SHORT TERM EFFECTS OF VALSE ON BALANCE, FUNCTIONAL ACTIVITY AND EMOTIONAL STATUS IN THE ELDERLY

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ABSTRACT

Aim: Our study was conducted to determine whether participation of two weeks supervised group valse programme improves balance, functional activity and emotional status in at-risk community-dwelling elderly people.

Methods: Sixty elderly subjects aged between 65 and 94 (mean age was 71.7±5.8 years for the valse group and 72.3±6.4 years for the control group) were accepted into the study. Number of falls in the previous year, vertigo, visual and hearing problems, usage of walking aids were considered. Physical function was examined by evaluating the subject's balance and gait. Romberg with eyes open and closed, 30 meters walking time were recorded. The best time of three trials was used for data analysis. Emotional status of the elderly were evaluated by the positive and negative affect schedule. All of the measurement were performed both at the beginning and at the end of two weeks of dancing session. Dancing figures consisted of mainly primitive forms of valse movements.

Results: Apart from measurements of keeping a half squat position all other evaluations were found to be significantly different at the end of two weeks dancing period. For balance measurements p values for sharpened Romberg eyes open, sharpened Romberg eyes closed, one legged stance test eyes open, one legged stance test eyes closed in the valse group were 0.000, 0.001, 0.003, 0.009, respectively. In the valse group there was statistically significant difference in walking time between base-line and at the end of second week evaluations (p=0.000). The positive emotion scores increased significantly while the negative emotion scores decreased significantly (p values were 0.000 for both)

Conclusion: Even 2 weeks of valse that includes rhytmic swing and position changing movements could make a significant improvement in balance, functional activity and emotional status of the elderly.

Key words: Balance, elderly, rehabilitation, valse

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INTRODUCTION

Balance problem increases with aging and poor balance is a major risk factor for falls [1]. The older individual has a greater propensity to fall under trying conditions due to greater body sway when standing, impaired ability to stand longer on one leg and lesser capacity to lean anteriorly with aging [2].

Studies have shown that approximately one third of community-dwelling persons over the age of 65 yrs experience one or more falls each year [3]. Prevention of falls is mandatory, because of the severe consequence of falls, such as fractures and other injuries, disability, and fear of falling [4].

Regarding balance, there is evidence that vision and somatosensory input are much more important for older adults compared to younger ones. Several studies have been claimed that physical weakness and a low functional level in old age are consequences of a sedentary lifestyle [5].

Prolonged inactivity and confinement causes intellectual deficit and emotional disturbances, probably due to sensory deprivation, decreased motor activity, poor balance and loss of coordination [6].

However, mobility limitation is potentially modifiable through rehabilitation [3]. Lack of exercise is being viewed increasingly as a risk factor not only for functional loss but for onset of various disease processes including cardiovascular disease and diabetes, among others. Supervised general group exercise has also been found to be effective in moderating falls risk factors, and a recent study involving a factorial design found that those randomised to the exercise intervention suffered significantly fewer falls [7].

However these studies focused only on weight bearing exercise /resistance training /aerobic exercise and valse has not been examined as a means of exercise intervention.

Dance is a pleasurable activity for older people and may be a way to encourage sedantary older persons to take the first step to increase their physical activity [1,8]. The valse is a dance in 3/4 time, done primarily in closed position, the commonest basic figure of which is a full turn in two measures using three steps per measure [9,10].

Our study was conducted to determine whether participation of two weeks supervised group valse programme improves balance, functional activity and emotional status in at-risk community-dwelling elderly people.

MATERIAL AND METHODS

The study was designed to be a prospective, randomised, controlled study. All subjects were recruited from the outpatient and inpatient 1st clinics PM&R of

Ministry of Health Ankara Education and Research Hospital. Sixty elderly subjects aged between 65 and 94 were accepted into the study.

The eligibility criteria included a)aged 65 or older b)living independently in a community c)being without contraindications to cardiorespiratory fitness assessment (i.e.unstable angina, resting diastolic blood pressure >115, systolic blood pressure>200 mmHg) d)not having a regular exercise habit.

Number of falls in the previous year, vertigo (according to 0-100 scale), visual and hearing problems, usage of walking aids were considered. Physical function was examined by evaluating the subject's balance and gait.

Balance included one-leg balance, functional reach and Sharpened Romberg tests. Descriptive data were collected regarding static standing balance of elderly as they performed two timed balance tests. All subjects performed Sharpened Romberg and the one-legged stance test on each foot in two test conditions: 1) eyes open, 2) eyes closed. The best time of three trials was used for data analysis (11).

Functional reach - the distance a person can lean forward with his/her arm flexed to 90 degrees- is predictive of falls and functional status, is related to the range of motion of axial spinal rotation, and is sensitive to change with exercise [1,12].

Then, 30 meters walking time were performed. The subjects were asked to walk 30 m as fast as possible with their shoes on, making a turn of 1800 after 15 m. The time was measured and enrolled as m/s [13]. The muscular endurance strength of the lower extremity was assessed by keeping a half-squat position [1].

The valse group consisted of 33 women and 7 men. Dance programme included warm-up, dance

Tablo-I

Baseline physical characteristics of both groups

	Valse group n=40	Control group n=20	P*
Age (yrs)	71.7±5.8	72.3±6.4	0.708
Gender (f/m)	33/7	16/4	
Height (cm)	155.0±8.4	155.5±8.9	0.833
Weight (kg)	68.6±11.0	63.6±11.0	0.101
BMI (kg/m^2)	28.8±5.5	27.1±3.2	0.100

*Statistical analysis was performed by Student's test

and cool down periods. Dancing figures consisted of mainly primitive forms of valse movements. Fourty elderly subjects performed valse for 30-45 minutes, 5 days a week for two weeks.

The basic figures of valse were selected. First the dancing teacher teached the group to put 1 step forward, bring the other near to it, and go up on the toes then down then make a sway.

As the second figure the group stepped forward with the right foot then the left foot closed up to the right one. Then the right foot go back to the starting point and the left foot followed it (making a rectangle during this period). Woman and men danced in different classes and performed similar dance figures singular. Dance figures was performed singularly in order not to lose time for concordance and adaptation of the partners. Turning movements of the valse couldn't be achieved completely our study group.

Control group did not performed valse movements. Their assessment were repeated at the and of 2 weeks.

Emotional status of the elderly were evaluated by the positive and negative affect schedule. Affects were divided as positive and negative. Turkish version of the Schedule was applied to the groups. All of the measurements were performed both at the beginning and at the end of two weeks of dancing session [14,15].

Statistical analyses were performed using the Statistical Package for Social Sciences (SPPS) 10.0 for Windows. Analytical methods include descriptive statistics and Student's t test and Chi-squre test for comparison of differences between groups. Wilcoxon test was used to analyse changes in parameters at the pre and post treatment session. Correlations are presented as the Spearmen's correlation coefficient. Values are presented as means and standard errors of means, and differences of $p<0.05$ were taken as significant.

RESULTS

Sixty healthy elderly subjects were enrolled in the study. Mean age was 71.7±5.8 years (65-88) for the valse group and 72.3±6.4 years (65 and 94) for the control group were accepted into the study. There were 40 subjects (33 female, 7 male) in valse group with BMI (kg/m2) 28.8±5.5, a d 20 subjects (16 female, 4 male) in control group with BMI 27.1±3.2. The baseline characteristics of the valse group were very similar to those of the control group, with no statistically significant difference ($p>0.05$) (Table I).

Table II shows the findings regarding falls, sensory problems and ambulation in the valse and control groups. No statistically significant difference were observed between the groups ($p<0.05$).

Apart from measurements of keeping a half squat position all other evaluations were found to be significantly different at the end of two weeks dancing period. For balance measurements p values for sharpened Romberg eyes open, sharpened Romberg eyes closed, one legged stance test eyes open, one legged stance test eyes closed in the valse group were 0.000, 0.001, 0.003, 0.009, respectively. For one-legged stance test with eyes open, maximum balance time was 30 seconds. No significant difference was found in mean balance time between subjects who had fallen versus those who had not fallen ($p>0.05$). The one-legged stance test mean balance time decreased significantly as age increased. When compared to one leg stance test, more subjects were able to reach the maximum balance time by sharpened Romberg test (mean

Tablo-II

The comparison of ambulation, falls and sensory problems between valse and control group.

	Valse group n=40%	Control group n=20 p*	%
Hearing problem	55	65	0.581
Visual problem	77	60	0.225
Vertigo	45	35	0.581
Usage of walking aids	20	35	0.223
Falling in previous year	27	25	1.000

*Statistical analysis was performed by Chi-square test

23.4±18.7 s for sharpened Romberg, 10.3±8.1 s for one leg stance test).

The functional reach that was also included in the balance category improved significantly (p=0.000) (Table-II).

In the valse group there was statistically significant difference in walking time between base-line and at the end of second week evaluations (p=0.000). At the end of the intervention, there were no significant improvements in keeping half-squat position time of the valse group. No significant difference was observed in the parameters of the control group end of the second week (Table-III).

The positive affect scores increased significantly while the negative affect scores decreased significantly (p values were 0.000 for both) (Table-IV).

Tablo-III

Balance, strength and locomotion measurements pre and post 2-week intervention or control period.

Measures	Pre	Post	p*
Sharpened Romberg eyes open (s)			
Valse group	23.4±18.7	30.8±19.1	**0.000**
Control group	24.7±22.4	23.6±2.0	**0.936**
Sharpened Romberg eyes closed (s)			
Valse group	13.4±16.4	17.3±17.6	**0.001**
Control group	15.2±16.6	14.4±14.4	**0.739**
One-leg balance with eyes open (s)			
Valse group	10.3±8.1	12.2±6.6	**0.003**
Control group	10.2±6.2	9.4±4.6	**0.414**
One-leg balance with eyes closed (s)			
Valse group	2.9±0.9	4.1±3.8	**0.009**
Control group	2.4±1.0	2.2±0.8	**0.414**
Functional reach			
Valse group	23.9±1.3	25.0±0.9	**0.000**
Control group	24.2±1.4	23.6±1.9	**0.339**
Keeping a half squat position (s)			
Valse group	37.9±9.3	39.0±12.6	**0.771**
Control group	37.4±7.4	36.4±1.2	**0.948**
30 meters walking time (m/s)			
Valse group	1.5±0.5	1.8±0.7	**0.000**
Control group	1.4±0.5	1.4±0.6	**0.195**

*Statistical analysis was performed by Wilcoxon test

Tablo-IV

Positive and negative affect measurements pre and post 2-week intervention or control period

Measures	Pre	Post	p
Positive affects score			
Valse group	17.0±6.1	23.0±5.9	**0.000**
Control group	21.6±4.2	21.1±5.7	**0.546**
Negative affects score			
Valse group	17.6±8.0	10.4±5.3	**0.000**
Control group	15.3±9.4	15.0±8.8	**0.302**

* Statistical analysis was performed by Wilcoxon test

DISCUSSION

Aging, an integral part of living, typically is accompained by gradual but progressive physiologic changes and an increased prevalance of acute and chronic illness. Aging is associated with a higher incidence of physical impairment and functional disability [7].

Important predictors for physical impairment and functional disability are measures of mobility and physical activity, such as poor balance, muscle weakness, low level of physical activity, and poor physical performance [4]. Deterioration in motor control appears to be an important factor responsible for changes in balance in advanced age [1].

Previous research reports indicated the benefits of exercise for older people including cardiovascular fitness, increased flexibility of joint structures, increased mental achievement, improved socialization and self-concept, increased relaxation and improve quality of life [8,16]. Coordination exercise with low velocity, low impact, and a high interest level, which also provides a good training effect, is most preferred for older persons [16].

Gehlsen et al. had reported that functional fitness was lower in subjects a history of falls than in those with no history of falls [1].

Recent studies have shown that supervised exercise for the elderly should emphasize aerobic, strength, flexibility, and balance training [16].

Many interventions trained balance using static postures (standing on one foot or narrowed base of support, forward leans) and active balance activities (fast walking with rapid turns, walking backward, tandem gait, walk to the side).

Shaw et al have indicated great improvements in dynamic balance using by resistance exercise for older person [17].

Single leg (one leg) stance, Romberg, and the sharpened or tandem Romberg are often included in a static balance test battery and can be performed with eyes open or eyes closed [18].

Our results demonstrated improved static balance (one leg balance with eyes closed and open and functional reach) and functional activity after two weeks of valse programme. The subjects could stand on one leg for 10.3±8.1 seconds with their eyes open and for 2.9±0.9 seconds with their eyes closed at baseline. These results are in agreement with those of other studies [13]. There were large differences between the eyes-open and eyes-closed conditions in the static balance tests. This implies that vision is very important to the elderly to help maintain balance. The positive change in the one leg balance with eyes closed was significant, resulting from the repetetion of various stepping movements in the main part of the valse.

In normal aging, walking speed decreases both at self-selected and maximal speed. A significant association between increased postural sway and decreased walking speed has also been found [13]. The gait of older adults is slower; they have shorter stride length and spend longer time in stance with both feet on the ground [2].

Their mean walking speed may be considered to be lower than that for the elderly population in general [13]. Average gait speeds for subjects without known impairments over 60 years of age have ranged from 0.84 to 2.1 m/s for fast walking speeds [19]. In our group, the time required to walk 30 m had incre-

ased significantly.at the end of two weeks, the increase in the walking speed of the valse group was 20 %.

In our study, there was no statistically significant difference in keeping a half squat position. However, it is probable that the period that these activities were held, might be insufficient to observe strength changes.

Several studies reported the improvement in functional reach after physical therapy in older adults [1]. This change was correlated significantly with the change in mobility skills that involved 'ascending stairs, step over step', 'rising from the chair without upper extremity support', and so on. The functional reach of our valse group was improved as well.

Exercise has beneficial emotional effects across all ages and in both sexes [20]. In our study, we have achieved beter scores in evaluated tests after two weeks valse program. Our data indicated that perceived challenge in the positive affects score was characterized by high levels of positive affect in the valse group. There was statistically significant decrease in the negative affects score at the end of valse programme.

Music adds interest and positive experiences to exercise regimens and improves participation for older persons. O'Konski also found that elderly persons demonstrated significantly better adherence to exercises with music than without it [8].

Golomer found that dancers rely more on proprioception and less on visual input than nondancers. Movement and choreography in valse programme included the sagittal step and the straddling step, in which balance and locomotion /agility are needed [1].

Our data suggest that elderly people who regularly practice basic valse figures with music could show better postural stability. Even 2 weeks of valse that includes rhytmic swing and position changing movements made a significant improvement in balance, functional activity and emotional status of elderly subjects in the more challenging conditions than those who do not. Therefore, valse could be recommended as a regimen of coordination exercise to improve balance and coordination. In addition dancing movements and music may be enjoyable than other physical exercise movements for the elderly.

Further longitudinal studies are needed to assess the efficacy of valse program on physical and psychosocial aspects of the elderly.

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