Original Article

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The Comparison of Physical Activity and Health Related Physical Fitness Levels Between Exercising and Non-Exercising Housewives

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Purpose: Together with increased level of physical activity health related physical fitness is also likely to increase. Therefore, regular physical exercise is an important factor to improve health and preventing chronic diseases. The aim of this study was to compare physical activity and health related physical fitness levels were compared between exercising and non-exercising housewives.
Method: A total of 45 healthy housewives [exercising (n = 22) and non-exercising (n = 23)], aged 40-60 years, were included in this study. The criteria for 'exercising' were doing aerobic type exercise at least 3 times a week for 1 hour. The demographic data of the individuals (age, depression level) were recorded. International Physical Activity Questionnaire-Short Form (IPAQ-SF) used to measure the level of physical activity, 6 Minute Walk Test (6MWT) to evaluate the aerobic capacity and Sit to Stand Test (SST) Scale to assess muscular strength and endurance and Basal Metabolic Index (BMI) to evaluate body composition. Analysis studies were performed using the SPSS 18.0 program. In order to compare the two groups Mann-Whitney U test was used. The level of p value <0.05 was accepted as statistically significant.
Results: There was not any difference between exercising and non-exercising housewives in terms of demographic characteristics. Considering the level of physical activity compared to non-exercising housewives (1.566 ± 2.582 Met-min/week) exercising housewives (2.522 ± 2.439 MET-min / week) were found to be significantly more active (p=0.003). The aerobic capacity of exercising housewives (648.18 ± 120.80 meters) was found to be significantly higher (p=0.000) than non-exercising housewives (469.04 ± 110.09 meters), but muscular strength and endurance levels of the two groups (exercising 19.13 ± 4.60 repetition / 30 sec) (non-exercising 17.82 ± 5.06 repetition / 30 sec) and BMI (exercising 24.33 ± 4.06 kg/m^2) (non-exercising 26.67 ± 4.99 kg/m^2) was not different between the two groups.
Conclusion: The housewives who are considered to be less physically active than the working women the habit of regular exercise is found to be contributed to an increase in physical activity level and cardiovascular fitness but there was not any difference in musculoskeletal fitness and body composition between exercising and non-exercising housewives. The combination of exercise types (aerobic and resistance) may be suggested to the exercising housewives to improve the components of health related physical fitness.

Keywords: Physical activity, physical fitness, exercise, housewives

Introduction

Physical activity which is defined as 'all leisure and non-leisure body movements resulting in an increased energy output from the resting condition' is one of the most important factors for improving health at all ages (1). The World Health Organization (WHO) states that insufficient physical activity is the 4th leading risk factor for mortality. According to WHO data approximately 3.2 million deaths and 32.1 million disability-adjusted life years (DALYs), representing about 2.1% of the global DALYs, each year are attributable to insufficient physical activity (2).

Regular physical activity plays an important role for the primary and secondary prevention of various chronic conditions. Physical activity is known to be of benefit over 25 chronic conditions. However, the main benefits of physical activity are lowering the risk of: early death, coronary heart disease, stroke, metabolic syndrome, high blood pressure, high blood cholesterol, Type 2 diabetes, breast and colon cancer, osteoporosis, falls and mental problems among adults (1, 3-6). Regardless of the presence of any chronic disease or disability routine physical activity can improve the health and quality of life of people (3, 4).

Contemporarily environmental factors associated with urbanization (i.e. high density traffic), passive transportation (i.e. travelling by car), inactivity during leisure time (i.e. using social media) and sedentary behavior (i.e. using elevators) are amongst the factors contributing to physical inactivity all around the world. Worldwide, 31% of adults (women 34% and men 28%) aged 15 and over are insufficiently active. In high-income countries, 41% of men and 48% of women were insufficiently physically active, as compared to 18% of men and 21% of women in low-income countries (7). It is evident that women are physically less active than men regardless the income levels of the countries. The difference between genders could be due to the lower income level of women than men, more workload at home and care-giving roles in the family and cultural expectations which may restrict the participation of women in certain forms of physical activity (8).

Routine physical activity is associated with reduction of the risk of chronic disease and premature death which could be explained by indirect (reduced abdominal adiposity and weight control) and direct (reduced systemic inflammation, improved glucose homeostasis and insulin sensitivity, decreased blood coagulation, enhanced lipid lipoprotein profiles, reduced resting blood pressure, improved coronary blood flow, enhanced cardiac function and improved endothelial function) adaptations (6, 9, 10). Physically active people who have other risk factors for cardiovascular disease may be at lower risk of premature death than people who are physically inactive with no risk factors for cardiovascular disease (11, 12).

The occupation as an important socio-economic parameter can influence cardiovascular disease risk factors due to changes in the lifestyle (13). In the study of Navadeh et al, physical activity in housewives was found to be about 9% less than that of working women which indicates more sedentary lifestyle and increased risk factors

for chronic diseases (14). As it is stated in the study of Hu et al. compared to physically active women physically inactive middle-aged women (engaging in less than 1 hour of exercise per week) experienced a 52% increase in all-cause mortality, a doubling of cardiovascular-related mortality and a 29% increase in cancer-related mortality (15). The Household Labor Force Statistics shows that there are 14.7 million housewives in Turkey which constitutes approximately 20% of whole population (16). Therefore, the health of housewives comprises an important issue for public health. Physical activity can help to improve women's health and prevent diseases in housewives.

'Physical exercise' which is a subcategory of 'physical activity' is planned, structured, repetitive, and purposive that aims to improve or maintain one or more components of physical fitness (17). Physical fitness refers to physiologic state of well-being that allows one to meet the demands of daily living (health related physical fitness) or that provides the basis for sport performance (performance related physical fitness), or both (18). In our study the 'physical activity levels' and 'health related physical fitness' involving cardiovascular fitness (aerobic capacity), musculoskeletal fitness (muscular strength and endurance) and body composition (BMI) were compared between exercising and non-exercising housewives.

Materials and Methods

A total of 45 healthy women [exercising (n = 22) and non-exercising (n = 23)], aged 40-60 years, were included in this study. The criteria

for 'exercising' were doing aerobic type exercise at least 3 times a week for 1 hour. The demographic data of the individuals (age, body weight, height) were recorded.

International Physical Activity Questionnaire-Short Form (IPAQ-SF) was used to measure the level of physical activity level of housewives (19, 20). Short form is the most appropriate format to assess the activity level. In that form there are 4 items which are questioning the time spent (number of days x average time per day) for vigorous-intensity activity, moderate-intensity activity, walking activity, and sitting over the previous 7 days. Each category has different MET level (i.e. vigorous intensity activity's MET level is 8, moderate intensity activity's 4, walking activity's 3.3). These 4 categories were calculated separately (MET level x number of days x average time per day) and then summed to gain an overall estimate of physical activity in a week (MET-min/week)

6 Minute Walk Test (6MWT) was used for the evaluation of the aerobic capacity of housewives (21).

This submaximal test measures the distance (m) walked in 6 minutes. Subjects were asked to walk the 30 m track (forth and back= 60 m= 1 lap) as quickly as possible. Beside the lap numbers, pre-test and post-test blood pressure (systolic/diastolic), heart rate, SpO2 (oxygen saturation), perception of fatigue and dyspnea (Borg scale) were also recorded.

To assess muscular strength and endurance of lower extremity, Sit to Stand Test (SST) was used (22). İndividuals were asked to sit in the middle of chair with straight back and place their hands on the opposite shoulder crossed at the wrists. Whenever they were ready they start rising to a full standing position and then sitting back down again. The number of sitting and standing repetitions during 30 seconds were recorded.

Body mass index (BMI) is an important parameter of cardiorespiratory fitness and a predictor of cardiometabolic risk in healthy adults. BMI is calculated by dividing weight (kg) by the square of the participants' height (m^2) (BMI = (kg)/ (m^2)). BMI is categorized according to the World Health Organization BMI cut-off values with 18.5-24.9 representing an acceptable weight, 25-29.9 as overweight and BMI ≥ 30 representing the obese (23).

Statistical Analysis

Analysis studies were performed using the SPSS 18.0 program. The variables were described as mean ± standard deviation (X ± SD). In order to compare the two groups Mann-Whitney U nonparametric test was used. The level of p value <0.05 was accepted as statistically significant.

Results

Housewives between 40-60 years of age were included in this study. There was not any difference concerning the age between exercising (46.22 ± 6.97 years) and non-exercising (49.43±8.00 years) housewives ($P > 0.05$).
Considering the level of physical activity compared to non-exercising housewives exercising housewives were found to be significantly more active (p=0.003) (Table 1).

The level of health related physical fitness results showed that only the cardiovascular fitness (aerobic capacity) which was measured with 6 MWT of exercising housewives has reached statistically significant level when comparing to the non-exercising housewives. Thus, the aerobic capacity of exercising housewives was significantly higher than non-exercising housewives (p=0.000).

The other health related physical fitness components which was evaluated in this study were musculoskeletal fitness (muscular strength and endurance), assessed with the 30 second SST and body composition (BMI) levels of the two groups and was not different between the two groups (Table 1).

Table 1:

	Exercising (X±SD)	Non-exercising (X±SD)	P
International Physical Activity Questionnaire-Short Form (Met-min/week)	2.522 ± 2.43	1.566 ± 2.58	0.003*
6 Minute Walk Test (meters)	648.18 ± 120.80	469.04 ± 110.09	0.001*
Sit to Stand Test (repetition / 30 sec)	19.13 ± 4.60	17.82 ± 5.06	0.210
Body Mass Index (kg/m^2)	24.33±4.06	26.67±4.99	0.130

$p<0.05$

Discussion

The purpose of this study was to compare physical activity and health related physical fitness levels of exercising and non-exercising housewives. The housewives who are considered to be physically less active than the working women the habit of regular exercise is found to be contributed to an increase in physical activity and one component of health related physical fitness. Hereunder, cardiovascular fitness (aerobic capacity) was found to be higher in the exercising housewives compared to non-exercising housewives however there was not any difference in musculoskeletal fitness (muscular strength and endurance) and body composition between exercising and non-exercising housewives.

Non-exercise physical activities (NEPA) is defined as mainly low intensity non-volitional activities such as walking, which are embedded into much of daily life abrogating the need for extra time or special facility of exercise (24). With the assumption that 'usual household activities would affects the level of NEPA are likewise among all housewives' the physical activity level of the exercising and non-exercising housewives were examined to compare the level of physical activity between exercising and non-exercising housewives. In our study both exercising and non-exercising housewives had a moderate (600-3000 MET-minutes/week) level of physical activity. However, not surprisingly it was found that exercising housewives has a higher level of physical activity, approaching to vigorous physical activity level (≤ 3000 MET-minutes/week), and compared to non-exercising housewives (25).

Warburton and colleagues have stated that physical activity and physical fitness was related to health status in a dose dependent fashion (26). Therefore, the dose - response relationship between physical activity and health benefits is curvilinear and reflects a progressive decrease in the risk with increasing physical activity/fitness levels.

From this point of view, although NEPA has some health benefits, to participate in a regular exercise program would have additional health benefits and should be recommended to non-exercising housewives. Additionally, it should be bear in mind that 'every little bit counts, but more is even better' (27, 28).

Blair et al have stated that it is preferable to encourage people to become more physically active rather that to become physically fit, as inactive people will likely achieve the latter if they do the former (29). By means of this, we have evaluated the health related physical fitness levels of the two groups whether if there is difference between exercising (physically more active) and non-exercising (physically less active) housewives.

It is known that regular exercise training using large muscle groups (such as walking, running, jogging, swimming, and cycling) produces cardiovascular adaptations that increase exercise capacity and endurance, hence increases the cardiovascular fitness (30-32). Correspondingly, in our study the cardiovascular fitness level (6 MWT) of exercising housewives was found to be higher than non-exercising housewives. When comparing the cardiovascular fitness levels of exercising and non-exercising housewives with the age matched healthy women population (551 m) (33) it could be seen that exercising housewives has higher whereas non-exercising housewives has lower levels than healthy women population.

Virtually, many daily living activities depend on one or more of the musculoskeletal fitness components rather than a large aerobic output. Routine physical activity is the primary factor in improving musculoskeletal fitness which is associated with an increase in overall health status and reduction in the risk of chronic disease and disability (1, 9, 34). In this current study it was found that the musculoskeletal fitness level between exercising and non-exercising housewives was not different. Both of groups have similar outcomes on the '30 second Sit to Stand Test' (average number of repetitions for people between 50-54 years of age is 18 repetition/30 sec) (35).

Physical activity may not only enhance cardiovascular and musculoskeletal fitness level but also helps to deplete excessive energy and increase basal metabolism due to an increase in the activity of enzymes of aerobic oxidation (36-39). Many studies showed that long-term moderate intensity aerobic exercise programs done by sedentary women is effective in improving body composition nevertheless the improvement depends on the type/mode, intensity, frequency and duration of exercise (40-44). The body composition (BMI) levels of the exercising and non-exercising housewives in our study were not found to be significantly different.

The effects of any exercise protocol may vary according to the type/mode, intensity, frequency and duration of the exercise. Furthermore, the environmental conditions and individual factors (e.g. fitness level, physiological and genetic variability, social and psychological factors also plays an important role on the magnitude of the effect of exercise training. Assuredly, the type/mode of the exercise is one of the primary issues to be addressed. Aerobic exercises 'continuous

dynamic and rhythmical contractions of large muscle groups' (i.e. walking, jogging, cycling, dancing) are best suited for stimulating improvements in cardiovascular fitness whereas resistance exercises (i.e. free weights, exercise bands, exercise machines) are effective for improving muscular strength and muscular endurance. It is known that to alter the body composition more than one type of exercise training should be used thus; combining aerobic and resistance training exercises may be the most effective way to improve the body composition (45-49).

In the current study although the cardiovascular fitness was found to be higher in the exercising housewives compared to non-exercising housewives musculoskeletal fitness and body composition was not found to be different between exercising and non-exercising housewives. It is known that the gains in muscular fitness are specific to the exercised muscle groups, type and speed of contraction and training intensity. Additionally, resistance training programs are recommended to emphasize dynamic exercises involving both concentric and eccentric muscle actions that recruit multiple muscle groups including exercises targeting the major muscle groups. Along with multijoint exercises single-joint exercises that isolate functionally important muscle groups (i.e. hamstrings, quadriceps, biceps, triceps) should also be included to a resistance training program (49, 50).

Our findings apply to healthy housewives, who reported performing regular exercises, which was defined as 'aerobic type exercise at least 3 times a week for 1 hour', with that of the housewives who did not exercise. Although the type/mode of exercise was specified as 'aerobic exercise' there was not a specific exercise program; types (walking, stationary bicycling, swimming, aquarobics fitness programs and etc.) of aerobic exercises and the dosage (intensity, frequency and duration) of the program of exercise may vary among the participating housewives. This constitutes the main limitation of our study. Additionally, our results should be considered cautiously because the exercises were not supervised and we could not obtain the adherence of exercise in the exercising housewives group.

In conclusion, the housewives who are considered to be less physically active than the working women the habit of regular exercise is found to be contributed to an increase in physical activity level. When comparing the health related physical fitness levels of exercising and non-exercising housewives although there was not any difference in musculoskeletal fitness and body composition, the cardiovascular fitness was found to be higher in the exercising housewives compared to non-exercising housewives. It is recommended that in order to develop musculoskeletal fitness an exercise program should be implemented to specific muscle groups with a predetermined program involving appropriate training dosage and contraction type and speed. Additionally, the combination of exercise types (aerobic and resistance) may be suggested to the exercising housewives to improve the components of health related physical fitness.

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