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Assessment of Physical Fitness Levels of Elderly Turkish Males over 60 Years

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A B S T R A C T

The purpose of this study was to assess the physical fitness level of independent-living Turkish males aged from 60 to > 80 years. 849 healthy and physically independent male adults participated in this study voluntarily. Participants divided into five age groups as 60–64, 65–69, 70–74, 75–79 and >80. SFT protocol that included six items (chair stand test, arm curl test, 2 min step test, chair sit and reach test, back scratch test, 8 foot up and go test), was administered to each participant to assess their physical fitness level. Findings from this study indicated that physical fitness level of participants decreased through the aging process. Almost in all test items of SFT, 60–64 age group had better scores than that of the other age groups.

Key words: *senior fitness test, physical fitness, elderly people*

Introduction

Old age can be characterized as a continuation of life with decreasing capacities for adaptation. Chronological and biological age may be inconsistent and the existence of age related changes may vary between organ systems in the same individual. So that age is not an illness, it is just decreasing of systems' capacities through aging process[1,2]. Although physical fitness traditionally has been thought of more as the concern of young people than that of older people, this attitude is changing rapidly. Normal aging in the absence of diseases is remarkably benign process. In other words, our body can remain healthy as we age. Although our organs may gradually lose some functions, we may not even notice these changes expect during periods of great exertion or stress[3]. Functional decreases in aging process characterized by decreases in aerobic, anaerobic capacities, strength, flexibility, agility ect.[4–7]. As average life expectancy is increasing, we realize that our ability to enjoy a mobile, active and independent lifestyle well into the later years will depend to a large degree on how well we maintain our personal fitness level. Whereas healthy promotion and avoidance of some diseases depends on life style (heart disease, obesity, diabetes) are the major goals of most youth fitness tests for older adults whose chronic health status generally has already been established, the focus tends to shift from disease, prevention to functional mobility – the ability to continue to do the things one wants and needs to do, to stay strong, active and independent[8]. Most of us would agree that quality of life in later years depends to a large degree on being able to do things we want to do without pain for as long as possible. As we are living longer, it is becoming increasingly important to pay attention to our physical condition. Lack of appropriate levels of physical activity can lead to declines in physical and physiological functions that may effect the ability of people to perform functional activities. This potential impairment is important to all populations but particularly so for older adults[9]. Ironically the numerous technological advances in recent years have had mixed benefits for people relative to quality of life. Whereas medical technology has contributed to a longer life expectancy, computer / automation technology is resulting in increasingly sedentary lifestyle and an increased risk for chronic health and mobility problems[10].

The Senior Fitness Test (SFT) described as a battery of test items that measures the physical capacity of older adults to perform normal everyday activities. The test is

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considered a functional fitness test as opposed to a health-related fitness test because of its purpose to assessing the physical characteristics needed for functional mobility in later years. The test is based on a functional fitness framework which points out that being able to perform everyday activities (e.g. personal care, shopping, housework) requires the ability to perform functional movement, such as walking, stair climbing and standing up and these that these functional movements, in turn, are dependent on having sufficient physiological reserve (i.e. strength, endurance, flexibility, balance). One unique feature of Senior Fitness Test is that it measures physiological parameters using functional movement tasks, such as standing, bending, lifting, reaching and walking. Functional fitness performance is having the physiological capacity to perform normal everyday activities safely and independently without undue fatigue. Reason why it is important to assess the functional fitness of older adults include the following; 1- Identification of at-risk participants 2- Program planning and evaluation 3- Goal setting and motivation of participants[9,11]. Also functional ability is an indicator of physical function and reflects the level of an adult's functioning in activities of daily living; instrumental activities of daily living and mobility[12,13]. As we age, we want to have strength, endurance, flexibility and mobility to remain active and independent so that we can take care of our own personnel and household needs; do our own shopping or participate in active social, recreational and sport activities, if that is our choice, The SFT is for use by professional in the fields of health, fitness and aging who need an economical easy-to-use assessment tool for measuring older adult fitness in the clinical or community setting. The test was designed to assess independent-living older adults ages 60 to 90 across a wide range of ability levels from the borderline frail to the highly fit[8]. Reliability and validity support for the SFT is very acceptable. Test-retest reliability estimates exceeded. 80 for all test for older males. Criterion-related validity coefficients exceeded. 70 for five of all seven performance tests demonstrated construct validity. Thus, the battery has been established with content validity and feasibility as guidelines. Further research has established sufficient reliability and validity for the battery[8,14].

The purpose of this study was to assess the physical fitness level of independent living male adults over 60 years. Also determination of the normative for population of healthy elderly males in Turkey is an important task. This would contribute to a more efficacious and more reliable application of the Senior Fitness Test in our country.

Methods

Participants

Total 849 male healthy and physically independent adults between age of 60 and >80 participated in this study voluntarily from 9 different cities of all 7 regions of Turkey. All the necessary and ethical permissions were taken from the authorities and subjects were recruited through announcements on the local media and some posters were hanged in public places in each city The subjects have not participated in proper physical activity, some of them have walked in park, done housework and done simple physical exercises by themselves. Participants divided into five age categories as 60–64 (n= 203), 65–69 (n=278), 70–74 (n= 210), 75–79 (n=107) and > 80 (n=51). Descriptive information of the participants is provided in Table 1. The SFT was applied to participants to determine their physical fitness level. All participants completed all test, any participants who could not complete or perform any test properly, excluded from study.

Measurements

Subjective Health

Participants were asked whether or not they suffered from an illness that may prevent to participate and perform SFT protocol like hypertension, any heart operation, some physical limitations etc. (for blood pressure >100 mmHg diastolic and >180 mmHg systolic, for resting heart rate >100 beat / min. determined as critical level to participate in test protocol).

Body Mass Index

Body Mass Index (BMI; weight divided by height squared kg/m^2) was calculated from measures of height and weight scores[14]. To determine the body mass index, body weight taken by digital scale (Master, TR) and height was measured by manual tape scale (Tera, CHN).

TABLE 1
PARTICIPANTS' CHARACTERISTICS

Age Group	n	Age (yrs)	Height (cm)	Weight (kg)	BMI (kg/m^2)
60–64	203	61.5±1.4	170.3±5.5	79.1±10.8	27.1±3.3
65–69	278	66.5±1.3	169.9±6.2	77.4±11.1	26.7±3.4
70–74	210	71.6±1.4	168.5±6.8	74.9±9.8	26.3±3.3
75–79	107	76.3±1.4	168.1±6.4	74.6±12.7	26.4±4.3
>80	51	82.3±2.8	166.4±7.9	72.4±8.5	26.1±2.7
Total	849	68.8±6.1	169.2±6.5	76.5±11.0	26.7±3.5

Procedures

SFT protocol included 6 separated test items; Chair stand test, arm curl test, 2 minutes step test, chair sit and reach test, back scratch test, 8 foot up and go test were administered to each participant following the Senior Fitness Test (SFT) Manual [8].

Before the SFT procedure begins participants engaged in five to eight minutes of warm – up stretching activities. It was not really matter what specific activities were used during warm – up as long as they involved the large muscle groups and were not too strenuous. Activities that involved marching in place swinging the arms and up and back and side to side walking steps were used to warm – up the muscles. After warm – up some simple stretches were done, paying special attention to the areas that will be stretched during tests, especially lower – body (hamstring) muscle and the upper – body (shoulder) area. During testing an assistant was present to give instructions and to make corrections, before each test item was explained demonstrated by him. Before each testing, participant had practice one or two times to ensure proper form. Also to avoid some medical complications and injuries that might be occurred during tests a doctor and a nurse with necessary equipments were ready.

Statistical method

Statistical analysis of the data gathered from study was done by using SPSS 11.0 for windows program. Initially, means and standard deviations were calculated for all of the data. The statistical significance of the data was assessed by the one-way analysis of variance (ANOVA) and as post hoc comparison Tukey test was used.

Results

At the end of the statistical analysis mean and SD of the participants were given Table 2. Our results indicated that the analysed parameters are consistently getting worse in all age groups as age increases. Statistical results indicated that generally there was a good significant difference throughout the age groups, except in some minorities which were given below. Although chair and stand test scores were significantly different ($f=60.69$), $p<0.01$, difference among from 60–64 and 65–69, 75–79 and >80 age groups were not significant. Arm curl test scores were significantly different in all age groups $f=72.03$ except 70–74 and 75–79 age groups. Comparison of two min. test scores indicated that however there were no significant differences between 75–79 and >80 ($p>0.05$), there were significant differences among other age groups ($f=73.27$). Chair sit and reach test scores were significantly different in whole test population $f=11.38$, but 70–74 age group was not significantly different than 75–79. Back scratch test values were significantly different ($f=12.33$) except 60–64 and 65–69 age groups. There were no significant differences between 8 foot up and go test scores of 60–64 and 65–69, however the other age groups were significantly different ($f=113.73$). Lastly BMI scores were not significantly different in all age groups ($f=1.80$).

Discussion and Conclusion

In Turkish society activity level of people decreases through the aging process. The main reason of that as a cultural behaviour, young people respect the elders and they show that by serving them at home or outside, for example they serve their meals to their room or table, they bring water or another needs while they are watching TV or doing another thing, carry their belongings, supply a car for even short travel, not permit them to do their personal everyday activities. These behaviours push the elders into inactive life. Actually these cultural habits are not beneficial to them. The SFT was designed to assess physical performance in older adults across a wide range of groups and ability level.

By this study we aimed to determine the physical fitness level of independent-living adults aged between 60 – >80 years. The SFT protocol has 6 items that assess physical fitness levels of adults related with daily activities such as climbing stairs, walking, getting out of a chair, tub or car, lifting and carrying things, combing one's hair, putting on over head garments, reaching for a seatbelt etc.

TABLE 2
SFT SCORES OF PARTICIPANTS

Test Items	Age Groups (yrs)					
	60–64 (a)	65–69 (b)	70–74 (c)	75–79 (d)	>80 (e)	Total
Chair Stand Test (# of stands)	16.1±2.9^{c,d,e}	15.5±2.8^{c,d,e}	13.5±2.7^{a,b,d,e}	12.4±2.9^{a,b,c}	11.2±3.3^{a,b,c}	14.5±3.2
Arm Curl Test (# of reps)	17.9±2.7^{b,c,d,e}	17.2±2.3^{a,c,d,e}	15.1±2.8^{a,b,e}	14.4±2.6^{a,b,e}	13.1±3.1^{a,b,c,d}	16.2±3.1
2 min. Step Test (# of reps)	76.9±16.2^{b,c,d,e}	71.3±15.1^{a,c,d,e}	62.5±13.1^{a,b,d,e}	53.6±16.1^{a,b,c}	47.7±16.3^{a,b,c}	66.8±17.5
Chair Sit and Reach Test (cm)	–2.0±7.2^{b,c,d,e}	–3.8±7.2$^{a.c.d.e}$	–6.1±8.9^{a,b,e}	–6.8±8.3^{a,b,e}	–8.6±10.4^{a,b,c,d}	–4.6±8.8
Back Scratch Test (cm)	–8.2±8.9^{c,d,e}	–7.9±9.5^{c,d,e}	–10.6±9.6^{a,b,d,e}	–12.6±10.0^{a,b,c,e}	–15.9±9.4^{a,b,c,d}	–9.7±9.7
8 Foot Up and Go Test (sec)	4.7±0.8^{c,d,e}	5.1±0.9^{c,d,e}	6.0±1.2^{a,b,d,e}	6.6±1.8^{a,b,c,e}	7.8±1.8^{a,b,c,d}	5.6±1.4

Significant differences between groups, $p<0.01$. a: 60–64 age group; b: 65–69 age group; c: 70–74 age group; d: 75–79 age group; e: >80 age group

It has been reported that BMI scores were not significantly different between age groups in males. These values showed some similarities with the previous studies[15–17]. BMI might be as part of the SFT because of the role it plays in maintaining functional mobility. Studies indicated that people who have overweight (typically due to excess body fat) are more likely to be disabled in later years than are people with normal body mass ratings. Similarly researchers are finding that people with low Bemis are at increased risk for health and mobility problems, possibly due to an associated loss in muscle mass and / or bone tissue[17–19].

Lower body strength of participants was assessed by chair stand test; it decreased with aging in males. Lower body strength is the main predictor of balance, physical performance and defeats in mobility[20]. Although different scores were gathered in different leg muscles, results indicated that lower body strength decreased 30–50% between 50–70 years[22–24]. Researchers reported that physical exercise program even old ages caused significant increasing in muscle strength, walking speed, balance, activity level, everyday activities and ability to climb stairs[25–27]. Chair stand performance also has been found to be effective in detecting normal age-related declines[28], in discriminating fallers and non fallers[29] and in detecting the effects of physical training in older adults[30]. Brian et al. reported that chair stand test score of 50 years old males as 11.9+3.68 before the low impact exercise program and 14.7+5.15 after the same program and 12.4+3.93 before the Tai Chi training program and 13.8+4.47 after the Tai Chi training program[31]. Participating in multiple-component physical activity programs from 5 to 10 months significantly increased upper and lower body strength of older adults[32]. Studies also showed that chair stand performance is associated with risk of falling[33,34]. Chair stand test scores of participants showed some similarities with the previously researches[1,8].

Arm curl test was used to assess upper-body strength needed for performing household and other activities involving lifting and carrying things such as groceries, suitcases and grandchildren etc. According to statistical analysis arm curl scores of participants were significantly different ($p<0.01$), but the differences between 70–74 and 75–79 age groups were not significant. Rikli and Jones[8] reported the arm curl scores of males and females with high physical fitness level as 18.0+4.9 for males and 15.7+4.6 for females. Ayceman[1] also found, the arm curl scores of males aged 60–73 as 17.3+1.7 before the training program and 22.8+3.6 after training program. Tomoko et al. reported that home based well rounded exercise program improved the arm curl scores of elderly adults aged 62–68 years, increment was from 18.8+3.4 to 22.2+3.9[35]. Gul et al. indicated that at the end of the strength and endurance training program arm cur values of the groups reported as 15.3+1.5 in strength exercise group and 12.3+1.0 in endurance group, consequently they claimed that there were no differences in fitness tests between strength and endurance training groups[12]. Also Tracy et al. indicated that older men appear to have a greater capacity for absolute strength and muscle mass gain than older women[36]. These results are in agreement with present study.

2 min. step test is an alternative method to assess aerobic endurance in elderly people. The scores of participants in present study supported the fact that is claimed by experts, aerobic endurance gradually decreases through aging and this decrement is higher in males than that of females[37–40]. Brian et al. reported that 2 min. step test score of 50 years old males as 70.1+32.2 before the low impact exercise program and 102.9+27.1 after the same program and 67.7+30.2 before the Tai Chi training program and 91.2+28.5 after the Tai Chi training program[31].

Flexibility is important for maintaining good posture and reducing the risk of injuries and back problems. It is also critical for task of daily living such as tying shoes, kneeling down to pick up objects from the floor, putting on overhead garments and combing hair. Lower and upper body flexibility of participants were tested by chair sit and reach test and back scratch test. Test scores of this study lower than the study that was applied to American society, done by Rikli and Jones[8].

Balance and agility are important for a number of common mobility tasks such as walking, negotiating curbs, climbing stairs and making quick movements needed to avoid hazards in environment, to get on or off a bus in a timely manner, to cross the street before the lights turns red or to answer a phone or the door. The results of this study showed that; there was a significant difference among the age groups in all sex and the scores of participants gradually getting bad through the aging. Findings from several studies have shown that balance is best improved and risk of failing reduced, if older adults include specific balance and coordination activities in their exercise programs along with aerobic, strength and flexibility exercises[41–43]. Professionals who work with older people should be encouraged to develop individualized programs of exercise that are consistent with the needs and demeanour of individuals whom they serve[31]. Past evidence also indicated that performance on the 8 foot up and go test can discriminate among various functional categories in older adults and is responsive to changes resulting from increased level of physical activity[34,44]. Elizabeth et al. reported that although group based resistance programs improved lower body flexibility and agility/ dynamic balance and strength, home based resistance training program improved upper body flexibility and strength and no improvement were observed in walking group in old adults aged 65 to 96[7]. Studies conducted specifically on the 8 foot up and go test indicated that it is an excellent discriminator of performance changes across age groups and that it can detect expected differences between high active and low active older adults and results showed that average 8 foot up and go test scores of high active older people were considerably faster (6.0 sec.) than those of low active group (7.1 sec.)[8]. The study also conducted by Mitto et al.[45] also indicated that the 8 foot up and go test scores of physi-

cally active older people were faster (4.9 sec.) than those of sedentary people (5.7 sec.).

In conclusion, the findings from this study indicated that physical fitness level of participants decreased through the aging. Almost in all test items of SFT protocol, 60–64 age group had better scores than that of the other age groups. Previous studies also support these findings. Additionally, the SFT scores of participants were similar with sedanter adults who had low physical fitness level but lower than that of adults with high physical fitness level[1,8,15,16,26]. Lastly we should encourage the elderly people to participate exercise programs properly as much as young people to carry on healthy life and to have high physical fitness level.

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STUPNJEVI TJELESNE SPREME STARIJIH TURSKIH MUŠKARACA IZNAD 60 GODINA STAROSTI

SAŽETAK

Svrha ove studije bila je istražiti stupanj tjelesne spreme samostalnih turskih muškaraca između 60 i 80 godina starosti. U istraživanju su dobrovoljno prisustvovala 849 zdrava i tjelesno samostalna odrasla muškarca. Ispitanici su podijeljeni u pet dobnih skupina: 60–64, 65–69, 70–74, 75–79 i >80. SFT protokol, koji je uključivao šest dijelova (test sjedni-ustani, test zavrtanja rukom, test spavanja 2 min, test sjedni-dohvati, test češkanja leđa i 8 testova digni nogu i kreni), predstavljen je svakom ispitaniku kako bi se ispitala njihova tjelesna sprema. Rezultati ove studije pokazala su da se stupanj tjelesne spreme smanjuje s godinama starosti. U gotovo svim testovim SFT protokola, grupa 60-64 imala je bolje rezultate od ostalig dobnih skupina.