and Chair (Roh, 2015).

To date, previous research has focused on its positive role for youth and adults (Cromwell et al., 2007; Johnson et al., 2007). However, there has been little research on how a Pilates exercise affects on the elderly’s wellness. Therefore, the purpose of this study is to examine the effect of a 12-week Pilates intervention on wellness of the elderly.

MATERIALS AND METHODS

Research participants

The participants of this research were sampled from the elderly (aging over 65 yr old) who participated in continuing education centers located in Incheon metropolitan city. Researcher explained the purpose of the study and 93 elderly agreed to participate in

Table 1. The general characteristics of research participants

Variable	No. (%)
Gender	
Female	63 (71.6)
Male	25 (18.4)
Partnership	
Yes	40 (45.5)
No	48 (54.5)
Motive for participation	
For health	51 (58.0)
For fun	15 (17.0)
For releasing stress	22 (25.0)

Table 2. Pilates program

	First program with mat (1–6 wk)	Second program with bands (7–12 wk)	Intensity	Frequency
Warming up (5 min)	<ol style="list-style-type: none"> 1. Feel weight on feet 2. Knee bands, squat, rotations, side bends, roll downs 3. Breathing 	<ol style="list-style-type: none"> 1. Breathing 2. Standing arm work from behind 3. Standing arm work band in hands 		
Main (40 min)	<ol style="list-style-type: none"> 1. Pelvic clock 2. Pregnant cat 3. Hip circles 4. Abdominal curls 5. Toe taps 6. Hundred 7. Roll up pre 8. Small leg circles 9. Rolling like a ball 10. Single leg stretch 11. Spine stretch forward 12. Spine stretch side 13. Baby swan 14. Single leg kicks 15. Side leg series 	<ol style="list-style-type: none"> 1. Hundred 2. Roll up 3. Single leg circles 4. Rolling like a ball 5. Single leg stretch 6. Double leg stretch 7. Spine stretch forward 8. Spine stretch side 9. Saw 10. Swan 11. Side leg work 12. Standing arm work-biceps curls 13. Standing arm work-overhead press 14. Standing arm work-deltoid lift 15. Standing arm work-triceps press 	6–8 times	3 times/wk
Cool down (5 min)	<ol style="list-style-type: none"> 1. Hamstring stretch 2. Quadriceps stretch 3. Piriformis stretch 	<ol style="list-style-type: none"> 1. Hamstring stretch 2. Adductor stretch 3. Abductor stretch 		

Pilates exercise in the beginning of this study, but 5 participants dropped out due to personal reasons such as health issue (4) and the lack of time (1). As a result, a total of 88 participants (63 females: 68.57 ± 4.43 yr, 26 males: 68.8 ± 4.69 yr) completed a 12-week Pilates intervention for this research. The general characteristics of participants are shown in Table 1.

Pilates program and investigation tool

All participants received a Pilates exercise training, 3 sessions of 50 min per week for a duration of 12 weeks. Pilates exercises which were used in this study were based on the programs that were used in previous studies (Kaesler et al., 2007; Pilates, 2001). The exercises were performed into two parts. For the first six weeks, Pilates on the mats was performed and the second part was performed with bands for the rest six weeks. The specific programs are shown in Table 2.

The tool for data collection in this research was questionnaire. This questionnaire was composed of 23 items; 4 items in background information and 19 items in wellness. Before and after performing the exercises, all participants completed a questionnaire to measure the efficiency of Pilates exercises on wellness. Wellness scale was developed by Kim (2000) with 19 questions consisted of five subvariables such as physical (5 items), social (4 items), spiritual (3 items), intellectual (3 items), and emotional wellness (4 items). The responses to all items were made by the Likert Scale with 1 point in “not at all” and 5 point in “strongly agree”.

To test the validity of the questionnaire, a meeting of a panel of experts was held with 3 professors in a realm of socio-psychology.

They reviewed the questionnaire and discussed the content validity of items. An exploratory factor analysis was conducted to verify the validity of measurement tool. A principle component analysis was conducted to minimize the number of factors and varimax rotation was used as a rotation method. A reliability coefficient which represents internal consistency was calculated to verify reliability. The reliability coefficient ranged from 0.708 to 0.847 which was judged to be very reliable. The validity and reliability of the questionnaire are shown in Table 3.

Research procedures and data analysis

The IBM SPSS Statistics ver. 20.0 (IBM Co., Armonk, NY, USA) was used to analyze all data collected in this study. First, an exploratory factor analysis and a reliability analysis were conducted to verify the validity and reliability of the questionnaire. Second, the paired *t*-test was conducted to verify the difference between pre- and posttest. The significance level of (α) was set as 0.05.

RESULTS

The collected data went through descriptive statistics such as mean and standard deviation and paired *t*-test was used to determine whether the mean difference between pre- and posttest. The results are shown in Table 4.

As seen in Table 4, there were statistically significant differences in physical ($t = 2.762$, $P < 0.01$), social ($t = 3.362$, $P < 0.001$), spiritual ($t = 2.307$, $P < 0.05$) and emotional wellness ($t = 2.489$, $P < 0.05$) for the elderly between pre- and post-Pilates interven-

Table 3. The exploratory factor analysis and reliability analysis

Item	Item number	Eigenvalue	Variance rate	Accumulation	Reliability
Wellness					
Physical	5	7.890	41.529	41.529	0.825
Social	4	2.029	10.678	52.206	0.847
Spiritual	3	1.349	7.101	59.307	0.708
Intellectual	3	1.110	5.001	64.308	0.751
Emotional	4	1.023	4.133	68.441	0.818

Table 4. Change in the elderly's wellness before and after the Pilates intervention

Variable	Before	After	<i>t</i> -test	<i>P</i> -value
Physical wellness	3.16 ± 0.52	3.39 ± 0.57	2.762	0.006**
Social wellness	2.65 ± 0.69	3.06 ± 0.80	3.362	0.000***
Intellectual wellness	3.23 ± 0.48	3.32 ± 0.61	0.976	0.022*
Spiritual wellness	3.22 ± 0.47	3.42 ± 0.65	2.307	0.33
Emotional wellness	3.31 ± 0.49	3.52 ± 0.64	2.489	0.014*

Values are presented as mean \pm standard deviation.

* $P < 0.05$. ** $P < 0.01$. *** $P < 0.001$.

tion. However, there was no statistically significant difference in intellectual wellness.

DISCUSSION

This research examined the effect of a 12-week Pilates exercise on wellness in elderly women. Findings of the study revealed that Pilates exercises might be a useful tool for helping older persons to improve various dimensions of wellness. In other words, Pilates exercises program for 12 weeks significantly improved elderly's wellness such as physical, social, spiritual and emotional wellness.

After reviewing the literature, it was found that the Pilates exercise contributes to improving physical wellness in the elderly (Hall et al., 1999; Kaesler et al., 2007; Smith and Smith, 2005). Bullo et al. (2015), which studied on the effects of Pilates exercise training on physical fitness and welling in the elderly, argue that Pilates exercise can be considered a proper physical activity for the elderly. Consequently, this exercise increases physical fitness and in turn it improves overall quality of life.

Previous studies also have shown that Pilates exercise reinforces emotional wellness in older persons (Siqueira Rodrigues et al., 2010). According to Mokhtari et al. (2013), 12-week Pilates exercises reduces depression in the elderly. Similarly, Campos de Oliveira et al. (2015) investigated the effect of 12-week Pilates exercises of older adults who completed for duration of 12 weeks. The results revealed that Pilates exercises improve aspects of the health-related quality of life of older adults.

In addition, Kim and Lee (2011) investigated the effect of leisure sports on wellness in the elderly. Older persons who spent more time in active exercises build a better relationship with others and have interpersonal relation skills. The more they participated in physical activities, the more they are socially healthy. In this study, therefore, Pilates exercises may play an important role in improving overall wellness in the elderly and in turn it may affects older persons' overall health and wellbeing.

This research focuses primarily on the effect of a 12-week Pilates intervention on wellness in the elderly. In other words, this study does not have two-group experimental designs. Therefore, future research should be designed with a control group such as other exercise group or nonexercise group.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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