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Investigation of Physical (In) Activity Levels of Individuals Aged 50 to 69 Living in Bursa

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ABSTRACT The aim of the present study was to examine the physical activity of individuals aged 50 to 69 years and living in Bursa. A total of 1,280 male (mean age 58.5 ± 6.4) and 760 female (mean age 55.8 ± 6.1years) subjects were sampled. The participants' physical activity levels were evaluated using the International Physical Activity Questionnaire. The subjects were divided into four age groups (G1: 50–54 years, G2: 55–59 years, G3: 60–64 years, G4: 65–69 years). The male subjects were statistically significant and more physically active than their female counterparts in all age groups ($p < 0.05$). Comparisons of physical activity by age group showed that there were no statistically significant differences between G3 and G4 for the male subjects, or between G1 and G2 and G3 and G4 for the female subjects ($p > 0.05$). However, there were statistically significant differences ($p < 0.05$) between other age groups.

INTRODUCTION

Developments in technology and medicine have led to higher living standards and extended lives, which has led to an increase in the elderly population. This increase in the elderly population also brings with it many problems. The risk of developing non-communicable chronic health conditions increases with increase in age. Many studies emphasize the relationship between physical activity (PA) and chronic diseases such as heart disease, stroke, lung disease, hypertension, cancer, Alzheimer's disease and obesity in middle-aged and elderly populations (Gebel et al. 2015; WHO 2009; Zatonski et al. 2011). The World Health Organization (WHO) determined that high blood pressure, smoking, high blood glucose, physical inactivity and obesity are five leading risk factors for death (Chodzko-Zajko et al. 2009; Long et al. 2015; WHO 2010). Other leading risk factors are connected with physical inactivity. There is a negative relationship between adults' medical costs and PA. Worldwide, medical costs for inactive adults are considerably higher than those for active adults. To prevent the aforementioned diseases and reduce medical costs, it is suggested that adults lead more physically active lives (WHO 2009; Zatonski et al. 2011).

In Turkey, the elderly population is increasing more rapidly than other age groups. Life expectancy in 2013 was 76.9 years, and after 10 years, life expectancy will increase to 77.9 years (TIS 2013). According to a report by the Ministry of Health, the General Directorate of Health Research, which was published in 2014, 52.4 percent and 44.1 percent of males and females between 51 and 64 years of age, and 53.8 percent and 66.5 percent of males and females between 65 and 74 years of age are sedentary or minimally physically active, respectively (TIS 2014; RTMH-GHR 2014).

Unfortunately, the people of Turkey are yet to understand the importance of this physical activity. Meanwhile, intrapersonal and health factors can affect the physical activity levels. To increase the physical activity among people, it is suggested that initial physical activity assessments should be undergone. After the PA levels are determined, actions can then be planned. In Turkey, studies on physical activity among middle-aged and older adults are still lacking.

Therefore, the main objectives of the present study were to examine the physical activity levels of individuals aged 50 to 69 who lived in Bursa and to determine the relationships between physical activity and selected general health characteristics, health-related behaviors and certain socio-economic variables.

METHODS

Participants

This descriptive and comparative cross-sectional study was approved by the Uludag University (UU) Human Ethics Committee, study number 2014-12/7, dated 10.06.2014, and subsequently, the study was initiated. A total of 1,280 male (mean age 58.5 ± 6.4 years, height 178 ± 8.3

cm and weight 80.4 ± 7.7 kg) and 760 female (mean age 55.8 ± 6.1years, height 162.8 ± 7.4 cm and weight 68.5 kg ± 5.3) Turkish citizens who lived in Bursa volunteered to participate in the study. The volunteers' names were not collected. Subjects could elect to volunteer to participate in the present investigation after being informed about the study. The study was restricted to the 50-69-age range. Subjects with chronic diseases or disabilities or who had been in too much discomfort to perform normal physical activities during the last week were also excluded. This was determined through self-reports from individuals. Written informed consent was obtained after information pertaining to this research was explained to the subjects.

Assessment of Physical Activity

The participants' physical activity levels were evaluated using the International Physical Activity Questionnaire – Short Form (IPAQ - SF), Turkish version. This questionnaire was publicly available, and no permission was required before using it. The reliability and validity of the questionnaire were tested across many countries. All the participants were required to answer the IPAQ, which consists of seven questions, including the number of days per week and minutes per day spent on vigorous activity, moderate-intensity activity and walking for at least 10 minutes at a time, and hours spent sitting and/or lying down (excluding sleeping) per day. The data obtained from the IPAQ was used to classify the participants' physical activity levels and to estimate their energy expenditures (for example, on a weekly basis). There are three levels of physical activity: low, moderate and high. The IPAQ describes physical activity energy expenditure in units: minutes per week = metabolic equivalent of task (MET). The weekly physical activity was calculated by summing the METs obtained during intense and moderate physical activity, while walking, throughout the week.

In addition to the IPAQ, the participants answered another questionnaire consisting of questions aimed at gathering information on personal data such as: age, gender, height, weight, general health status and health behavior practices. The participants' body mass indexes (BMIs) were assessed using the formula: Weight (kg) / Height^2 (m). Self-reported height and weight measurements were used to calculate BMI. Based on the WHO classifications, participants were defined as underweight (< 18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), and overweight (25–29.9 kg/m^2) or obese ($\geq$ 30 kg/m^2).

Data Collection

Following the Human Ethics Committee's approval of this study, 20 students (interviewers) from the Department of Physical Education and Sport at Uludag University were trained to collect the questionnaire data. Then, interviewers visited homes, outdoor and indoor common living areas in the Osmangazi, Nilüfer and Yildirim districts in Bursa. After interviewers provided information regarding the study, they asked individuals whether they would volunteer to participate and answer the questionnaire. The questionnaires were given to the individuals in the survey sample. Volunteers who answered the questionnaire survey forms placed them in envelopes that had been prepared in advance.

Statistical Analysis

All statistical analyses were performed using SPSS version 22.0 (SPSS Inc., Chicago, IL, USA) software. All values of the variables were expressed as the mean, standard deviation (M ± SD), number (n) and percentage (%). To compare physical activity levels, sitting times, and energy expenditures between female and male subjects, the researchers used independent-sample t-tests, and for comparisons between age groups, they used a one-way ANOVA (post hoc Bonferroni test). Chi-square tests (χ^2) were used to analyze the differences between female and male participants' physical activity categories (low, moderate or high). The relationships between participants' physical activity levels (PALs) and their socio-economic and health-related characteristics were assessed using Pearson correlation coefficients. The level of statistical significance in all analyses was set as p-value less than .05.

RESULTS

The subjects' socio-economic and health-related characteristics are presented in Table 1. The subjects were divided into groups by age range: 50-54 (37.1%), 55-59 (27.6%), 60-64 (19.5%) and 65-69 (15.8%). Descriptive analyses showed that

Table 1: Socio-economic status, health-related characteristics and behaviors of participants, (n (%)

Variable	*Group*	*Male (n=1280; %62.7)*	*Female (n=760, %37.3)*	*Total (n=2040, %100)*
Age	50-54	395 (30.9)	362 (47.6)	757 (37.1)
	55-59	365 (28.5)	198 (26.1)	563 (27.6)
	60-64	236 (18.4)	162 (21.3)	398 (19.5)
	65-69	284 (22.2)	38 (5)	322 (15.8)
BMI	Normal	520 (40.6)	399 (52.5)	919 (45.1)
	Overweight	678 (52.9)	161 (21.2)	839 (41.1)
	Obese	82 (6.5)	200 (26.3)	282 (13.8)
Retirement	Yes	960 (75)	360 (47.4)	1320 (64.7)
	No	320 (25)	400 (52.6)	720 (35.3)
Education	Primary	277 (21.7)	120 (15.8)	397 (19.5)
	Secondary	167 (13)	162 (21.3)	329 (16.1)
	High	559 (43.7)	160 (21.1)	719 (35.2)
	University	277 (21.6)	318 (41.8)	595 (29.2)
Marital Status	Married	1135 (88.6)	681 (89.6)	1816 (89)
	Single	145 (11.4)	79 (10.4)	224 (11)
Health-related	Poor	43 (3.4)	80 (10.5)	123 (6)
Physical Fitness	Fair	597 (46.6)	440 (57.9)	1037 (51.8)
	Good	560 (43.8)	203 (26.7)	763 (37.4)
	Very Good	80 (6.2)	37 (4.9)	117 (5.8)
Perceived Weight	Overweight	123 (9.6)	395 (52)	518 (25.4)
	About right	1077 (84.1)	360 (47.4)	1437 (70.4)
	Underweight	80 (6.3)	5 (0.6)	85 (4.2)
Exercise	Yes	440 (34.4)	160 (21.1)	600 (29.4)
	No	840 (65.6)	600 (78.9)	1440 (70.6)
Smoking	Current smoker	724 (56.6)	282 (37.1)	1006 (49.4)
	Non- smoker	556 (43.4)	478 (62.9)	1034 (50.6)
Drink Alcohol	Yes	601 (47)	39 (5.1)	640 (31.4)
	No	679 (53)	721 (94.9)	1400 (68.6)
Hypertension	Yes	202 (15.8)	39 (5.2)	241 (11.8)
	No	718 (56.1)	521 (68.5)	1239 (60.7)
	No know	360 (28.1)	200 (26.3)	560 (27.5)

45.1 percent of subjects were of normal weight based on their BMI, 64.7 percent were retired, 35.2 percent had high school educations, 89 percent were married, 51.8 percent had "Fair" health-related physical fitness, 70.4 percent perceived their weight as "About Right", 70.6 percent did not exercise, 50.6 percent never smoked tobacco, 68.6 percent never drank alcohol, and 60.7 percent self-reported no hypertension.

The male subjects' physical activity levels and energy expenditures were statistically significantly higher than those of female subjects in all age groups ($p < 0.05$). Additionally, male subjects showed statistically significantly longer sitting times than female subjects in all age groups ($p < 0.05$), except for G1 ($p > 0.05$). BMIs were higher among the females in G1 and G4, but they were higher among males in G2 and G3 ($p < 0.05$). Comparisons of PA by age group showed no statistically significant differences between G3 and G4 for male subjects or between G1 and G2 and G3 and G4 for female subjects ($p > 0.05$). There were statistically significant differences ($p < 0.05$) between other groups in PA (Table 2).

Subjects were categorized into three subgroups according to their physical activity levels (LFA, MFA and HFA). In each age group, the researchers compared the males and females PA categories. Chi-square analyses indicated statistically significant differences in these categories among the four age groups ($p < 0.05$) (Table 3).

Pearson's correlation coefficient analyses indicated that there were positive relationships between PAL and income, health-related PF, children, exercising and self-reported hypertension. However, PAL had negative relationships with age, gender, marital status, smoking tobacco and drinking alcohol ($p < 0.05$) (Table 4).

DISCUSSION

The findings from the present study suggest that mean PALs and energy expenditures are

Table 2: Comparison PA, sitting, energy expenditure and BMI of participants according to age groups and gender (Mean ± SD)

Variable	*Gender*	*50-54 year (G1)*	*55-59 year (G2)*	*60-64 year (G3)*	*65-69 year (G4)*	*F*	*Pairwise comparisons*
PA (MET-min/week)	M	2728 ± 1581	2031 ± 891	1356 ± 694	1334 ± 768	176.7*	G3-G4: Ns
	F	1895 ±1564)	1771 ± 1164	720 ± 450	396 ± 225	42.4*	G1-G2 / G3-G4: Ns
	t	*7.2890**	*8.406**	*7.868**	*7.720**		
Sitting (min/week)	M	278 ± 117	210 ± 104	217 ± 125	255 ± 73	31.9*	G1-G4 / G2-G3: Ns
	F	241 ± 72	184 ± 32),	210 ± 65	120 ± 35	73.6*	
	t	*5.102**	*3.405**	*.112*	*11.659**		
Energy Expenditure (kcal/week)	M	1107 ± 657	825 ± 379	525 ± 227	513 ± 307	179.1*	G3-G4: Ns
	F	789 750	566 ± 365	243 ± 313	172 ± 102	41.8*	G3-G4: Ns
	t	*6.224**	*4.253**	*9.948**	*7.002**		
BMI (kg/m²)	M	25.8 ± 2.6	25.1 ± 1.8	24,8 ± 3.7	25.7 ± 2.3	10.9*	G1-G4 / G2-G3: Ns
	F	27.3 ± 4.1	22.3 ± 2.1	23,8 ± 2.5	30.1 ± 3.3	140.5*	
	t	*5.751**	*16.83**	*2.951**	*12.015**		

*: There is statistically significant difference (p<0.05) M: Male PA: Physical activity
Ns: No significant difference (p>0.05)

Table 3: Physical activity level categories of age groups and comparisons according gender, n (%)

	Male			*Female*			*Chi-square*
Age	*LFA*	*MFA*	*HFA*	*LFA*	*MFA*	*HFA*	
50-54	44 ± 11.1	195 ± 49.4	156 ± 39.5	77 ± 21.3	202 ± 55.8	83 ± 22.9	*38**
55-59	120 ± 32.9	187 ± 51.2	58 ± 15.9	78 ± 39.4	81 ± 40.9	23 ± 14.2	*85.7**
60-64	40 ± 16.9	184 ± 78	12 ± 5.1	79 ± 48.8	60 ± 37	18 ± 11.1	*136.1**
65-69	55 ± 19.4	189 ± 66.5	40 ± 14.1	21 ± 55.2	12 ± 31.6	5 ± 13.2	*132.1**

*: There is statistically significant difference (p<0.05) LFA: Low physical activity category
MFA: Moderate physical activity category HFA: High physical activity category

Table 4: Correlation between PAL and socio-economic and health-related characteristics of participants

PAL	*Age*	*BMI*	*Gender*	*Income*	*Health-related PF*	*Stress*	*Perceived Weight*
	-.290*	-.067*	-.055*	.124*	.139*	.013	.012
	Education	*Marital Status*	*Children*	*Smoking*	*Alcohol*	*Exercising*	*Self-reported Hypertension*
	.018	-.120*	.155*	-.143*	-.126*	.236*	-054*

PAL: Physical Activity Level *: There is statistically significant correlation (p < 0.05)

higher among males than females in the four age groups (50–54, 55–59, 60–64 and 65–69). Age group comparisons revealed that mean PALs and energy expenditures decreased with an increase in age. In particular, PA, after age 60, dramatically decreased in both genders. Previous studies have stressed that males and females are equally likely to participate in physical activities (such as walking, bicycling, and calisthenics), but males are more likely to be involved in sports, intense activities, and frequently performed activities (Stephens et al. 1985; Tucket 2015). Townsend et al. (2012) found that English men spent more time on moderate to vigorous physical activity (MVPA) than women did, 31 minutes per day compared with 24. The amount of time spent in this activity level category did decline with age for both sexes.

In the present study, PALs were separated into “low”, “moderate” or “high”. The physical inactivity (the low PA category) prevalence for females and males were 11.1 percent and 21.3 percent for ages 50-54, 32.9 percent and 39.4 percent for ages 55-59, 16.9 percent and 48.8 per-

cent for ages 60-64, and 19.4 percent and 55.2 percent for 65-69, respectively. These findings indicated that physical inactivity prevalence was higher among the female than the male subjects between ages 50 and 69. Among female subjects, physical inactivity drastically increased after age 60. In contrast, among male subjects, physical inactivity was higher among the 55-59 age group than the others. Today, in Turkey, there are more male employees than females, and the retirement age is approximately 55-59. Retirement is a major lifestyle change and can affect physical (in) activity levels. Occupational activities have an important role in total daily physical activity. However, it is noteworthy that physical inactivity among females aged 60-69 years increased to fifty percent and more. One previous study stressed that approximately eighty percent of older Korean adults aged 60-70 do not engage in moderate physical activity and are inactive (KMHW 2007). Caspersen et al. (2000), in a cross-sectional study, found that physical inactivity levels among adult women were moderately higher (5.5%) than were those for men. The proportion of middle-aged and older men who were physically inactive during leisure time increased with age. More than sixty percent of American adults over the age of 50 years failed to achieve the recommended activity levels (USDHHS 2008). Additionally, in England, only twenty percent of men and seventeen percent of women older than 65 years achieved the recommended levels of PA and exercise (Martinez-Gonzalez 1999). A study based on doubly labeled water determined decreasing physical activity with increasing age (Westerterp 2000). Cramm and Lee (2014) suggest that a majority of older Indians are physically inactive; only thirty-seven percent of men and nineteen percent of women engaged in vigorous activity more than once a week, and forty-eight percent of men and thirty-four percent of women engaged in moderate activity more than once a week. These studies observed that given the growing prevalence of chronic diseases in India's aging population, efforts to prevent chronic diseases and improve health behaviors, especially physical activity, are needed (Cramm and Lee 2014). According to a report by the British Heart Foundation Health Promotion Research Group (2012), physical inactivity in the United Kingdom (UK) increased approximately twenty percent among the 45-54 and the 65-74 age groups, in both genders. In addition, physical inactivity is higher among female United Kingdom citizens than their male counterparts. In contrast, from 1977 to 2008, adults in England (aged 45-74) who met the physical activity recommendations increased by approximately eight to ten percent for both genders. In the UK countries between 1997 and 2011, the self-reported percentages of female and male adults who met the physical activity recommendations increased continuously (Townsend et al. 2012). The findings of the present study are supported by the abovementioned studies.

The present study revealed positive associations between PAL and income, health-related physical fitness, children, exercising and self-reported hypertension. However, PAL had negative associations with age, gender, marital status, smoking tobacco and drinking alcohol. Education, income and socio-economic status are important in current life. Norman et al. (2002) reported an inverse association between education and total daily activity. Generally, people with higher education levels tend to have higher incomes. Because higher-salary occupations tend not to require physical activity, adults in these occupations may be more sedentary. However, in the present study, many subjects were retired (64.7% in total for both sexes). In contrast, a review study by Stephens et al. (1985) showed positive associations between recreational physical activity and income and education. Self-reported physical activity levels increased with increasing household incomes in UK countries. More educated individuals with higher socioeconomic status are more knowledgeable regarding the benefits of physical activity, and this study's findings supported the positive associations between physical activity and income and education. Norman et al. (2002) observed a decreasing trend of physical activity with age among Swedish men between ages 45 and 79. Moreover, this study indicated associations between physical activity and education, marital status, self-related health, BMI and smoking.

Some previous studies have reported inverse associations between physical activity and obesity (Koeneman et al. 2012; Norman et al. 2002; Martinez-Gonzalez et al. 1999). Obesity is affected by two major factors: calorie intake (nutrition) and calorie expenditure (physical activity). Increasing one's physical activity level increases energy expenditures and prevents overweight and obesity. Thus, the present study's observed negative associations between physical activity and obesity are explicable.

Self-rated health has been positively associated with leisure time exercise in a number of recent studies (Rutten et al. 2001; Burton and Turrell 2003), consistent with the results showing that total physical activity increases with better self-rated physical fitness. Mesters et al. (2014) stressed that Dutch subjects aged 45-70 years are less physically active if they drink alcohol and smoke. A small number of studies that investigated the relationship between alcohol consumption, smoking and PA found significant associations (Sallis et al. 1989). These findings also support the present study.

Recent epidemiologic studies have reported that physical activity is effective in preventing and alleviating hypertension (Lakka and Laaksonen 2007; Caroll et al. 2000). Perez et al. (2013) found, based on self-reports that leisure time physical activity may protect against hypertension in Brazilian adults. It was shown that patients with chronic diseases such as hypertension, diabetes, and hyperlipidemia had less physical activity. Physical inactivity increases the prevalence of chronic diseases because optimization of energy consumption and insulin sensitivity is dependent on aerobic exercise.

One limitation of the present study is that it employs, largely, the use of the self-report method to gather and measure the subjects' physical activities. Likewise, their health status and behaviors were assessed by the self-report as well. Meanwhile, self-reported measurements may not predict health outcomes as precisely as objective methods. Self-report measurements require that participants have good memories and estimation skills. Questionnaires are generally suitable for categorizing or ranking physical activity levels, but they are not sufficiently accurate to assess absolute levels of physical activity. Another limitation of the present study is that it used only one assessment of PA, whereas two or more repeated measures would have given more accurate results. Also, there was no data on diet, one of the most influential factors in healthy aging. Finally, the present study was cross-sectional and could not explain the causality between PA and other study factors.

However, despite the limitations, there is some strength in the present study. The key strengths were the large-size sample and the simultaneous consideration of many factors (for example, age, gender, income, education, smoking, drinking alcohol, stress, BMI, hypertension, marital status, health-related physical fitness) that might be associated with physical (in) activity. Moreover, it is one of the first studies to concentrate on factors that influence PA in Turkish individuals between ages 50 and 60.

CONCLUSION

In conclusion, the physical activity levels of male participants were higher than those of their female counterparts. Physical inactivity prevalence increases with age in both sexes. Physical inactivity drastically increased after 60 years, particularly among female subjects. Physical activity is also positively associated with income and health-related physical fitness and is inversely associated with age, BMI, gender, marital status, smoking, drinking alcohol and hypertension.

RECOMMENDATIONS

Future research is needed to explore the effects of different time periods and seasons of physical activity among middle-aged and older adults. Moreover, research needs to assess the effectiveness of physical activity interventions that target adults just before or after life-changing events. Additionally, there should be physical activity assessments for middle-aged and older rural and urban adults.

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