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PHYSICAL ACTIVITY OF GREEK OLDER ADULTS AGED 65 AND OVER

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Abstract

Physical activity (PA) levels of community-dwelling adults aged 60 and over were assessed in Greece, in order to determine age and gender effects. PA was assessed using the PA Scale for the Elderly in 591 persons (287 males and 304 females), (M=74.04, SD=5.46). Participants were assigned into two age groups: A=65-75 and B=76-86 years. According to two way ANOVA, no significant differences were reported in total PA between men and women ($p>.05$) even though a significant age effect was reported with participants in Group A having higher scores than participants in Group B ($p<.001$). Men reported greater participation in recreational activities of moderate intensity ($p<.001$) and in exercises for muscular strength and endurance ($p<.05$). Women were more active in PA related to household ($p<.001$). Age effects resulted in favor of older adults in Group A 61-70 years when compared to older adults in Group B for walking, for recreational activities and for housework ($p<.001$). In conclusion, both gender and age affect PA participation of older adults in Greece.

Keywords: elderly, older adults, PASE, PA levels, age and gender effects

Introduction

According to CDC (2002) PA is any bodily movement produced by skeletal muscles that results in an expenditure of energy (expressed in kilocalories) and includes a broad range of occupational, leisure time and routine daily activities. These activities can require light, moderate

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or vigorous effort and can lead to improved health if they are practiced regularly. Numerous research studies have reported many health and performance related benefits of engaging in regular PA, particularly for older adults and for the least active segments of the population (Shephard, 2002). A linear reduction in mortality risk has been suggested with increased levels of PA in older adults (Dishman, Washburn, & Heath, 2004, Craig, Russell, Cameron, & Beaulieu, 1997) and a threshold of about 1,000 kcal per week was accompanied by a 20% to 30% reduction in mortality risk (Lee, Hiesh, & Paffenbarger, 1995). Physical inactivity is also recognized by the AHA and WHO as a major independent risk factor for coronary heart disease (CHD) (Fletcher et al, 1996; Bijnen, Caspersen, & Mosterd, 1994). Physical inactivity in men has been strongly related to high risk for CHD (Lakka, et al., 1994; Morris, Clayton, Everit, Semmence & Burgess, 1990; Paffenbarger, Hyde, Wing & Hsieh, 1986; Paffenbarger et al., 1993) but on the other hand this relation is less clear for women (Blair, Kohl, & Barlow, 1993; Haapanen, Miilunpalo, Vuori, Oja & Pasanen, 1997; Sesso, Paffenbarger, Ha & Lee, 1999). Individuals that developed CHD had lower participation during their free time in PA /sports but no differences were reported between men and women (Folsom et al., 1997). The importance of PA for maintaining good health for women has been presented in a longitudinal study where a negative relation was detected between participation in PA and breast cancer occurrence in 70.000 postmenopausal women (McTierman et al., 2003). PA contributes also in reducing the occurrence of other cerebrovascular diseases and stroke (Fagard, 2001) and regular PA of moderate or high intensity may limit the risk for diabetes type II by 25% to 50% (Dishman, et al., 2004).

Limited PA reflects 50% of the limitations in functional capacity where the other 50% of the limitations that the older adults face are the result of increasing age (Hirvensalo, Rantanen, & Heikkinen, 2000). Low levels of PA in older adults lead to limited independence (Gularnik, Ferruci, Simonsick, Salive & Wallace, 1995) and to increased need for care services (Horgas, Wilms, & Bates, 1998).

The intensity of PA is considered to play an important role in determining positive health effects. Participation in vigorous PA ($\geq$ 6 MET) was associated with a decreased risk in all-cause mortality, but no benefits were reported for participation in light or moderate intensity PA (Lee, Hsieh, & Paffenbarger, 1995). Older men that reported participation in vigorous physical activities ($\geq$ 8.4 MET) (climbing stairs, organized sports and mountain hiking) had a decreased mortality risk of 25 % - 30% (Paffenberger, et al., 1986). Additionally an increase in participation in PA of older men for the previous five years from "seldom" to "very frequently" resulted in a 44% reduction in all cause mortality risk (Blair, Kohl, & Barlow, 1993).

The content, the intensity and the amount of PA seem to change in relation to the age and gender of older adults. Previous studies showed rates of physical inactivity are higher for women when compared to men and for the oldest individuals when compared to younger older adults (Craig, et al., 1997; Kamimoto, Easton, Maurise, Husten & Macera, 1999; USDHHS, 1999). An epidemiological study in U.S concerning the prevalence of physical inactivity in adults aged 65 and older reported that 37% of older men and 23% of older women engaged in regular leisure-time PA (LTPA = participation for 30 min or more at least 3 times per week during the part 2 weeks). The prevalence of LTPA was lowest for both men and women among those who were oldest, were black had less education, rated their health as "fair to poor" had activity limitations, were smokers, had less exercise knowledge and reported greater stress (Yusuf et al., 1996). In Canada, the population group of older adults with low income was the least physically active as well as the fastest growing in number population group (Craig & Cameron, 2002).

In Canada, percentages of older women in comparison to older men were lower for participation: in vigorous PA (20% women – 24% men), in moderate intensity PA (26% women – 27% men), as well as in low intensity PA (19% women – 20% men) (Craig, et al., 1997). Additionally during their free time older men participated more than women in physical activities (Mensink, Deketh, Mul, Schuit & Haffmeister, 1996).

The percentage of total population aged 65 and over for Greece has been reported 17.3 % and it was the second highest percentage in the world after Italy (18.1%), (Kinsella, & Velkoff, 2001). According to previous studies performed in Greece women in a family setting that take care of others were the least physically active segment of the population, with the lowest percentage of participation in recreational physical activities (Alexandris, & Caroll, 1998). According to Harahousou & Kambitsis (1993), limited participation in PA reported by Greek older adults is related to social and educational factors that exclude participation in sports and PA from their lifestyle. In particular older women had the lowest scores in participation in sports and recreational physical activities and instead preferred to participate in physical activities of daily living of low intensity, to watch TV, to visit friends and attend mass. The results of a more resent study in Greece (Michalopoulou, Zisi, Malliou & Godolias, 2004) suggested that older adults participated in activities of low intensity (housework and walking) and reach the levels of moderate to low PA. Until today no data was available concerning age and gender effects on the patterns of PA of older adults in Greece using a self report measure. The aim of the present study was to assess PA participation of older adults in Greece and determine possible age and gender effects in relation to the intensity and the content of the physical activities.

Methods

Participants

Subjects in this study were 591 older adults aged M 74.04, SD = 5.46 years, 287 males (M = 74.54 $\pm$ 5.54 years) and 304 females (M = 73.56 $\pm$ 5.35 years). For the purpose of this study subjects formed 2 age groups A = 65-75 and B = 76 - 86 years. Participants were randomly selected to take part in this study and they were residents of different areas of Greece (Attika, Hlia, Rodopi, Arta and Xanthi). They were recruited through Local Recreational Centers for the Elderly that exist in every Greek City.

Weight and height were measured to the nearest 0.1 Kg and to the nearest 0.01 m respectively using a wall-mounted stadiometer. Table 1. includes age and physical characteristics of the older men and women that participated in this study.

Table 1

Age and physical characteristics of the male and female participants

	Men		
	Total	Group A	Group B
N	287	153	134
Age (years)	74.54 ± 5.54	70.29 ± 3.08	79.39 ± 3.30
Weight (kg)	80.19 ± 12.71	79.23 ± 12.10	81.28 ± 13.34
Height (m)	1.68 ± 0.71	1.69 ± 0.07	1.68 ± 0.07
BMI	28.38 ± 4.15	28.19 ± 4.06	28.58 ± 4.26

Table 1 (continued)

	Women		
	Total	Group A	Group B
N	304	189	115
Age (years)	73.56 ± *5.35*	70.24 ± 3.24	79.01 ± 3.24
Weight (kg)	74.52 ± *12.43*	74.38 ± 10.58	74.75 ± 15.05
Height (m)	1.58 ± *0.12*	1.59 ± 0.07	1.58 ± 0.17
BMI	29.36 ± *4.56*	29.39 ± 3.94	29.31 ± 5.45

Instruments and Procedures

Physical Activity Scale of the Elderly

Physical Activity Scale of the Elderly (PASE; Washburn, Smith, Jette & Janney, 1993) is a 12 item scale that measures the average number of hours per day spent participating in leisure, household and occupational physical activities over the previous 7 day period. Under the category of leisure time activity, frequency and duration of participation in the following five activities were assessed: walking outside the home, light sport/recreation moderate sport/recreation strenuous sport/recreation and muscle strength/endurance exercises. Frequency of participation was assessed by asking respondents how often they are engaged in the activity over the part week. They responded using the following 4-point scale: 0= never; 1= seldom/1-2d; 2 = sometimes/3-4d; and 3 = often/5-7d. Duration was assessed by asking participants on the average, how many hours per day they spent on that activity. Responses were indicated using a 4 point scale: 1 = less than 1 h; 2 = 1 but less than 2h; 3 = 2- 4 h and 4 = more than 4h. By using a conversion table (Washburn, & Flicker, 1999) those categorical indices of frequency and duration were used to calculate the average daily frequency of participation for each activity. To ensure that participants correctly classified their sport and recreational activities as light, moderate or strenuous participants recorded the specific activities in which they participated. Under the category of household physical activities, participation in six activities was assessed: light housework, heavy housework or chores, home repairs, lawn work or yard care, outdoor gardening and caring for another person. Using a binary scale (2= yes, 1 = no) respondents indicated whether they engaged in these behaviors over the past 7 days. Under the category of work related PA participants indicated whether they worked for pay or as a volunteer (1 yes 0 = no). The total PASE score can be computed by multiplying the amount of time spent in each activity (hr/week) by the item weights and summing over all activities. The item weights are originally based on comparison with physical activities estimated with 3-day motion sensor counts, 3-day PA diary and global activity assessment (Washburn et al., 1993). The validity of this questionnaire has been reported as good (r =.65) and the reliability also (r = .75) (Washburn, & Flicker, 1999). Gender specific correlation coefficients have been reported 0.79 for men and 0.68 for women (Schuit, Schouten, Westerterp, & Saris, 1997). The reliability of this questionnaire in Greek population has been tested in a pilot study where 15 older men and 15 women were tested twice with a period of three weeks and it was proven very good (r = .79) (Michalopoulou et al., 2006).

Procedure

In order to obtain the data all questionnaires were completed using face to face interview technique after asking for verbal and written –signed consent from the participants. The collection of data included initially the completion of the questionnaire related to sociodemographic information. A second questionnaire was used to obtain information related to health status. Chronic illness was assessed be 12 specific disease questions (yes – no form). Anthropometrical data was then collected as weight (0.1 Kg) and height (0.01m). Data collection was completed with the completion of the PA Scale for the elderly. When participants had limited reading and/or writing skills the interviewer completed the questionnaires for them. All data collection tool place in a separate room in the local Recreational Center for the Elderly that exists in every Greek city and its duration never exceeded 30 min.

Analysis of Data

Descriptive statistics (mean values and frequency analysis) were performed on physical and demographic characteristics of the participants. Two -way Analysis of Variance (2 x 2) was used in order to assess "age" and "gender" effects on total PA score. A Two –way MANOVA was used to assess "age" and "gender" effects on the following dependent variables: walking, light PA related to sports/recreation, moderate PA related to sports/recreation, strenuous PA related to sports/recreation, PA related to muscle strength and endurance exercises and PA related to housework or chores and taking care of others. The level of significance was set at $p = 0.05$.

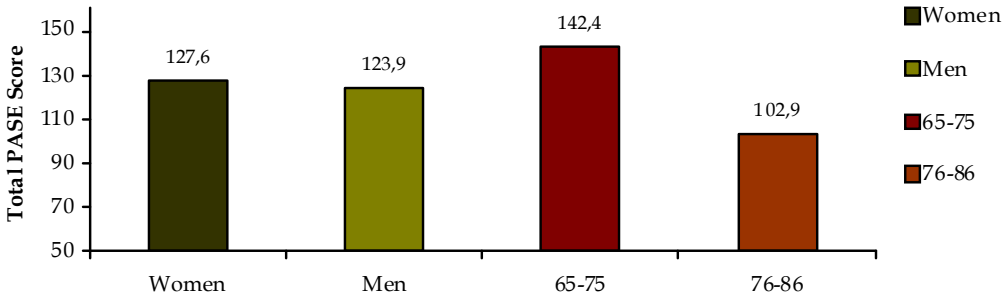
Results

According to the results of frequency analysis 18.7% of the participants were high-school graduates, 65.1% of the participants were elementary school graduates and 16.2% of the participants had not completed the primary level of education. Only 1.8 % of the participants were still working and 98.2% were retired. Additionally 37.2% of the participants were in the past working in professions that included strenuous PA (e.g. farmer, construction worker, industrial worker) 22.5% were involved in professions that required moderate physical effort (e.g. postman, waiter, machinery operator), 16.9% of the participants were involved in professions that included sitting and/or standing light physical effort (e.g. cashier, office clerk with general responsibilities) and 13.4% of them were involved in professions that included only sitting activities (e.g. driver, office clerk, office supervisor). The majority of the participants were married 63.6%, 27.6% were widowed, 5.5% were divorced and 3.3% had never married. Health status was considered very good for 12.1% of the participants, good for 31.7%, fair for 27.8% and bad for 28.4% of the participants.

Age and gender effects in Physical Activity

In order to determine age and gender effects a two-way ANOVA (age groups: A= 65-75, and B 76-86 years by gender: men, women) was performed on the dependent variable of total PA. According to the results of the analysis no significant interaction was reported for the factors "age" and "gender" ($F_{1,587}$= 1.312, p>.05, η^2=.20). The factor "age" had a significant main effect ($F_{1,587}$ = 71,118, p<.001, η^2 = .11) with participants in group A being significantly more active when compared to participants in group B (Graph 1). On the contrary no significant main effect was also revealed for the factor "gender" ($F_{1,587}$ = 0.51, p>.05, η^2 = .21). Mean values are presented in Figure 1.

Figure 1. Total physical activity score (PASE) for all participants according to gender and age



According to the results of two –way MANOVA no significant interaction was reported for the factors "gender" and "age" for all the dependent variables included in the analysis. Main effects were recorded for the factor gender for recreational PA of moderate intensity ($F_{1,587}$=11.988, p<.001, η^2=.03) and for participation in muscle strength and endurance exercises ($F_{1,587}$=5.800, p<.05, η^2=.02) with men being significantly more active when compared to women in this study. Additionally women were more active than men in regards to light housework ($F_{1,587}$=17.470, p<.001, η^2=.03), to lawn work or yard care ($F_{1,587}$ = 5.243, p<.05, η^2=.01) and to outdoor gardening ($F_{1,587}$ = 6.685, p<.01, η^2=.01) /Figures 2 and 3/.

Figure 2. differences in physical activity related to housework and carrying for others between men and women in both age groups

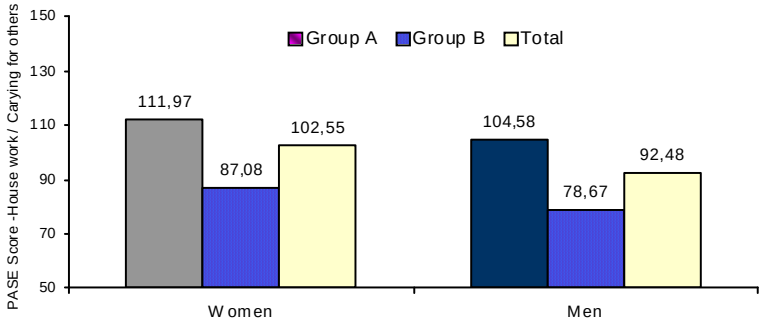
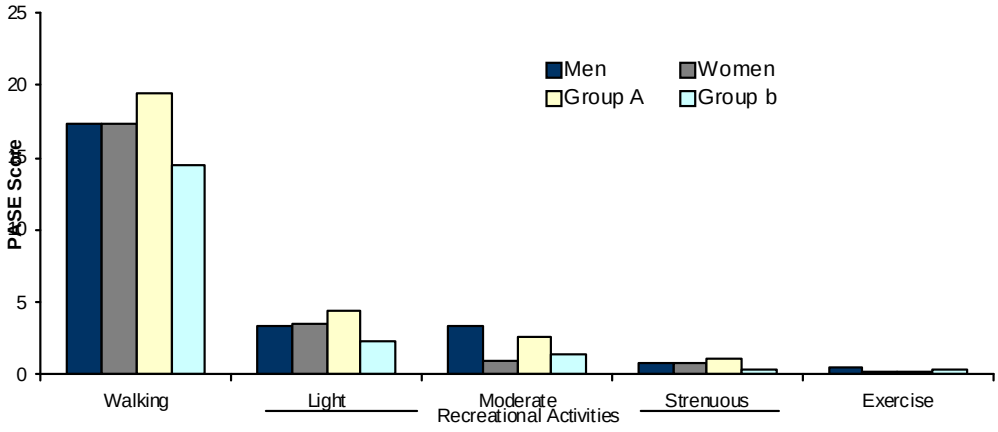


Figure 3. PASE scores for men and women in both age groups in walking, recreational physical activities and exercise



For the factor "age" significant main effects were reported for walking ($F_{1,587}$ = 12.289, p<.001, η^2=.07), for light recreational PA ($F_{1,587}$ = 9.281, p<.01, η^2=.04), for moderate intensity recreational PA ($F_{1,587}$ = 4.890, p<.05, η^2=.02), and for strenuous sport/recreational activities ($F_{1,587}$ = 8.543, p<.01, η^2=.04). Additionally as far as the variables of house work and carrying for another person are concerned the effect of factor "age" was significant for the following variables: light housework ($F_{1,587}$ = 8.612, p<.01, η^2=.02), heavy housework ($F_{1,587}$ = 16.003, p<.001, η^2=.03), home repairs ($F_{1,587}$ = 14.580, p<.001, η^2=.03), lawn work or yard care ($F_{1,587}$ = 29.014, p<.001, η^2=.05), outdoor gardening ($F_{1,587}$ = 12.687, p<.001, η^2=.02), caring for another person ($F_{1,587}$ = 7.518, p<.01, η^2=.02). All statistically significant differences were in favor of Group A when compared to Group B (Table 2).

Table 2

Mean values of PASE in different physical activity scores according to age group

	Group A	Group B	Total
	M ± SD	M ± SD	M ± SD
House work and carrying for others	108.66 ± 40.86	82.5 ± 47.16	97.66 ± 45.46
Walking	19.48 ± 18.33	14.43 ± 15.79	17.35 ± 17.47
Light recreational activities	4.34 ± 9.40	2.26 ± 6.07	3.46 ± 8.22
Moderate recreational activities	2.62 ± 9.61	1.36 ± 5.66	2.09 ± 8.20
Strenuous recreational activities	1.09 ± 4.21	0.25 ± 2.02	0.73 ± 3.48
Muscle strength/ endurance exercises	0.22 ± 1.49	0.33 ± 1.80	0.27 ± 1.63

*p<.05, **p<.01

Discussion

According to the results of this study women and men similar PA scores a finding that is not in accordance with those of numerous previous studies where in most cases older men are more active when compared to older women (Craig et al., 1997; Jones et al., 1998; Michalopoulou et al., 2006; Yusuf et al., 1996). This difference may be due to differences in the instrument – questionnaire used for assessing PA of older adults. The majority of the questionnaires used in previous studies were designed in order to record typical differences in the physical activities of younger adults and middle aged adults and might not be suitable for recording the physical activities that older adults participate at (Shephard, 2002). Additionally most of these instruments have not assessed or emphasized PA resulting from transportation, household activities or other domestic activities such as care-giving and these activities may be particularly important and more common in the lives of women and thus underestimate PA levels in older women. The PASE questionnaire that was used in this study includes questions that assess the above activities (house work and caring for others) and have a significant contribution to the total PA score especially for women. According to Washburn et al., (1993) who constructed PASE, this instrument was designed to overcome the above problems inherent in existing methods of assessing PA in older adults by including questions related to moderate and strenuous PA performed as part of housework and carrying for others. In the study of Schuit et al. (1997), women participated more in physical activities related to house work and caring for

other and thus were more active when compared to men a finding that is being supported by the results of our study.

In more detail, the differences in PA sub scores that were recorded in the present study in favor of women when compared to male participants include light house work, outdoor gardening and yard care. The above findings led us to the conclusion that the advantage of women over men in PA was mainly the result of PA related to housework, an advantage that persists in both age groups. In a study with frail older men that lived independently (Hachisuka, Tsutsui, Furusawa, & Ogata, 1999), had lower levels of PA when compared to frail older women of the same age.

Differences in favor of men were recorded in the present is study for activities performed outside the home environment, that is recreational physical activities of moderate intensity and for participation in muscle strength and endurance exercises. This finding has been reported in the literature before since, where older men are more frequently found outside their home participating during their free-time in physical activities of moderate intensity (Dallosso et al., 1998). In recreational activities of low and high intensity the scores for men and women were not different and the respective scores were relatively low when compared to the scores for walking, another for of activity where no gender differences were reported in this study. This finding is in accordance with those of previous studies that mention that the elderly perform engage in mostly at physical activities alone and when they are at home (Horgas, et al., 1998). They devote a significant percentage of their free time in watching TV and only a very small percentage of them engage in physical activities (Crespo, Keteyian, Heath, & Sempos, 1996). Additionally, walking represents the form of physical activity that older adults prefer irrespective of gender and age (Craig, & Cameron, 2002) supporting the finding that walking was the form of physical activity with the second highest PA sub scale scores recorded for the participants in this study, following the sub scale of housework and taking care of others.

In relation to age and PA participation (total PA score), older adults in Group A (65-75 years) had the higher PA scores when compared to older adults in Group B (76-86 years). These findings are supported by previous studies according to which PA is reduced when age increases for older adults (Craig, et al., 1997; Kamimoto et al., 1999; USDHHS, 1999; Jones et al., 1998). The conclusions presented by the above cross-sectional studies were based on comparisons performed between younger and older adults and not between different age groups of older adults.

Additionally, differences in PA sub scales, in relation to its content and the intensity were reported between the two age groups of this study for walking and light and moderate intensity recreational physical activities and for participation in exercises for muscular strength and endurance. Previous studies using different age groups of elderly participants (Avlund et al. 2004), reported that older adults aged 70-79 years do not significantly decrease walking as a form of PA when compared to younger groups of older adults. This lack of accordance between the findings of our study and those of previous ones, may reflect the different age groups being studied. Further more, participants in Group B were less active when housework and carrying for another person was concerned reflecting their limitation in performing the basic and instrumental activities of daily living required in daily life due to limitations in their functional abilities and other health problems that they face (Jack, & Luigi. 2003).

In conclusion older women and men had similar PA scores (total PA) and age had a significant effect on their total PA score. The majority of the PA variables used in assessing different in content and intensity physical activities were lower for the older participants (age 76-86) when compared to participants in group A (65-75 years). The highest PA scores in this study were recorded for the sub scales assessing housework and carrying for another person and the lowest for the sub scales assessing strenuous recreational PA and participation in exercises for the improvement of strength and endurance. Walking on the other hand was the only activity

were relatively high scores were recorded for both men and women and for participants in both age groups. The findings that support the notion that PA is related to the maintenance of good physical condition and health (Shephard, 2002) does not seem to affect the lifestyle of Greek older adults especially those above the age of 76 since the scores obtained were relatively low. In general they prefer recreational activities of low intensity and men participate more than women in recreational activities of moderate intensity and in muscular strength and endurance exercises. Future intervention attempts should take into consideration the above findings when addressing the issue of health enhancing physical activity promotion addressed to the older adults in Greece.

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