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Lamia PINAR, Prof. Dr.[1]
Bilge KARA, Prof. Dr.[2]
Ömer KOZAN, Prof. Dr.[3]

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İletişim (Correspondence):

Prof. Dr. Bilge KARA
Dokuz Eylül Üniversitesi
Fizyoterapi ve Rehabilitasyon
Yüksekokulu 35340 İnciraltı - İzmir - TÜRKİYE
Tel: 0232 277 50 30
e-posta: bparlaksteer@gmail.com

1 *Gazi University, Faculty of Medicine, Department of Physiology*
2 *Dokuz Eylul University, School of Physiotherapy and Rehabilitation*
3 *Dokuz Eylul University, Faculty of Medicine, Department of Cardiology*

RESEARCH ARTICLE

EFFECTS OF LONG-TERM CALISTHENICS ON PHYSICAL FITNESS AND QUALITY OF LIFE IN OLDER WOMEN

ABSTRACT

Purpose: Investigate the effects of long-term regular aerobic exercise to physical fitness and quality of life in older women.

Methods: The volunteer subjects were selected between a hundred older people who were the members of a solidarity center. Fulfilling the international criteria for 'exercising standards for the aged', forty-five female volunteers with a mean age of 68.04±5.56 years (range, 60-80 years) participated to the study. After the cardiovascular and general health care evaluation, the older women were evaluated for exercise indication. An aerobic program of submaximal-level calisthenics was designed and the older women gathered at three times a week for exercising, 40-50 min a day for 4 months under a physiotherapist's supervision. Before and after the 4-month exercise program, subjects underwent tests including a set of physical fitness and a quality of life assessment (short form-36).

Results: Four month submaximal-level aerobic calisthenics led to a significant improvement ($p<0.05$) in body composition (fat weight, waist-to-hip ratio); cardiopulmonary fitness (VO_2max); musculoskeletal fitness (vertical jumping, dynamometer test and flexibility); and motor fitness (equilibrium). Life quality of subjects improved significantly ($p<0.05$).

Discussion: Four month regular calisthenics enhanced physical fitness and parameters of quality of life such as physical functioning, bodily pain, general health perceptions, vitality, social functioning, role limitation of emotional, role limitation of physical, mental health in elderly women.

Key words: Aging; calisthenics; physical fitness; quality of life

ARAŞTIRMA MAKALESİ

YAŞLI KADINLARDA UZUN SÜRELİ KALİSTENİK EGZERSİZLERİN YAŞAM KALİTESİ VE FİZİKSEL UYGUNLUĞA ETKİSİ

ÖZET

Amaç: Uzun süreli aerobik egzersizlerin, yaşlı kadınlarda, fiziksel uygunluk ve yaşam kalitesine olan etkilerini incelemektir.

Yöntem: Gönüllü katılımcılar, bir yaşlı dayanışma merkezinin 100 üyesi arasından seçilmiştir. 'Yaşlılar için saptanmış Uluslararası, Standart Egzersiz Kriterleri'ne uygun ve yaş ortalaması 68.04±5.56 olan kırk beş kadın çalışmaya katılmıştır. Kardiyovasküler ve genel sağlık taramasından geçen yaşlılar, egzersiz indikasyonu açısından değerlendirilmiştir. Submaksimal seviyede kalisteniklerden oluşmuş bir aerobik egzersiz program hazırlanmış ve yaşlı kadınlar 4 ay boyunca, haftada 3 gün, 40-50 dakika olacak şekilde, bir fizyoterapist gözetiminde egzersize alınmıştır. Katılımcılara bu 4 aylık eğitim sürecinin başında ve sonunda fiziksel uygunluk ve yaşam kalitesini (short form-36) ölçen testler uygulanmıştır.

Sonuçlar: Dört ay süre ile uygulanan submaksimal aerobik kalistenikler, vücut kompozisyonunda (yağ ağırlığı, kalça-bel oranı); kardiyopulmoner uygunlukta (VO^2max); muskuloskeletal uygunlukta (vertikal sıçrama, dinamometre testi ve fleksibilite) ve motor uygunlukta (denge) anlamlı ($p<0.05$) iyileşmeler sağlamıştır. Yaşam kalitelerinde anlamlı düzelmeler saptanmıştır ($p<0.05$).

Tartışma: Dört ay süresince uygulanan düzenli kalistenik egzersiz, yaşlı kadınlarda fiziksel uygunluğu arttırmış; fiziksel fonksiyon, ağrı, genel sağlık algısı, canlılık, sosyal fonksiyon, emosyonel rol güçlükleri, fiziksel rol güçlükleri, mental sağlık gibi bazı yaşam kalitesi parametrelerinde iyileşmeler sağlamıştır.

Anahtar Kelimeler: Yaşlanma; kalistenikler; fiziksel uygunluk; yaşam kalitesi

INTRODUCTION

The number of people over 60 years of age is projected to double in the next 20 years; hence, reducing age-related disability is an essential public health goal. Declining physical function is associated with institutionalization, morbidity and mortality (1,2). Older adults have the highest rates of disability, functional dependence and use of healthcare resources, so effective interventions for older individuals are of special interest (3,4). Regular physical activity has many health benefits for older people, contributing to a healthy and independent lifestyle and improvements in functional capacity, quality of life, and body composition (5,6). Paterson et al suggested that increasing physical activity levels is the most important intervention to improve health in populations. For older adults, extending life is an important factor, but the maintenance of functional independence is also of high importance, both to maintain quality of life and to manage health resources (7). Various modalities of exercise have been demonstrated to improve physical function and quality of life in older adults. These exercises consist of strengthening of muscles, improving cardiovascular capacities, training of flexibility and equilibrium. Exercises can also minimize the physiological effects of an otherwise sedentary lifestyle by reducing the development and progression of chronic disease and disabling conditions (1,8-10).

The exercise models that are most suitable for the elderly are walking, running, swimming, cycling, aquatic type exercise, weightlifting and yoga-type aerobic and dynamic exercises (11). Calisthenics are aerobic exercises and are suitable for older people. They are rhythmic, smooth, enjoyable exercises that are easy to perform alone or in group format, and can be modified according to subjects' fitness levels (12). Exercise program must improve physical activity in health care and cause to change the life style of subjects. To set up physiological adaptations, the exercises must be applied regularly at least for 3 days a week for 12 weeks. After 3 months, exercise is called as long-term exercises (13). Although calisthenics are claimed to be as suitable exercises for older people, there are not much knowledge for the effects of these exercises on physical activities and quality of life of elderly.

Our aim in this study was to assess whether a 12-week calisthenics increases the endurance, muscular strength and balance and helps to improve health-related quality of life (HRQL) of elderly women.

Methods

Subjects

About 100 women and men attending a solidarity center for the aged for daily activities were willing to participate to the exercise training. First, the subjects were chosen from both genders, although the number of men was lower than that of the women. After clinical examinations in Cardiology Department and exercise tests, only 48 women and men out of 100 subjects met the physical and mental health conditions mentioned below (fig1); therefore, only women subjects were enrolled in this program to provide standardization. We followed internationally agreed criteria for the selection of older subjects for exercise studies designed both for safety and to define degrees of freedom from diseases that might affect the exercise performance (14). According to these criteria; subjects who had any form of acute cardiovascular, pulmonary, cerebrovascular, metabolic, psychotic, rheumatic or infectious illness, severe obesity, systemic diseases such as rheumatoid arthritis, severe osteoarthritis; bone fracture or history of joint surgery or high systolic blood pressure (>200 mmHg) or high diastolic blood pressure (>100 mmHg) were excluded from the study.

As a result, 45 volunteered elderly women aged between 60-80 years participated to the study.

Each subject enrolled in the study was informed about the purpose of the study, and gave a written informed consent. The study was approved by the Dokuz Eylul University, Faculty of Medicine Ethics Committee.

Study population and design

A standardized 4-month calisthenic group exercise program was designed for the elderly women. The participants' body composition, musculoskeletal fitness, motor fitness and quality of life were assessed during a week before the initiation of the exercise program and during a week following the 3 months program.

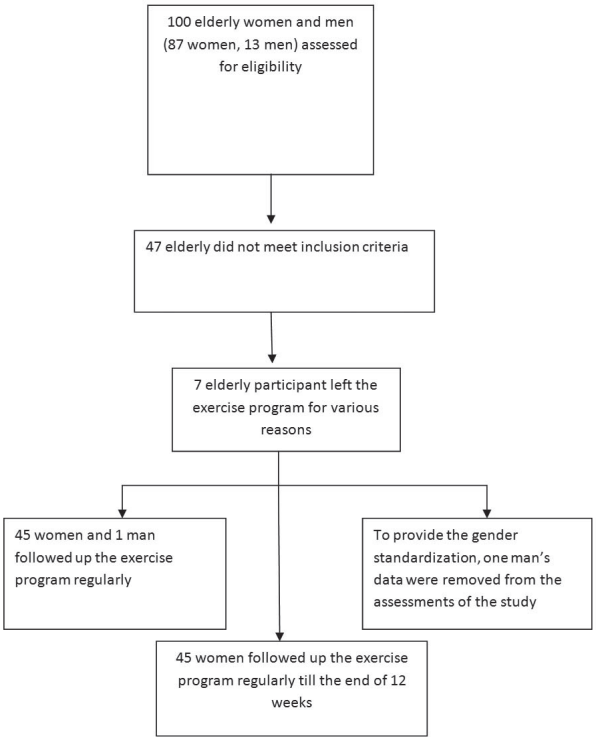

Figure 1. The Flow of Participants Through Each Stage of the Study

Calisthenics

Calisthenics are consists of exercises aiming to improve the muscle and cardiovascular endurance (15). The intensity of the calisthenics depends on the numbers of sets and repetitions, and on the length of resting periods. In the exercise program, a training session began at a low level of intensity and was gradually increased to the training zone; that is, the state where target heart rate was reached and sustained. Each person's target heart rate was estimated by subtracting one's chronological age from 220 and multiplying this value by 60-70%. This provides a safe target heart rate for exercise (16). In our study, each subject followed her own initial and target heart rate during the warming exercise and tried to stabilize her heart rate in target heart rate. The exercise program was applied as 40-50 min in a day, three days a week, for 3 months. To prevent injury, each workout contained warm-up and cool down phases at the beginning and at the end of trial, for 5 to 10 minutes. After warm-up, the exercise program consisted of spine lateral flexion, spine twisting, neck rotation, neck flexion and extension, trunk flexion and extension, trunk lateral flexion and arm circles. Then, the subjects performed the strengthening exercises including sit-ups/crunches and push-ups. Sit-up exercise was started with the back on the floor, knees bent, bottoms of feet against the floor. The shoulders were lifted off the floor by tightening abdominal muscles bringing the chest closer to the knees to strengthen the abdominal muscles. Push-up exercise was performed with face down on floor, keeping the back straight, palms tight on the back. Then, the head and shoulders were raised off the floor. This movement aims to strengthen the back extensor muscles. Each model of the exercises was repeated about ten times. When there was lack of continuity for several excuses, women were encouraged to make up the program in another day of that week.

INTERVENTIONS

Assessment of body composition

In terms of body composition, body mass index (BMI), skinfold thickness, body fat ratio, fat weight, fat-free mass, and waist-to-hip ratio were evaluated. BMI was calculated as body weight in kilograms divided by the square of height in meters (kg/m^2). Skinfold thickness was measured using calipers (Croswell, Crymych, Dyfed SA41 3UF.U.K.) and values for the biceps, triceps, subscapular area, abdominal area, suprailiac region, and thigh were noted. Three measurements were carried out at each site and averaged. Assessments of skinfold were done by the formula below (17-19).

Body fat ratio Assessment: J-P (Jackson-Pollock) Method

•For female (sum of the three areas)

triceps + suprailiac + thigh = sum of skinfolds (ST)

Body density = 1.0994921 - (0.0009929 x ST) + (0.0000023 x ST2) - (0.0001392 x age)

% Body Fat = (495 /Body density) - 450

Body fat ratio was expressed as the proportion of fat relative to total body weight. It was assessed using the skinfold values as described above (20). Fat weight was calculated using the following equation: Total Body Weight [lb] × Body Fat Ratio ÷ 100 (1 pound [lb]= 0.454 kg). Then, the fat-free mass was calculated by subtracting the fat weight

from the total body weight. Waist-to-hip ratio was calculated by dividing the circumference of waist just above the belly button, by the circumference of the hip at the widest part of the buttocks.

Evaluation of the VO^2 max for aerobic capacity

VO^2 max as the measure of aerobic capacity or fitness was evaluated at baseline before the initiation of the exercise program and following the 4-month training session. We used 6-minute walk (6MWT) test in order to predict peak oxygen uptake simply. This test is used both for healthy adults and older people. We tested subjects in a 30-m length corridor with vinyl flooring in a warm (22-24°C) environment. The subjects were asked to walk as fast as she could, up and down the course, in a 6-min period. Systolic and diastolic blood pressure measurements were performed daily just before the group exercise session and after the recovery period in relaxed and sitting position. Following formula was used for the calculation of VO^2 max (21).

VO^2 max = (0.02 × D [m] - 0.191) × (Age [yrs] - 0.07) × (W [kg] + 0.09) × (H [cm] + 0.26) × (RPP [×10-3] + 2.45)

D is distance walked, W is body weight, H is height, and RPP is the "rate pressure product" (calculated as heart rate × systolic blood pressure/1000).

The participants also noted their perception of the exercise intensity before and after the program using the Borg scale (recording of perceived exertion), with higher values indicating 20 points and lower values indicating 6 points (22).

Assessment of musculoskeletal fitness

Musculoskeletal fitness involving endurance, muscular strength, and flexibility was tested by collecting data for vertical jumping ability, muscle strength, and flexibility, respectively (23).

Vertical jumping ability test

The subject was asked to stand with her legs straight and body slightly separated in front of a wall with knees unlocked. The subject jumped three times as high as possible and the distance she jumped was measured. Vertical jumping test is one parameter of Eurofit test battery. The mean jumping distance was calculated (23,24).

Jump and reach height = Take off Height + Flight Height + Reach Height – Loss Height

These tests were performed using a back and leg strength dynamometer (Takai Back and Leg Dynamometer, Japan). Back strength was recorded with the subject in upright position with legs extended and the leg strength was measured with the legs flexed (25).

Flexibility tests

The extent of lateral flexion of the thoracic and lumbar spine was measured. The subject was asked to stand upright against a wall with feet placed on two parallel lines that were 15 cm apart and oriented at right angles to the wall. The body was positioned with the scapulae and buttocks contacting the wall and the heels slightly away from the wall, so that a comfortable upright stance could be maintained. The subject was asked to hold her arms in relaxed natural position straight down beside the body. The position of the middle finger on each lateral thigh area was marked with a horizontal line. Then, the subject was instructed to flex as far as possible to each side and the position of the middle finger at maximum flexion was marked. The distance between the markings on each thigh was then recorded (26). The lesser distance between the top of the middle finger and the floor shows increase of the flexibility.

Assessment of motor fitness

We assessed body balance by testing each subject's ability to balance on one leg on a flat firm surface with eyes closed and eyes open. For each subject, we recorded three attempts that were needed to achieve 30 continuous seconds of balance on dominant leg with eyes open, and then with eyes closed. After measurement of the length of time the subjects stayed on one leg with eyes open and eyes closed with a chronometer, the mean of three attempts succeeded by the subject was calculated (23,27).

Assessment of quality of life

The short Form 36 Health Survey (SF-36) was used to measure HRQOL and perceived changes in health status before and after the exercise program. The SF-36 questionnaire covers eight scales: physical functioning, role limitation because

of physical health, bodily pain, general health perceptions, vitality, social functioning, role limitation because of emotional health problems, and mental health. These scales were scored from 0 (poorest health) to 100 (optimal health) (28).

Statistical analysis

Descriptive statistics including frequency distributions of categorical variables and means and standard deviations for continuous variables. Statistical analyses were performed using the software program SPSS for Windows version 15.0. Parametric comparisons between the measurements for body composition, aerobic fitness, musculoskeletal fitness, motor fitness and the parameters of quality of life were made using paired-samples t test. P values <0.05 were considered to indicate statistical significance. Pre-and post-exercise mean values were all calculated in 95% confidence interval (CI). Results were analyzed using both p and CI values. Even paired sample t-test results were significant, results with close CI intervals have been considered as statistically non-significant.

Results

Data indicating physical fitness including four main parameters as body composition; aerobic fitness; musculoskeletal fitness and motor fitness are shown in Tables 1, 2, 3 and 4.

Evaluation of body composition

The mean values for body composition parameters such as body fat ratio, fat weight, fat-free body weight and skin-fold values were significantly lower after exercise compared to pre-exercise values (Table1). Although the difference between BMI were significant after two-tailed paired sample t-test, it has been considered as non-significant since 95% CI limits were overlap to each other (95% CI limits, pre-exercise=27.84-25.98, 95% CI limits, post-exercise=27.13-25.49). Pre-and post-exercise waist-to-hip ratio were statistically insignificant (p>0.05).

Evaluation of aerobic fitness

A summary of the aerobic fitness parameters have been shown in Table-2. The mean distances recorded for the 6-min walking test between pre- and post-exercise were not significantly different (Table 2). Pre-and post-exercise VO^2 max and Borg Scale data were significantly different in 95 % CI. VO^2 max showed a significant increase after the exercise program (p<0.001) Comparing before and after 3 month exercise program, there was a significant decrease in Borg scale points (p<0.05).

Evaluation of musculoskeletal and motor fitness

The changes in the parameters showing musculoskeletal and motor fitness which are the components of the physical fitness are demonstrated in

Table 1. Parameters of body composition and skinfold of the study population pre-and-post-exercise program

		Pre-exercise	Post-exercise	Standard deviation of the difference	p value
BODY COMPOSITION	BMI (kg/m^2)	26.96±3.00	26.31±2.82	-0.65±0.59	0.001
	Body fat ratio (%)	35.76±2.89	35.12±3.21	-0,64±1.73	0.016
	Fat weight (kg)	24.03±4.00	23.05±3.56	-0.97±1.63	0.001
	Fat-free body weight (kg)	42.10±5.38	41.46±5.18	0,001±0.00	0.001
	Waist-to-hip ratio	0.75±0.05	0.74±0.12	1.71±2.12	0.508
SKIN FOLD	Biceps (mm)	11.97±3.04	11.57±3.08	-0.40±1.25	0.039
	Triceps (mm)	15.22±3.39	14.70±3.44	-0.52±0.90	0.001
	Subscapular (mm)	18.78±5.46	17.66±4.56	-1.12±2.13	0.001
	Suprailiac (mm)	17.92±4.97	17.28±4.64	-0.63±2.06	0.046
	Abdominal (mm)	25.75±5.35	24.43±5.18	-1.32±1.98	0.001
	Thigh (mm)	21.84±5.61	20.35±5.23	20.35±5.23	0.001

Table 2. Parameters of aerobic fitness of the study population pre-and-post-exercise program

		Pre-exercise	Post-exercise	Standard deviation of the difference	p value
AEROBIC FITNESS	Walking distance (m)	508.20±81.99	528.22±110.97	31.13±85.16	0.220
	SBP (mmHg)	164.77±27.00	151.55±25.93	-13.22±28.26	0.003
	DBP (mmHg)	90.22±15.22	83.11±7.33	-7.11±11.40	0.001
	Heart rate (pulse/min)	84.00±11.73	76.88±11.19	-7.11±15.64	0.004
	Respiration rate (breath/min)	24.84±3.82	23.28±2.45	1.55±4.10	0.015
	VO2max (ml/kg/min)	12.24±2.28	13.96±3.09	1.71±2.12	0.001
	Borg scale score	14.20±1.05	11.40±0.68	-2.80±1.03	0.001

Data are given as mean±SD. BMI: Body mass index; SBP: Systolic blood pressure; DBP: Diastolic blood pressure

Table 3. There was a significant improvement in vertical jump, back muscle strength, leg muscle strength, flexibility (right lateral flexion, left lateral flexion) after the exercise program ($p<0.05$). Pre- and post-exercise comparisons for musculoskeletal and motor fitness parameters were done using paired sample T test and results have been found as statistically significant in 95 % CI.

Evaluation of life quality

As given in Table 4, post-exercise scores; role limitations due to emotional problems (Role Emotional) ($p=0.002$) physical function, role limitation due to physical problems, bodily pain, general health, vitality, social activity, and general mental health demonstrated significant improvement ($p=0.001$). According to the scale of HRQOL, the difference between pre- and post-exercise values was significantly different in 95% CI ($p<0.05$).

DISCUSSION

Aging is associated with declines in physical and mental functioning that may be altered by exercise. In addition to the well-documented health benefits of regular exercise, this type of activity is also known to improve mood, and reduce depression and anxiety (29). In our study, our elderly women showed statistically significant increase in much of the parameters of body composition related with their physical fitness. Their cardiovascular, motor

Table 3. Parameters of musculoskeletal and motor fitness of the study population pre-and-post-exercise program

			Pre-exercise	Post-exercise	Standard deviation of the difference	p value
MUSCULOSKELETAL FITNESS	Vertical jump test (cm)		13.64±4.34	18.34±3.63	4.70±3.07	0.001
	Dynamometer tests	Back (kg)	41.12±15.18	50.06±16.03	8.94±14.60	0.001
		Leg (kg)	43.12±14.66	54.60±20.03	11.47±18.76	0.001
	Flexibility tests	Right lateral flexion (cm)	47.53±7.30	42.92±5.14	-4.61±7.15	0.001
		Left lateral flexion (cm)	46.54±4.74	42.61±5.08	-3.93±3.99	0.001
MOTOR FITNESS	Eyes open (s)		18.30±10.75	35.28±14.61	16.98±9.96	0.001
	Eyes closed (s)		3.50±2.33	12.35±3.41	8.85±2.94	0.001

Table 4. Quality of life as indicated by SF-36 results pre-and post-exercise program

	Pre-exercise	Post-exercise	Standard deviation of the difference	p value
Physical functioning	48.33±19.56	62.55±20.90	14.22±12.38	0.001
Role physical	53.44±32.76	70.88±31.28	-17.44±29.39	0.001
Bodily pain	52.91±22.14	62.84±18.88	-9.93±14.48	0.001
General health	49.48±14.11	68.40±15.39	18.91±14.51	0.001
Role emotional	47.26±23.98	61.97±27.50	-14.71±29.55	0.002
Vitality	52.00±19.11	66.93±16.12	14.93±19.09	0.001
Social functioning	58.60±16.95	77.28±18.36	18.68±14.43	0.001
Mental health	55.91±13.68	68.33±12.86	12.42±10.12	0.001

Data are listed as mean±SD

and musculoskeletal fitness improved significantly after 4-month calisthenics. Calisthenics, asone of the aerobic submaximal exercise are considered an appropriate, effective, entertaining and safe exercise model for older people. Aerobic exercise is necessary to ensure cardiovascular health. Even low-level activity decreases deposition of visceral adipose tissue and reduces blood glucose and lipid levels (1,30,31). In our study, we found that the older women's skinfold value changed significantly at all sites tested. Participants lost 2 % of their body weight in average during the 4-month exercise period. However because the values were evaluated in the 95 % confidence interval, we couldn't find significant difference in their BMI after 4-month training. There was no significant difference in waist-hip ratios of the women after 4-month exercise program. On the other hand, the assessments of body fat ratio, fat weight and fat free body weight of elderly women decreased significantly after 4-month exercise period. In our study, only long-term exercise training was applied to elderly women. We didn't recommend any program related with weight control. We evaluated that, the period of exercise for 4-month was rather short for significant weight loss.

The most important findings of our study were that regular aerobic activity increased the women's exercise capacity. It is shown that in elderly, a peak aerobic capacity for walking is closely linked with decreasing indices of lifestyle-related diseases (32). The most fundamental measurement of fitness is VO^2 max, which represents the individual's maximum capacity to transport and use oxygen during physical activity (33). Some investigations have demonstrated that VO^2 max declines with age at a rate of approximately 1% per year. It was postulated that part of the decline associated with aging might be due to sedentary life-style rather than aging itself. Following the 4-month calisthenics, we found that our subjects had increased their aerobic capacity significantly. We observed no remarkable change in the distance the women were able to walk in 6 min, possibly because of existing walking habits; however, drops in the other parameters that comprise the formula resulted in significantly increased VO^2 max at the end of the training period. These results are in line with those of Pierce et al. (34) who noted a 16 % increase in their elderly subjects' with mild hypertension in VO^2 max after a 4-month exercise program.

The exercises also had positive effects on joint flexibility, muscle strength and balance. Exercise programs for older adults can delay age-induced impairment of personal mobility that is needed to perform routine activities (35). It is suggested that exercising elderly perceived control and mastery of a given activity, in conjunction with overall satisfaction and enjoyment of that activity. It has also been stated that self-esteem and a generally positive outlook provides a compliment effect on life satisfaction (36-39).

It was reported that a 2-month program of resistance training once a week for elderly men and women led to reduced anxiety and greater muscle

strength (40). As noted above, physical activities that improve muscle strength, endurance, and flexibility in older people also enhance their ability to perform the tasks of daily living (41). Similarly in our study, 4-months calisthenics improved muscle strength and the flexibility of the bodies in elderly women (Table 3).

Balance is another important factor in providing mobility (37). Furthermore, deficits in postural control and muscle strength represents important risk factors to fall (38) and this fear prevents older people to be independent in the basic activities of daily living (39). In our study, an improvement in balance was observed by the end of the training program in elderly women.

The increase in daily activities, also can affect the quality of life in older people. Measures of quality of life have been increasing in popularity because they have been shown to be positively associated with objective health outcomes (e.g., body mass index and number of chronic conditions) and mortality (42,43). For example, it was observed that men who reported poor health had an eightfold increase in total mortality as compared with those reporting excellent health. Nowadays, researchers intend to better understand which factors are determinant in perception of quality of life for elderly people. Personal habits such as smoking and sedentarism, seems to play a major role in the etiology of the diseases of civilization. On the other hand, it is believed that promotion of physical activity is a viable pathway of public health intervention, which includes increasing or maintaining quality of life. In accordance with this idea, Lorraine et al. have suggested that physical activity is associated with self-rated health, one indicator of quality of life (44). In support of these results, it was previously demonstrated a positive association between physical activity and self reported quality of life among older adults. Over a 5-year period, Leinonen et al. observed that decreases in physical activity levels were related with decline in self-assessment of health (45). Rejeski and Mihalko, in a review of physical activity and quality of life in older adults, concluded that physical activity could lead to improved perception of physical function and mental health in older adults (12). According to these authors, physical activity may provide a global indicator of health and functioning through which deterioration in health and functional performance can be perceived and reflected in everyday life. Although some studies showed associations between physical activity and perceived quality of life; there is not much study about the relationships between fitness and perceived quality of life. Also there is not much researches about the effects of calisthenics applied to elderly people. Our study revealed that, after 4-month calisthenics, all parameters of quality of life of elderly woman improved significantly (Table 4).

The increased self-esteem and positive feelings that came from the exercise program seemed to help the participants engage more effectively in their daily activities. Because integration to a social networks independently effect mood and well-being and prevent their feelings of loneliness in the elderly.

As a conclusion, simple performed regular aerobic exercise in the form of calisthenics has shown a positive impact on physical fitness and quality of life of our older women. They also declared their well-being feelings in all aspects of daily activities after exercise program.

The Limitations of the Study

This study did not have a control group consisting of elderly people. We evaluated the bodily and emotionally fitness only in older women, not in older men, because of the least number of the men fulfilled the inclusion criteria. Exercise periods longer than this 4-month could be more effective. We need more researches related with calisthenics applied to elderly people with wide contributions and wide parameters.

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