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## To compare the effects of 4 weeks of Nordic walking and retro walking on balance and quality of life in community dwelling elderly: A pilot study

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### Abstract

**Background:** The prevalence of balance and gait deficits increases with age and is associated with the increased incidence of falls seen in the elderly population. Elderly people may suffer from the multiple health disorders due to the vulnerability for many physical and mental disturbances. Quality of life in elderly population can be affected by many environmental factors. As there are researches on Nordic walking (NW) and Retro walking (RW) improving balance in elderly population. Hence, this study compares effects of 4 weeks of Nordic walking (NW) and Retro walking (RW) in balance and quality of life in community dwelling elderly population.

**Aim:** To compare the effects of 4 weeks of Nordic walking and Retro walking on balance and quality of life in community dwelling elderly.

**Objective:** To find out the effect of Nordic walking training and Retro walking training on balance and quality of life in community dwelling elderly. Then to compare the effects of both the trainings to see which one will be more effective.

**Methodology:** A total number of 6 individuals (n=6), both males (4) and females (2), participated in this study. The participants were divided into two groups i. e. Group A (Nordic walking) and Group B (Retro walking). Its effects were assessed using Berg Balance Scale (BBS) and SF-36 Questionnaire as an outcome measure. Pre-intervention measures were taken. Group A done Nordic walking training while Group B done Retro walking training for 30 minutes for 4 weeks, 3 times a week. Post-intervention measures were taken.

**Results:** The results were given after performing Paired t-test in difference between pre and post values of BBS and SF-36 Questionnaire in both the groups. Group A and Group B showed  $P < 0.05$  is taken as significant in both balance and quality of life. Then inter group analysis was done using Unpaired t-test in which it showed P value-0.0031 for Berg Balance Scale which is very significant and for SF-36 Questionnaire P value-0.6072 which is not significant.

**Conclusion:** Nordic walking and Retro walking both the techniques were effective in improving balance and quality of life in community dwelling elderly, while Nordic walking was more effective in improving balance than Retro walking.

**Keywords:** Elderly, Nordic walking, retro walking, balance, quality of life

### 1. Introduction

Ageing is a natural process resulting in many physiological changes debilitating functions of a human body. A selected number of factors influencing the probability of falls in this age group are: a decrease in physical activity due to weakening of the muscular apparatus, a loss of body balance, dizziness and visual impairment<sup>[1]</sup>.

The prevalence of balance and gait deficits increases with age and is associated with the increased incidence of falls seen in the elderly population. It is estimated that 13% of adult's self-report imbalance from ages 65 to 69 and this proportion increases to 46% in those aged 85 and older<sup>[4]</sup>.

Elderly people have higher probability of suffering from multiple health disorders due to experience reduced physical and mental functions. These problems can decrease life quality of elderly<sup>[5]</sup>.

According to WHO statements, quality of life defined as an individual's perception of their position in life in the context of the culture and values systems in which they live and in relation to their goals, expectations, standards and concerns<sup>[5]</sup>.

### **Nordic Walking**

Walking was considered one of the most common physical activities in the world. It is a natural movement, rarely associated with physical injury and easy to be practiced by people of all ages, including the elderly. Walking can be performed in different environments with no needs of particular equipment, overcoming some common barriers as the lack of time, fitness level and money. Moreover, the regular practice of walking activity was largely recommended for the overall health, with the reduction in the all-cause mortality and in the risk to develop non-communicable diseases [2].

A particular type of walking technique is the Nordic Walking (NW). NW is a form of brisk walking, utilizing a walking pole, which actively engages the trunk and upper limbs during walking, maintaining the natural gait, while the hands are performing an open-close cycle in an alternating manner. Due to the high muscle masses involved, NW produces a higher cardiorespiratory workload compared to the normal walking, despite any difference in the perceived exertion [2].

Generally, NW is characterized by a submaximal regular increase of both heart rate and cardiac output together with a reduction of peripheral vascular resistance, in order to support the contemporaneous work of a big volume of muscle mass not requiring the expression of high intensity strength. According to the walking speed and the ground characteristics, NW may be a whole-body aerobic or alternated aerobic/anaerobic discipline. For example, interval training NW was used in obese subjects, to increase energy expenditure and weight loss [2].

### **Retro Walking**

Backward walking, also known as retro walking, is said to have originated in ancient China, where it was practiced for good health. In the modern world, it's become quite the rage in Japan, China and parts of Europe, where people use it to build muscle, improve sports performance, promote balance [6].

Retro walking sharpens thinking skills and enhances cognitive control. This may be because even though backward walking is a physical activity, it's also a "neurobic" activity, meaning it requires brain activity that may help to stay mentally sharp.

### **2. Need of Study**

It is well established that the increased motor variability in elderly is associated with risk of falls and the lack of physical fitness is a strong predictor of mortality.

In Nordic walking, the person pushes himself/ herself forward with the poles, that engages and strengthen core muscles which improves balance and reduces risks of fall. Also it causes recruitment of upper limb muscles to produce ground reaction forces which will increase energy expenditure and so improves quality of life.

A recent study proposed the use of Retro walking, as clinical measure of mobility in the elderly population. Retro-walking include improvement in muscle activation pattern, reduction in adductor moment at knee during stance phase of gait and augmented stretch of hamstring muscle groups during the stride; all of these may have helped in reducing disability thus leading to improve function and balance.

Retro walking helps to reduce fatigue, anxiety and recover motivation mental health which will improve quality of life. In this study we have compared the effects of Nordic walking and Retro walking to see which one will be more effective on balance and quality of life in elderly population.

### **3. Subjects**

#### **Included**

- Age: 60-70 years.
- Both males and females
- 25-56 on Berg Balance Scale

#### **Excluded**

- Recent trauma
- Recent fractures
- Patients using assistive devices
- Neurological conditions which will influence my study. (e.g. stroke, multiple sclerosis, etc.)
- Cardiovascular conditions which will influence my study. (e.g. recent MI, IHD, etc.)
- Respiratory conditions which will influence my study. (e.g. asthma, COPD, etc.)
- Elderly people who are following Exercise, Yoga, etc.
- Elderly people who are already taking treatment for affected balance.
- Musculoskeletal conditions such as shoulder pain, RA hand, low back pain, etc.

### **4. Method**

Various old age homes were visited in and around the city. Participants were selected according to the inclusion and exclusion criteria.

The study was explained to the participants individually and written consents were taken from them.

Participants were divided into two groups i. e. group A and group B by chit method.

Pre and Post assessment of SF-36 Questionnaire and Berg Balance Scale was done.

Data analysis was done.

### **5. Protocol**

Group A and Group B received the following exercises:

#### **Group A**

Warm Up, for 5 minutes

Nordic Walking, for 30 minutes.

Cool Down, for 5 minutes

40 minutes' session: 3 times a week for 4 weeks

Rest Period – As per the subject's convenience.

#### **Group B**

Warm Up, for 5 minutes,

Retro Walking, for 30 minutes,

Cool Down, for 5 minutes.

40 minutes' session: 3 times a week for 4 weeks

Rest Period – As per the subject's convenience.

### **6. Outcome Measure**

#### **Berg Balance Scale**

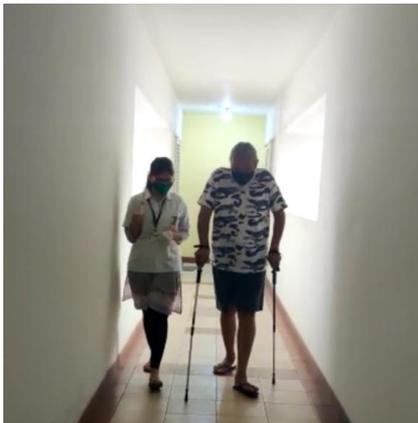
- It is an objective to measure static and dynamic balance abilities. (r-0.98)
- Participants were required to perform 14 movements required in everyday living. The total score is out of 56

and higher scores reflect a better level of balance ability.

- Scoring range from 0-4, where 0 - lowest level of function, 4-highest level of function.

**SF-36 Questionnaire**

- The 36-Item Short Form Health Survey questionnaire (SF-36) [3] is a very popular instrument for evaluating Health-Related Quality of Life.
- The SF-36 measures eight scales: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH).



**Fig 1: Nordic Walking**

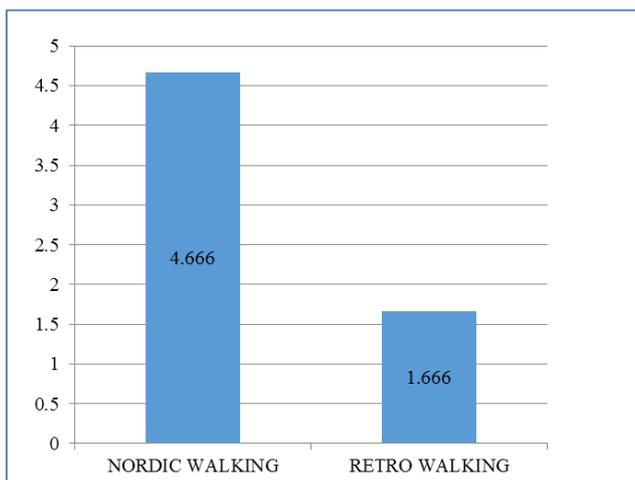


**Fig 2: Retro Walking**

**Data Analysis**

**a) Paired T-Test**

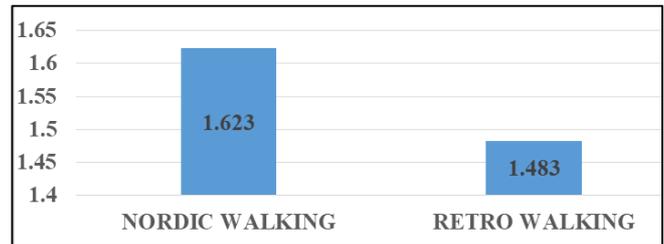
**Berg Balance Scale**



**Fig 3: Paired T-Test Berg Balance Scale**

**Table 1: Berg Balance Scale (Fig. 3)**

	Mean	STD Deviation	P-Value
Nordic Walking	4.666	1.73	0.0051
Retro Walking	1.666	2.00	0.0377



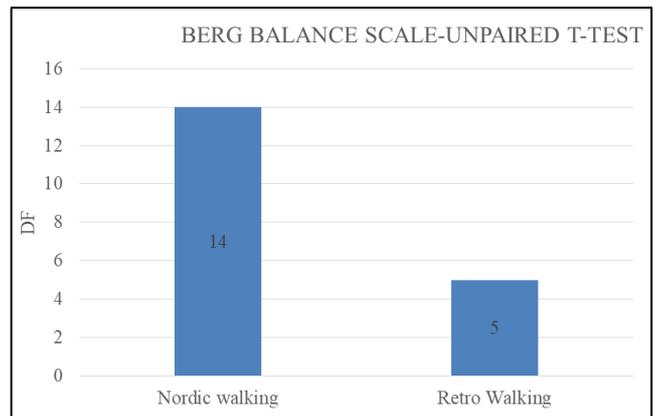
**Fig 4: Paired T-Test SF – 36 Questionnaire**

**Table 2: SF 36 – Questionnaire (Fig. 4)**

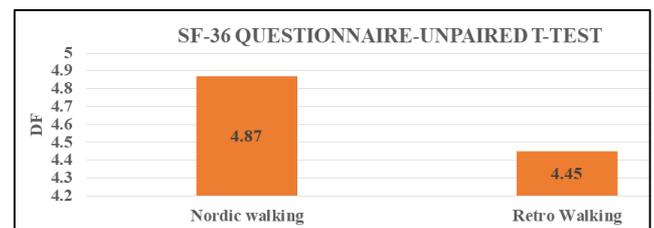
	Mean	STD Deviation	P-Value
Nordic Walking	1.6233	0.404	0.0200
Retro Walking	1.4833	0.161	0.0039

**Table 3: Unpaired T – Test (Fig. 5 & 6)**

Outcome measures	P Value	T- Value
Berg Balance Scale	0.0031	6.364
SF-36 Questionnaire	0.6072	0.5571



**Fig 5: Berg balance scale unpaired T-Test**



**Fig 6: SF 36 Questionnaire Unpaired T-Test**

**7. Results**

In this study, there was comparison between Nordic walking (Group A) and Retro walking (Group B) on balance and quality of life in community dwelling elderly.

The difference between the pre and post values on Berg Balance scale and SF-36 Questionnaire compared in both the groups and analyzed using Paired t-test.

In Group A, the values on Berg Balance Scale and SF-36 show P value 0.0051 and 0.020 respectively in Nordic walking training which is statistically significant and thus 4 weeks of Nordic walking training is effective in community dwelling elderly on balance and quality of life.

In Group B, the values on Berg Balance Scale and SF-36 Questionnaire show P value 0.00377 and 0.0039 in Retro walking training which is statistically significant and thus 4 weeks of Retro walking training is effective in community dwelling elderly on balance and quality of life.

Now inter group i.e. Group A and Group B analysis was done using unpaired t-test for Berg Balance Scale show P value 0.0031 where it was statistically very significant. Hence Nordic walking (Group A) was more effective than Retro walking (Group B) in community dwelling elderly on balance.

Similar test was performed for SF-36 Questionnaire where Group A and Group B showed P value 0.6072 which is statistically not significant.

## 8. Discussion

Current study compared the effects of Nordic Walking and Retro Walking on balance and quality of life in community dwelling elderly.

Total no. of participants in this study were 6. The result of the study showed that the Nordic walking is more effective than Retro walking on balance in community dwelling elderly. While Nordic and Retro walking were not significantly different in case of quality of life.

Despite all the age-related changes, functional walking capacity remains crucial for participation in personal, family, and societal roles, and unfortunately, distance walked and gait speed are predictors of hospitalization, institutionalization, and perceived and diagnosed health status [9].

Thus, since walking independence is of key importance in the elderly, and walking is often the only form of exercise available to them, strategies to promote walking capacity would be of great benefit to elders [9].

A promising walking strategy is Nordic walking (NW). When used by the fit, it is an intensive form of walking that uses the muscles of the upper and lower body in a continuous and reciprocal movement. The poles used are similar to those used in cross-country skiing but have rubber tips and modified hand grips designed to provide a better platform for the hand during the push phase of poling. The poles provide balance as well as promote a more physiological gait pattern, in which the trunk is upright and hip/shoulder countermovement are present, as opposed to the shuffling gait and flexed posture observed in many seniors [9].

Zbigniew *et al.* [1] has done a study in which a general tendency for body balance improvement was observed among the elderly under the influence of Nordic walking training. The average test results for static body balance level were improved by 4.32%. In the case of dynamic body balance the increase was 5.68%.

Sabrina *et al.* [9] had done a randomized pilot trial indicate that, for an elderly, Nordic walking was 106% more effective than overground walking in improving comfortable gait speed.

The use of the poles did not increase shoulder or arm pain or disability in the legs, which is a positive finding given that many elderly people have concomitant arthritis and the use of the arms in the walking exercise could increase shoulder pain. There were statistically significant changes on the Berg balance score among subjects in both groups, owing most likely to the interventions carried out as part of the regular rehabilitation program [9].

The influence of Nordic Walking on Physical Fitness of Elderly People-this study showed that walking with sticks prevents age-induced decrease in bone density [3].

Andrea Natalia *et al.* regarding the quality of life, they identified improvements in the psychological and social participation domains in Nordic walking training.

Manisha Nayyar (2015), have investigated the effect of Retro walking on pain, balance and functional performance in OA of knee in which she revealed Retro walking group showed a significant improvement in WOMAC scores.

N. E. Fritz *et al.* suggested that Backward Walking places greater demands on postural control systems due to lack of visual information and because BW is not as habitually performed. Thus, decreased postural stability and/or fear of falling may induce changes such as lower gait velocity and shorter steps to avoid falls.

Priya Range (Oct - 2016), did a comparative study on effectiveness of forward and backward walking on pain, physical function and quality of life in subjects with OA of knee joint that resulted forward walking and backward walking along with conventional therapy are equally effective in reducing pain and improving physical function and Quality of life.

## 9. Conclusion

Therefore, in this study Nordic walking and Retro walking both the techniques are effective in improving balance and quality of life in community dwelling elderly.

However, Nordic walking is more effective than retro walking in improving balance in community dwelling elderly.

Whereas, Nordic walking and retro walking both the techniques are equally effective in improving quality of life.

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