

Effects of a six-month intervention program on physical functioning, quality of life, attitudes to ageing and assertiveness of older adults

PhD thesis

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1. Introduction

As more individuals live longer everywhere in the world, it is of paramount importance to maintain quality of life, functional capacity and independence as they age. A lot of studies prove that regular physical activity is among the most important self-care behaviors that contribute for a healthy active living and for a quality of life (Prohaska et al. 2006; Morrow et al. 2004, Sagiv 2000).

Research also tells us that being active reduces the risk of non-communicable diseases such as heart disease, obesity, hypertension, diabetes, osteoporosis, depression as well as falls and injuries. (Bailey 2000, Petrella, Robert et al. 1999, Pate et al. 1995).

We believe that the most important task of 'sport for the old' is to promote the importance of physical activity, show the possibilities of an active lifestyle to this fast growing segment of the population, help them to find the type of exercises suitable for their age and what they enjoy. Social advantages should also not be forgotten. Regular physical activity helps to prevent the undesirable mood changes and social isolation, which are unfortunately frequent problems among our senior citizens.

In spite of the importance of the topic, relatively few studies focus on the older adults' way of life in the Hungarian

literature. Moreover, studies based on intervention programs, which are characteristics of the international sport scientific research in recent years, are almost missing from the Hungarian field.

2. Purpose of the study

With this gap-filling study our main purpose was to present the effects of a six month intervention program - modified Pilates training and Aqua fitness training on physical functioning, quality of life, attitudes to the aging process and assertiveness in a healthy, old population.

It was examined how physical performance, QOL, attitudes to ageing and assertive behaviour change due to regular training by the end of the six month program, and which of the two types of exercises – Pilates or Aqua-fitness – had stronger effects on the above mentioned variables.

We wanted to change our participants' way of life with respect to physical activity – to make PA part of their lives on the long run.

Hypothesis

H.1. We suppose that all components of physical fitness - aerobic capacity, flexibility, strength, motor agility/dynamic balance – can be developed significantly by the program in both groups.

H.2. It is supposed that autonomy and sociability will change significantly by both exercise groups as the result of the program.

H.3. Aqua aerobic will improve more areas of QOL than land exercise because of the positive effect of the different medium.

H.4. Regular exercise will lead older people to appropriate self-assessment and higher self-efficacy. The positive changes in these personal traits will help them to behave assertively in difficult situations.

H.5. It is supposed that in the change of assertive behaviour no difference is going to be measured between the two groups.

H.6. We suppose that the six month program will be long enough to change previously inactive persons' lifestyle and many of the participants will continue their participation on training sessions after the end of the program, even if they will have to pay for it.

Assessments

The Fullerton Functional Fitness Test was chosen to measure the changes in those physiological attributes which support behaviours needed to perform everyday activities required for independent living: aerobic capacity, flexibility, strength, motor agility/dynamic balance. This test was especially developed for older adults through research at the lifespan Wellness Clinic at California State University, Fullerton (Rikli & Jones 1999).

The test items:

- Chair Stand Test – to assess lower body strength
- Arm Curl Test – to assess upper body strength
- 6 min Walk Test – to assess aerobic endurance
- Back Scratch Test – to assess upper body (shoulder) flexibility
- Chair Sit and Reach Test – to assess lower body (primarily hamstring) flexibility
- 8-Foot Up and Go Test – to assess physical mobility (speed, agility, and dynamic balance)
- Body mass index (BMI, kg/m²) were assessed with Inbody-230 body composition analyzer.

Demographic Questionnaire

The most important demographic data (age, marital status, sex, and educational background) were asked by a simple, self-developed questionnaire.

Quality of life was measured by **WHOQOL-OLD**, a 24-item, 6-facet test, developed from WHOQOL to assess quality of life of older adults. The 24 questions are grouped around six main topics: autonomy, sociability, attitudes towards death, activities of past, present and future, perception and intimacy.

Attitudes to Ageing Questionnaire (AAQ)

The AAQ was developed by the same expert group as the QOL-OLD Questionnaire. It is a self-report measure with which older people themselves can express their attitudes to the process of ageing. It is a 24-item cross-cultural attitudes to ageing questionnaire consisting of a three-factor model encompassing psychological growth (reflecting positive gains of ageing), psychosocial loss (old age seen as a negative experience involving psychological and social loss), and physical change (focusing on physical functioning) (Laidlaw 2006).

Rathus's assertiveness questionnaire

Self-advocacy, self-efficacy, self-esteem, expression of emotions and social skills were assessed by the Rathus assertiveness questionnaire. Assertiveness well predicts how the individual is going to behave in conflict situations whether at work or in everyday life.

The following five factors occur in the psychometric analysis of the test: uncertainty, self-esteem disturbance, expression of emotions, self-efficacy, saying no, and the personal involvement in relationships. The test has strong internal consistency, proper reliability and validity.

Statistical Analysis

The questionnaires were filled in individually by participants. Data were analyzed by Statistical Package for Social Sciences for Windows, version 17.

Characteristics of the sample were described by Descriptive Statistics, Frequencies. Pearson's correlation was used to test the correlation between the combined indexes of the 4 tests at pre-and post program state (old sum, FFTsum, overall attitude and Rathus sum.) Differences between pre-and post measured data were analyzed by Paired Samples T-test. Repeated Measures ANOVA was used to test the effect of the type of

group and time on variables and the interaction between time and group effects. Scheffe's Post Hoc test was used to discover differences between group results.

3. Results

Differences between the pre-test and post-test data

Changes in Physical Functioning

Significant differences were found in 5 of the 7 variable pairs at the Pilates group. Lower ($t = -12.239, p < 0.001$) and upper body strength ($t = -10.211, p < 0.001$), lower body flexibility ($t = 7.334, p < 0.001$) physical mobility ($t = 7.335, p < 0.001$) (dynamic balance) and aerobic endurance ($t = -6.99, p < 0.001$) improved significantly as the result of the 6 month program. Shoulder flexibility and BMI did not change significantly. Aqua group: all these 5 items, plus upper body flexibility ($t = 2.895, p < 0.05$) changed significantly. Only BMI did not change. Lower body strength improved in the control group ($t = -3.413, p < 0.01$).

Changes in quality of life

Autonomy ($t = 3.25, p < 0.01$) and perception ($t = -4.813, p < 0.001$) in the Pilates group and sociability ($t = -4.75,$

$p < 0.001$) in the Aqua group, as subscales of QOL, improved significantly by the end of the program.

Changes in the attitude to the aging process

There was a significant, positive change by the aqua group in the overall attitude to the aging process as the result of the six month program ($t = -2.88$, $p < 0.05$). Significant difference was also found in the attitude to the physical changes due to the aging process in both exercising groups – Pilates ($t = -3.065$, $p < 0.001$), Aqua group ($t = -3.086$, $p < 0.001$).

Changes in assertive behaviour

No significant difference was found in overall or in the different dimensions of assertiveness between the pre-and post measured pairs

Intervention effects in physical functioning, quality of life, attitudes to aging and assertiveness

A 2-way mixed ANOVA with repeated measures was applied to test the effects of the 3 different interventions (control, Aqua and Pilates) on FFFT, QOL, AAQ and Rathus assertiveness items in two measures (pre-and post-program - time) and their

interactions. The effects were examined by subscales of the tests as well.

The dependent variables were all the 21 items of the four tests. Time factor at two levels, type of group - control, Aqua and Pilates - was the between-subjects factor. All the multivariate tests of significance suggested the presence of a main effect for group factor ($p < 0.001$) - the presence of an interaction effect -, as multivariate tests rejected the null at $p < .05$ ($p < 0.001$). We conclude the presence of a group*time interaction. The within-subject effects results showed a statistically significant main effect for the time factor $F(1, 52) = 58.6$ ($p < 0.001$) and a statistically significant group*time interaction effect $F(2, 52) = 16.03$ ($p < 0.001$). The between-subject analyses yielded no significant main effect of the experimental group $F(1, 52) = 1.54$.

Intervention effects and group comparison in the subscales of the tests

The main effects of time factor were shown by the analysis of the motor tests. There was group*time interaction in all cases, except BMI. Main effect of the intervention group could be discovered in upper body flexibility, lower body flexibility and aerobic endurance. Scheffé's post hoc analysis revealed that

performance of both the Aqua and Pilates groups differed significantly from that of the control group ($p < .05$).

The main effects of time factor could be shown by life quality in perception, whereas a group*time interaction was present in autonomy, perception and sociability. The between-subject analyses yielded a significant main effect of the experimental group ($p < .05$) only in sociability. Scheffé's post hoc analysis revealed that answers of the Aqua group differed significantly from that of the control group ($p < .05$).

4. Conclusion

It can be concluded that both Pilates and Aqua-fitness workouts three times per week, conducted regularly for a half year, are appropriate means to improve physical performance needed for everyday life in an inactive, old population and can contribute to maintain some aspects of quality of life. It helped them to accept the changes due to the aging process, but could not help them to stand up more for themselves.

Aqua-fitness was more effective in the improvement of shoulder flexibility than Pilates, but no other difference could be supported in any of the motor tests between the 2 exercise groups. Other physical tests showed significant improvement in both exercise groups. It has to be mentioned that there was

improvement in one variable, in lower body strength in the control group. Some control group members reported that simply taking part in the pre-measurement motivated them to start being more active (e.g., walk more). That might account for the positive change.

It can be concluded that it basically does not matter which type of exercise is being practiced regarding upper, lower body strength, lower body flexibility, dynamic balance and aerobic endurance, if it is practiced regularly and for enough of a time period. A Pilates program - presented by Kloubec and his colleagues - demonstrated that exposure to Pilates exercise for 12 weeks, for two 60-minute sessions per week was sufficient to promote statistically significant increases in abdominal endurance, hamstring flexibility, and upper-body muscular endurance. Participants did not demonstrate improvements in either posture or balance when compared with the control group (Kloubec 2010). In our study, dynamic balance improved as well, as the program was longer and sessions were more frequent. The program was not long enough however, to result in changes in overall life quality. Only some aspects of quality of life were found to change. In quality of life subscales, significant improvement was found in autonomy and perception at the Pilates group and sociability at the Aqua group by the end of the program. A more extensive

program, in which participant needs and interests are taken into greater consideration, may be more effective on the above mentioned variables.

Attitude towards the physical changes due to the aging process could be positively influenced by both exercising groups.

Not any of the assertiveness components – insecurity, self-esteem disorders, self-assertion being a customer, saying no, personal involvement in relationships, expressing feelings – could be developed significantly in any of the groups by the program.

Because the program is still successfully going on, we have made regular physical activity a part of these participants' everyday lives. Individual feedback about the program was also very positive – they enjoyed taking part in the program and reported a range of physiological and psychological benefits.

In our pre-study conducted in Eger about regular physical activity habits of the target population previous the intervention program, it was also revealed that female gender and higher level education had a positive effect on PA habits (Vécseyné 2007). It is worth trying to involve more males and older adults with lower education level in the research in the future.

In program planning it is also crucial, what type of exercise is chosen, especially when the purpose of the intervention is the

improvement of QOL and other psychological traits by PA. It can be read in Rejeski's review that individuals who participated in activities that they enjoyed reported the highest levels of life satisfaction (Rejeski, et al. 1996). Our findings and findings of previous studies in the topic suggest that enjoyment may be a possible mediator of change in life satisfaction with involvement in physical activity (Prohaska et al. 2006, Salem et al. 2009).

Although the number of scientific publications on the effects of regular physical activity on health outcomes has been increasing in the last twenty years, sedentary lifestyle is more and more the characteristics of the whole population, including the old generation. Our main task is to put theory in practice – promote active lifestyle by planning, implementing and evaluating intervention programs for the old, which are planned specifically according to their needs and interests.

The old generation deserves much more attention than what they get in Hungary. This study clearly proved the need for well-planned and professionally executed interventions in the future.

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