



EFFECT OF PILATES EXERCISES ON BALANCE CONTROL AND FALL PREVENTION AMONG AT- RISK ELDERLY: AN EXPERIMENTAL STUDY

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ABSTRACT

Falls and unstable balance were the most serious clinical problems faced by elderly. This study investigated the effect of Pilates exercises on balance control and fall prevention among at-risk elderly in selected old age homes in Thiruvananthapuram district. The study design adopted was quasi-experimental pre test post test control group design with quantitative approach. 60 at-risk elderly aged between 60-70 years were selected by purposive sampling technique and assigned as experimental group (n=30), participated in Pilates training for 6 weeks, 3 sessions per week and one hour per session and control group(n=30), received no intervention. Berg Balance Scale was employed to determine level of balance control and fall prevention before and after (9th and 18th sessions) for both groups. Independent 't' test and paired 't' test were computed to find the effectiveness. Findings revealed that there was a significant difference between pre and post test (I and II) scores in experimental group ($p < 0.01$) and no significant differences were found in the control group ($p > 0.05$). Using independent t test and analysis of variance, association between balance control and fall prevention and selected demographic variables were assessed. The results indicated an improvement in balance control and fall prevention in experimental group after Pilates exercises and no association between balance control and fall prevention and selected demographic variables. Thus it may be concluded that Pilates exercises offers a more efficient way of improving balance control and fall prevention among at-risk elderly.

KEYWORDS : Effect; Pilates exercises; Balance control and fall prevention; Assess

INTRODUCTION

India's older population will increase dramatically over the next four decades. According to United Nations Population Division (2011), the share of India's population aged 60 years and older is projected to climb from 8 percent in 2010 to 19 percent in 2050. Between 2010 and 2050, the share 65 and older is expected to increase from 5 percent to 14 percent, while the oldest age group 80 and older will triple from 1 percent to 3 percent¹.

The aging process is inevitably accompanied with restriction of the ability of independent movement and loss of balance. The postural system consists of several sensory systems, the motor system and a central integrating control system, which involves complex interactions among multiple neural systems. Due to aging, these systems are known to be affected and results in an impairment of the ability to maintain stance. Maintenance of body's balance is attributed to the postural control system. As age progresses, degree of body sway increases even in simple postural forms².

Joseph Pilates after the 1st World war developed Pilates exercises, described by practitioners as a unique method of physical fitness that uses a combination of muscle strengthening, lengthening and breathing to develop trunk muscles and restore muscle balance. A comprehensive method of stretching and strengthening exercises together aim to create a strong and limber body as well as strong will of mind that can control the body. Pilates method may be said to have six key principles: - centering, concentration, control, precision, breath and flow. Pilates exercises demands intense focus and were based on the idea of muscle control³.

Fall prevention is a big challenge among ageing population. According to WHO global report, more than 50% of injury related hospitalizations are among people over 65 years and older. Fall fatality rate for people aged 60 and above is 36.8 per 100,000 for men and 31.1 for women. In fact, the incidence population of fall injuries has increased by 131% during the last three decades. It is predicted that if preventive measures are not initiated, in immediate future the number of injuries by falls will be 100% higher in the year 2030⁴.

Moreover, the study results may be used to promote increased participation by elderly individuals in exercise training,

especially Pilates by providing evidence of a variety of physiological and psychological benefits that ultimately enhance overall independence and health later in life. The economic impact of an active lifestyle is likely to be beneficial not only to senior citizens but also to the entire health care system⁵.

MATERIALS AND METHODS

Prior written permission was obtained from the authorities of Missionaries of charity, Puthiyathura and Bethel Gram old age home, Kallayam. The study period was from 27-02-2017 to 12-04-2017. Non probability purposive sampling technique was used to select sixty subjects that satisfied the inclusion criteria. Before the commencement of the program, the investigator introduced herself to the participants and briefed on the purpose and intention of the research study. Samples were selected from the old age homes after obtaining informed consent. Thirty samples were selected from Bethel Gram old age home, Kallayam as experimental group (Pilates group). Thirty samples for the control group were selected from the Missionaries of charity, Puthiyathura. The pre-test was conducted on 27-02-2017 and 28-02-2017 for both experimental (Pilates group) and control group using Berg Balance Scale to assess their functional task performance. From the next day the experimental group (Pilates group) experienced Pilates training for 6 weeks, three sessions per week and one hour per session.

Each session began with warm up exercises (raising hands, neck stretching, bending upper body and back) for 5 minutes followed by the Pilates exercises that lasted 50 minutes. Pilates exercises included standing footwork parallel, standing wide knees bend, leg exercise, spine twist and single leg stance exercise. The session concluded with cooling exercises (lifting the shoulder up to ears, lateral flexion of the head, raising hands) for 5 minutes. No intervention was provided for the control group. Post- test I and II was conducted after the 9th and 18th sessions respectively for both the experimental group (Pilates group) and control group using the Berg Balance Scale.

RESULTS

Description Of Sample Characteristics

- Majority of the samples in the experimental group (70%) and control group (60%) were in the age group of 66- 70 years.

- In the experimental group, both male and female were about 50% and majority of samples in the control group (56.7%) were females.
- Majority of the samples in the experimental group (50%) and control group (46.7%) had secondary educational qualification.
- Most of the samples in the experimental group (43.3%) and control group (60%) were moderate workers.
- Majority of samples in the experimental group (40%) were widow/widower and in the control group (40%) were single.
- Among the study samples, most of them in the experimental group (70%) and control group (56.7%) had no habits of smoking, alcoholism or others.
- Majority of samples in the experimental group (50%) and control group (73.3%) had a family income below Rs.5000 per month.

Effect Of Pilates Exercises On Balance Control And Fall Prevention Among At-Risk Elderly

- Paired't' test was done to find out the effect of Pilates exercises on balance control and fall prevention among at-risk elderly in both experimental group and control group. In the experimental group, there was a significant difference between pre test and post test level of balance control and fall prevention. The obtained't' value was statistically significant at 0.01 level. In the control group, there was no significant difference between pre test and post test level of balance control and fall prevention. The obtained't' value was not statistically significant. Hence Pilates exercises were effective in improving balance control and fall prevention among at-risk elderly.
- Independent't' test was done to find out the effect of Pilates exercises on balance control and fall prevention among at-risk elderly between experimental group and control group. It was found that there was a significant difference between post test-I and post test II level of balance control and fall prevention between experimental group and control group. The obtained't' values was statistically significant at 0.01 level. Hence the Pilates exercises were effective in improving the balance control and fall prevention among at-risk elderly.

Association Between Balance Control And Fall Prevention And Selected Demographic Variables Among At-Risk Elderly

Independent 't' test and analysis of variance was computed to find out the association between balance control and fall prevention and selected demographic variables. There was no significant association between balance control and fall prevention among at-risk elderly and selected demographic variables.

DISCUSSION

The intervention of Pilates exercises among at-risk elderly had a positive impact on the level of balance control and fall prevention. These findings are in line with those obtained by Sonmezer E. They studied the effect of Pilates exercises on balance in elderly women aged over 60 years. Thirty women aged over 60 from the city of Karaj voluntarily participated in the study. The subjects were randomly allocated into experimental and control group. The subjects in the experimental group performed Pilates exercises three sessions per week for 6 weeks. No intervention was provided to control group and were refrained from doing any other physical exercises during the study. Pre test and post test were performed for both groups using Biodex Balance test and Timed Up & Go test. The results revealed that six weeks of Pilates training had a significant impact on dynamic balance among the experimental group compared to control group. The study concluded that Pilates exercises can be used to improve dynamic balance among elderly women⁶.

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