

## Physical activity in a sample of elderly Greek people: a research study

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### ABSTRACT

The beneficial role of exercise in elderly people has been documented by numerous of studies and is associated with an improved quality of life and increased longevity.

**Aim:** The aim of the present study was to assess the physical activity of elderly people in an urban area of Greek territory.

**Material and Methods:** The sample consisted of 426 elderly people who came from KAPI (Open Care Centers for Elderly) in Attica. Participants were men and women, aged of 65 years old and over. For the assessment of physical activity in elderly people there was conducted a seasonal record (summer / winter) of hours engaging in the following activities per week: standing, walking, cycling, sports of any kind, gardening, household tasks and home repairs. Statistical analysis was performed by the package SPSS 12.0.

**Results:** A large percentage of men (58.6%) and even more women (62.3%) did not exercise regularly. Only 38.9% of men and 31.5% of women used to walk more than 1 hour a day, while 6.6% of men and 2.5% of women regularly used a bicycle for their transport. Additionally, 76.0% of women engaged in household tasks for more than 1 hour a day, while the corresponding figure for men was only 7.8%. Furthermore, 25.7% of men and 21.0% of women were occupied with gardening and home repairs for more than 1 hour a day.

**Conclusions:** The present study showed that the participants had limited physical activity in general and minimal systematic exercise. The systematic exercise is rare in both, men and women, in people over 65 years old. Additionally, some level of physical activity was provided by necessary daily activities, such as household tasks for women and gardening and home repairs for both sexes. Taking into consideration the importance of physical activity in health promotion, the present issue should be one of the most important priorities in public health.

**Key words:** Physical activity, elderly, regular exercise, urban area, health promotion, Greece.

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## INTRODUCTION

Exercise and physical activity are beneficial for physical, psychological and social status. A considerable number of epidemiological and clinical studies support that physical activity is associated with a reduced mortality and morbidity in coronary artery disease,<sup>1</sup> stroke,<sup>2</sup> obesity,<sup>3</sup> hypertension,<sup>4</sup> hypercholesterolemia<sup>5</sup> and diabetes.<sup>6</sup>

The protective effect of physical activity is not only direct, but also indirect, since it helps to improve all the predisposing factors of cardiovascular diseases (hypertension, diabetes mellitus, dyslipidemia and obesity).<sup>7</sup> It should be mentioned that there is a difficulty in investigation of the mechanisms by which physical activity protects against coronary heart disease, independently of any coexistence of other risk factors.<sup>8</sup> However, it seems to correlate with the release of some vasodilators and antithrombotic substances from the endothelium of vessels.<sup>9</sup>

Physical exercise can be defined as any kind of activity which is conducted for

the improvement of physical condition and increases the heart rate to 70-85% of maximum, with the synchronized operation of many muscle groups without resistance, - aerobic (isotonic) exercise - (eg. running, jogging path, swimming, cycling, participation in team sports, fitness).

Similarly, physical activity can be defined as every muscle exercise which increases the heart rate to 50% of maximum (eg. household tasks, walking, gardening, using stairs instead of elevator, home repairs).<sup>10</sup>

Additionally, a considerable number of studies suggest that even a low level of activity has a protective role against weight gain and obesity. Thus, it should be strongly recommended to elderly people.<sup>1,3</sup> A research study conducted by Dontas et al.,<sup>11</sup> showed that the strongest factor of survival at the age of  $\geq 80$  years old was the ability to walk without assistance. It has been shown that exercises of resistance (strength) are generally safe for elderly people with sedentary life and can start slowly and

progressively (eg. resistance tubes, weights, springs) aimed at muscle strengthening in elderly people.<sup>12</sup>

Despite the proven benefits of physical activity, WHO<sup>13</sup> estimates that over 60% of adults do not exercise, which results in increased morbidity and premature mortality from various diseases, as well as the appearance of many socioeconomic problems.<sup>14</sup>

It is worth noting that physical activity improves lipid profile, reducing the levels of plasma triglycerides, VLDL and LDL cholesterol, and raising levels of HDL cholesterol.<sup>15,16</sup> There have been reported some positive changes in lipids in elderly women, after aerobic exercise programs of moderate intensity, 1 year's duration, with a frequency > 3 times a week.<sup>17</sup>

On the other hand, no changes in lipids were observed in research studies conducted on elderly men and women who applied aerobic exercises and resistance exercises for less than 3 months.<sup>18</sup>

It should be stressed that physical activity during leisure time is associated with a reduced risk for coronary heart disease.<sup>19</sup> Thus, a physical activity of a moderate intensity, with a total duration of 20-30 minutes a day, for all days a week, leads to cardiovascular benefits

and improves the physical condition of elderly people.<sup>20</sup>

Comparing to resistance exercises (eg. weights, springs), aerobic exercises of moderate intensity (eg. swimming, cycling, walking 30 minutes a day, three to five times a week) are recommended more to elderly people with hypertension, since they can lead to a drop of 10 mmHg for systolic blood pressure and 8 mmHg for diastolic blood pressure. Thus, aerobic exercises help to reduce morbidity and mortality from strokes and coronary artery disease.<sup>21,22</sup>

Physical activity in elderly people, even of a moderate intensity and duration, ( $\geq$  1 Km walking a day or gardening), has a beneficial effect on type 2 Diabetes and is associated with a reduced risk of mortality from coronary heart disease and other cardiovascular diseases<sup>6,23</sup>. These findings are supported by the studies of Evans et al.,<sup>15</sup> and Di Pietro et al.,<sup>24</sup> who recommend aerobic exercises of higher intensity for a longer period of time.

Regarding the interaction between diet and physical activity, many epidemiological research studies have shown that elderly people, although they maintain the same levels of their food intake, when they increase their physical activity they lose weight even for a short time.<sup>25</sup> Additionally, many research

studies have shown a greater weight loss when diet was combined with an increased physical activity.<sup>26</sup>

Despite the small overall gain in absolute terms, the ideal combination of adequate exercise and healthy eating is mostly beneficial in terms of maintaining muscle mass in elderly people.<sup>27</sup>

## Material and Method

### Study sample

The sample consisted of 426 people who came from KAPI (Open Care Centers for Elderly) in Attica. Participants were men and women aged of 65 years old and over. From the total selected 2250 active members of KAPI approximately, 426 participants (18.93%) examined randomly, of which there were 245 women and 181 men. To ensure the widest possible representation of all the members of KAPI, there were conducted visits in each KAPI which covered commensurate all days of the week, both morning and evening hours. The limited rate of refusal did not differ statistically significantly between the 8 (eight) KAPI.

### Methodology

The data collection was made by interviews between the researcher and the elderly people, as well as the use of some instruments for measuring blood

pressure and anthropometric indices. Before the survey, each elderly participant had to sign a form of information and a voluntary agreement, and received a copy of the form.

All the elderly participants completed a questionnaire concerning their health status, a questionnaire about the frequency of food consumption, and a questionnaire concerning their physical activity. In the questionnaire of physical activity, there was undertaken a seasonal record (summer / winter) of hours engaging in the following activities per week: mandatory standing, walking (e.g. work, entertainment, shopping), sports (e.g. swimming, running, basketball, aerobics, volleyball), cycling (e.g. work, entertainment, shopping), gardening, household tasks (e.g. cooking, cleaning, care of children, grandchildren, washing) and home repairs. Additionally, the questionnaire included questions of anthropometry (e.g. height and weight changes during the last five years).

Based on information about physical activity, it was calculated the average daily duration of various types of physical activity. This duration was multiplied with the metabolic equivalent index (metabolic equivalent - MET), which is a multiple of metabolic rate at rest.<sup>28</sup> Finally, the individual products

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summed at the total MET-hours, which constitute an estimate of the daily physical activity and expresses the energy spent on a typical day per kilogram of weight.

Apart from that, participants completed a form of anthropometric characteristics (e.g. measurement of body weight, height and circumference of chest, waist and hips). According to the instructions given to participants, they should wear light clothes and remove their shoes before the measurement of height and weight.

All the measurements were conducted with the same weighted organs in the total sample and carried out under standard procedures derived from the protocol of the research study. They are as follows:

- 1.The blood pressure measurements were made with a stethoscope and a mercury sphygmomanometer, with a tube size 12x35cm (the length of the cuff tube covered at least 80% of the arm).
- 2.The weight measurements were made by an electronic balance accurate to 0,1 Kg.
- 3.The measurements of stature were made by a classified height accurate to 0,1 cm.
- 4.The measurement of the circumference of the chest, waist

and hips was made by a measurement strip.

- 5.It was estimated the body mass index (BMI as [kg/m<sup>2</sup>]).

In the present research study, there were strictly followed all the ethical principles concerning every research study. (e.g. Participants' responses were not notified to anyone, even to the other volunteers who participated in the research study). Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS) 12.0. The significance level of the present study was  $p < 0.05$ .

## Results

The present research study was focused on a data from a sample of 426 elderly people who used to go to KAPI in Attica frequently. However, the sample is not totally representative of all the elderly population in Attica, due to the factors involved in selecting people who used to go to KAPI and the choice of those who cooperated with the study. Nevertheless, the data which are presented in Table 1 do not differ significantly from the distribution patterns of the elderly population in Greece.

Thus, a small percentage of elderly people have education beyond high school of 6 grades, while this small percentage is relatively higher in men (6.1%) than women (2.0%). Regarding



marital status, a significant percentage of women (34.7%) live alone, while this figure is very small in men (9.9%). All men reported that they work or worked in the past, while 20% of women reported that they had never had work with pay.

Table 2 presents the anthropometric characteristics of the study sample. Factors of sample selection are more affecting sociodemographic characteristics than anthropometric characteristics and nutrition. Thus, data in Table 2 are more general. The stature of men is significantly greater than that of women, approximately 10 cm, while the weight of men is only slightly larger than that of women. Thus, the BMI (Body Mass Index - BMI) is significantly higher in women.

As a result of this, almost two thirds of women (63.3%) can be described as obese, while the corresponding figure for men is 41.4%. It is obvious that obesity, which is regarded as an important problem in Greek people, concerns elderly people as well, and especially women. Although women have a higher BMI, they have an advantage concerning the perimeter ratio of waist to hip (waist-to-hip ratio - W / H), which is positively associated with morbidity and mortality.

Table 3 presents the physical activity of the study sample. Physical activity of the participants is generally limited and systematic exercise is minimal. A large percentage of men (58.6%) and even more women (62.3%) did not exercise regularly. Only 38.9% of men and 31.5% of women walked more than 1 hour a day, while 6.6% of men and 2.5% of women regularly used a bicycle for their transport. Additionally, 76.0% of women engaged in household tasks for more than 1 hour a day, while the corresponding figure for men was only 7.8%. Furthermore, 25.7% of men and 21.0% of women were involved in gardening and home repairs for more than 1 hour a day. The data which are presented in Table 3 are relative to specific activities during a week, with an exception of the total activity expressed in MET-hours, which covers a typical day.

It is worth noting that due to increased involvement of the participated women in household tasks, which have a degree of energy requirements, the participated women had more physical activity than men in the present study.

In Table 4, men and women of the sample are divided according to their consumption of glasses of alcoholic drinks a day and their smoking habits. It

should be noted that, regardless of the type of any alcoholic drink, a glass of a drink usually contains 10 g of alcohol. For this reason, drinks with high alcohol content are generally provided in small quantities (e.g. ouzo), while drinks with low alcohol content are generally provided in larger quantities (e.g. beer). A small percentage of women (22%) and even a smaller percentage of men in this study (8.8%) did not consume alcohol, while the majority of men and women had a moderate consumption of ethanol. However, men used to consume relatively larger quantities of ethanol than women.

Regarding smoking habits, there is a clear differentiation between men and women. More than two thirds of men are or have been smokers, although only 13.8% of them still continue to smoke. On the other hand, less than one quarter of women are or have been smokers, but half of them still continue to smoke.

Tables 5 and 6 present parameters of morbidity, which are examined as dependent variables in a logistic regression of multivariate dependencies for qualitative categorical variables. In each case, independent variables are sex and age, and factors that probably play a role in the dependent variable (explanatory or non-relationship) either from literature or from data.

In Table 5, the importance of findings about the history of coronary heart disease is done by flexible criteria, due to the limited number of observations and taking into consideration bibliographic data. Thus, it seems that women have a lower incidence of coronary heart disease history than men. Additionally, diabetes and smoking increase the risk of coronary heart disease, while physical activity tends to reduce this risk.

The negative relationship between physical activity and prostate hyperplasia is remarkable in the present study, although data are not statistically significant ( $p > 0,103$ ).

## Discussion

Taking into account the sociodemographic characteristics of the sample (Table 1), the elderly population should become a priority of public health, since in Greece more than one third of women and one tenth of men live alone. The elderly people who live alone are the most vulnerable group in natural disasters. The other characteristics of the study sample, and especially the relatively low level of academic education, are compatible with the corresponding characteristics of the Greek population at this age.<sup>29, 30</sup>

The anthropometric characteristics of the participants in this study (Table 2)

indicate that obesity, which is regarded as a serious problem in Greek population, concerns elderly people as well, since almost two thirds of women and more than 40% of men are obese, which means that they have BMI greater than 30 kg/m<sup>2</sup>.

It is worth noting that less than 10% of the examined elderly people had an acceptable body mass index (i.e. less than 25 kg/m<sup>2</sup>). Many research studies have showed that obesity is one of the most important modern health problems of the Greek population.<sup>31</sup> For this reason, emphasis should be placed in childhood, where there are the roots of many problems in adult life.<sup>29</sup>

The main objective of addressing obese patients is the reduction of cardiovascular risk, and this can be achieved through a combination of proper diet, regular physical activity and modification of general behavior.<sup>3, 26</sup>

Regarding hypertension, regular physical exercise is beneficial for both, prevention and treatment of hypertension. An exercise program of moderate or low intensity (walking, swimming, cycling) in people with hypertension, leads to a greater fall of blood pressure than a high intensity exercise program.<sup>21, 32, 33</sup>

Additionally, a change in way of life in elderly people (weight loss, diet, physical

activity) is associated with a significant reduction of risk factors from diabetes and cardiovascular death.<sup>23, 34</sup> However, morbidity and mortality mainly affect the elderly people, and therefore any delay or postponement in the treatment of a problem cannot be justified at this age.

It has been documented that physical exercise is a crucial factor of longevity, since a level of physical activity in daily life contributes to a reduction of all negative effects of age. For this reason, it should be recommended at people of every age, including people at third age.<sup>35</sup>

However, few elderly people have desirable levels of physical activity and this contributes to high rates of obesity, which were observed in this study. These findings are supported by the study of Gnardelli et al.,<sup>36</sup> who found that physical activity displays a significant decrease from the age of 55 years old and over. Regarding the relationship of age with physical activity, with the increase of age there is a parallel decrease in physical activity. Similarly, in the present study, people aged of 65-79 years of both sexes showed a significantly higher rate of physical activity than those aged of 80-90 years old.



Additionally, in this study, men and women aged of 65-74 years old used to walk more than 1 hour a day. These findings agree with the study of Avlund et al.,<sup>37</sup> where individuals aged of 70-79 years old had not reduced their participation in walking. Similarly, the study of EPIC showed that Greek men and women aged of 65-74 years old walked 5, 7 hours a week and 4, 7 respectively.<sup>38</sup>

The physical activities which are mostly carried out by elderly women are associated with activities of daily living, such as walking, shopping, cleaning, cooking, washing and caring for family members. There is also a selective involvement of women in household tasks. In this study, the total physical activity of elderly women was higher than that of men, since the household tasks and the care of the family or the care of someone else seems to help women to continue to be more active than men even at an old age. These findings agree with the findings of Schuit et al.,<sup>39</sup> and EPIC.<sup>40</sup>

Finally, the involvement of both sexes in home repairs and gardening, perhaps because of the fact that most participants had rural origin, are activities that provide some level of physical activity. However, systematic exercise (aerobics, jogging and

swimming) was rare in both sexes. Concerning bicycle, it does not seem to get used regularly, apart from a percentage of 6.6% of men and 2.5% of women who use it for shopping, exercise, travel, work. This may happen due to their fear of falling on rough roads and the lack of bicycle paths in the above municipalities.

### Conclusions

In conclusion, it could be stressed that a serious matter that should concern health professionals in public health in Greece is the limited physical activity of the elderly people, since only about 40% of men and 30% of women walk more than 1 hour a day. Taking into consideration the importance of physical activity in health promotion and quality of life, the above issue should be one of the most important priorities in public health, and particularly for the continuous growing population of elderly people.

Additionally, the State should reinforce programs aimed at increasing and maintaining physical activity in elderly people. All the programs should be affordable for every socioeconomic level and designed in such a way that meets the abilities and limitations of elderly people.

## REFERENCES

1. Hu G, Tuomilehto J, Silventoinen K, Barengo N, Jousilahti P. Joint effects of physical activity, body mass index, waist circumference and waist-to-hip ratio with the risk of cardiovascular disease among middle-aged Finish men and women. *Eur Heart J* 2004; 25(24): 2183-2184.
2. Pitsavos C, Panagiotakos DB, Chrysohoou C, Kokkinos P, Menotti A, Singh S, Dontas A. Physical activity decreases the risk of stroke in middle-age men with left ventricular hypertrophy: 40-year follow-up (1961-2001) of the Seven Countries Study (the Corfu cohort). *J Hum Hypertens* 2004;18(7):495-501.
3. Di Francesco V, Zamboni M, Zoico E, Bortolani A, Maggi S, Bissoli L, Zivelonghi A, Guariento S, Bosello O. Relationships between leisure-time physical activity, obesity and disability in elderly men. *Aging Clin Exp Res* 2005; 17(3): 201-206.
4. Kokkinos PF, Papademetriou V. Exercise and hypertension. *Cor Artery Dis* 2000; 11(3): 99-102.
5. Kostka T, Lacour J, Bonnefoy M. Response of blood lipids to physical exercise in elderly subjects. *Prev Cardiol* 2001; 4(3): 122-125.
6. Smith TC, Wingard DL, Smith B, Krtz-Silverstein D, Barrett-Connor E. Walking decreased risk of cardiovascular disease mortality in older adults with diabetes. *J Clin Epidemiol* 2007; 60(3):309-317.
7. Drewnowski A, Evans WJ. Nutrition, physical activity and quality of life in older adults: summary. *J Gerontol A Biol Sci Med Sci* 2001; 56(Spec No 2): 89-94.
8. Babatsikou F. Cardiovascular risk factors in elderly. *Review of Clinical Pharmacology and Pharmacokinetics, International Edition* 2010; 24 (3): 265-270.
9. Babatsikou F. Epidemiological data of cardiovascular diseases in the elderly. *To Vima tou Asklipiou (vima-asklipiou.gr)* 2010; 9 (3):230-242 (In Greek).
10. Hui EK, Rubenstein LZ. Promoting physical activity and exercise in older adults. *J Am Med Dir Assoc* 2006; 7(5): 310-314.
11. Dontas AS, Toupadaki N, Tzonou A, Kasviki-Charvati P. Survival in the oldest old: death risk factors in old and very old subjects. *J Aging Health* 1996; 8(2): 220-237.
12. Hass CJ, Feigenbaum MS, Franklin BA. Prescription of resistance training

- 
- for healthy populations. *Sports Med* 2001; 31(14): 953-964.
- 13.WHO. Annual Global Move for Health Initiative; A Concept Paper: World Health Organization 2003.
- 14.Katzmarzyk PT, Janssen I. The economic costs associated with physical inactivity and obesity in Canada: an update. *Can J Appl Physiol* 2004; 29(1): 90-115.
- 15.Evans EM, Racette SB, Peterson LR, Villareal DT, Greiwe JS, Holloszy JO. Aerobic power and insulin action improve in response to endurance exercise training in healthy 77-87 yr olds. *J Appl Physiol* 2005; 98(1): 40-45.
- 16.Babatsikou F, Metaxa, M, Koutis, C. Epidemiology of hyperlipidemia in elderly. *Epitheorese Klinikes Farmakologias kai Farmakokinetikes* 2009; 27 (2):137-142 (In Greek).
- 17.Kushi LH, Fee RM, Folsom AR, Mink PJ, Anderson KE, Sellers TA. Physical activity and mortality in postmenopausal women. *JAMA* 1997; 277(16): 1287-1292.
- 18.Fonong T, Toth JM, Ades AP, Katznel IL Calles-Escandon J, Poehlman Te. Relationship between physical activity and HDL-cholesterol in healthy older men and women. A cross-sectional and exercise intervention study. *Atherosclerosis* 1996; 127(2): 177-183.
- 19.Malmberg J, Millunpato S, Pasanen M, Vuori I, Oja P. Characteristics of leisure-time physical activity associated with risk of decline in perceived health-a 10-year follow-up of middle-aged and elderly men and women. *Prev Med* 2005; 41(1):141-150.
- 20.Brach JS, Simonsick EM, Kritchevsky S, Yaffe K, Newman AB. The association between physical function and lifestyle activity and exercise in the health, aging and body composition study. *J Am Geriatr Soc* 2004;52(4):502-509.
- 21.Stewart KJ. Exercise training and the cardiovascular consequences of type 2 diabetes and hypertension: plausible mechanisms for improving cardiovascular health. *JAMA* 2002; 288(13): 1622-1631.
- 22.Gandasentana R.D, Kusumaratna R. K. Physical activity reduced hypertension in the elderly and cost-effective. *Univ Med* 2011;30 (3):173-181.
- 23.Grandall J, Schade D, Ma Y, Fujimoto WY, Barrett-Conor E. The influence of age on the effects of lifestyle modification and metformin in prevention of diabetes. *J Gerontol A*
-

- Biol Sci Med Sci 2006; 61(10): 1075-1081.
24. Di Pietro L, Dziura J, Yeckel CW, Neuffer PD. Exercise and improved insulin sensitivity in older women: evidence of the enduring benefits of higher intensity training. *J Appl Physiol* 2006; 100(1):142-149.
25. Fogelholm M, Kukkonen-Harjula K. Does physical activity prevent weight gain- a systematic review. *Obes Rev* 2000; 1(2): 95-111.
26. Villareal DT, Banks M, Sinacore DR, Siener C, Klein S. Effect of weight loss and exercise on frailty in obese older adults. *Arch Intern Med* 2006; 166(8):860-866.
27. Dontas AS, Moschandreas J, Kafatos A. Physical activity and nutrition in older adults. *Public Health Nutr* 1999; 2(3A): 429-436.
28. Ainsworth Be, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ et al. Compendium of physical activities: Classification of energy codes and MET intensities. *Med Sci Sports Exerc* 2000; 32 (S9):S498-S504.
29. Babatsikou F. The health of elderly in Attica, Greece and factors affecting it. Doctoral Thesis. Athens, 2007.
30. Babatsikou F. Trend of the demographic indices over time in the Greek population. *To Vima tou Asklipiou* (vima-asklipiou.gr) 2009; 8(4): 275-290 (In Greek).
31. Mamalakis G, Kafatos A. prevalence of obesity in Greece. *Int J Obes* 1996; 20 (5):488-492.
32. Ogihara T, Rakugi H. Hypertension in the elderly: a Japanese perspective. *Drugs Aging* 2005; 22(4): 297-314.
33. Babatsikou F, Zavitsanou A. Epidemiology of hypertension in the elderly. *Health Science Journal* 2010; 4 (1): 24-30.
34. Wannamethee SG, Shaper AG, Walker M. Overweight and obesity and weight change in middle aged men: impact on cardiovascular disease and diabetes. *J Epidemiol Community Health* 2005; 59(2): 134-139.
35. Trichopoulos A, Costacou T, Bamia C, Trichopoulos D. Adherence to a Mediterranean diet and survival in a Greek population. *N Engl J Med* 2003; 348(26):2599-2608.
36. Gnardellis C, Lagiou A, Chloptsios I, Benetou V, Trichopoulos A. Estimation of physical activity in epidemiological studies. The Greek Experience in the context of the EPIC study. *Iatriki* 1999; 76(6):551-558. (In Greek).
37. Avlund K, Sakari-Rantala R, Rantanen T, Pedersen A.N. Frandin

- K, Schroll M. Tiredness and onset of walking limitations in older adults. *Journal of the American Geriatrics Society* 2004;52 (11):1963-1965.
38. Trichopoulou A, Orfanos P, Norat T, Bueno-de-Mesquita B, Ocke MC, Peeters PH, van der Schouw YT et al. Modified Mediterranean diet and survival: EPIC-elderly prospective cohort study. *BMJ* 2005; 330(7498): 991-995.
39. Schuit A.J, Schouten E.G, Westerterp K.R, Saris W.H. Validity of the Physical Activity Scale for the elderly (PASE) according to energy expenditure assessed by the doubly labeled water method. *Journal of Clinical Epidemiology* 1997; 50(5):541-546.
40. Valanou E, Bamia C, Chloptsios G, Koliva M, Trichopoulou A. Physical activity of 28.030 men and women of the Greek EPIC cohort. *Archives of Hellenic Medicine* 2006; 23(2):149-158 (In Greek).



## ANNEX

**Table 1.** Sociodemographic characteristics of the elderly sample from KAPI in Attica

(n = 426)

	Men (n=181) N (%)	Women (n=245) N (%)
<b>Age (years)</b>		
65-69	43 (23.8)	128 (52.3)
70-74	61 (33.7)	63 (25.7)
75+	77 (42.5)	54 (22.0)
<b>Education</b>		
≤6 years	131 (72.4)	200 (81.6)
7-12 years	39 (21.5)	37 (15.1)
>12 years	11 (6.1)	5 (2.0)
<b>Cohabitation</b>		
No	18 (9.9)	85 (34.7)
With spouse/ partner	100 (55.2)	77 (31.4)
With children	10 (5.5)	41 (16.7)
With spouse and children	53 (29.3)	42 (17.1)
With other		
<b>Work in the past or now</b>		
No	0 (0.0)	49 (20.0)
Yes	181 (100.0)	196 (80.0)

**Table 2.** Anthropometric characteristics of the elderly sample from KAPI in Attica (n = 426)

	Men (n=181) N (%)	Women (n=245) N (%)
<b>Stature (m)</b>		
<1,50	-	61 (24.9)
1,50-1,54	4 (2.2)	77 (31.4)
1,55-1,59	24 (13.3)	67 (27.3)
1,60-1,64	42 (23.2)	32 (13.1)
1,65+	111 (61.3)	8 (3.3)
<b>Weight (kg)</b>		
<70	23 (12.7)	82 (33.5)
70-74	23 (12.7)	43 (17.6)
75-79	30 (16.6)	39 (15.9)
80-84	33 (18.2)	36 (14.7)
85-89	32 (17.7)	15 (6.1)
90+	40 (22.1)	30 (12.2)
<b>BMI (kg/m<sup>2</sup>)</b>		

<24,99	19 (10.5)	15 (6.1)
25-29,9	87 (48.1)	75 (30.6)
30+	75 (41.4)	155 (63.3)
<b>Perimeter ratio of waist/ hip (cm)</b>		
<0,92	12 (6.6)	90 (36.7)
0,93-0,98	26 (14.4)	71 (29.0)
0,99-1,03	68 (37.6)	58 (23.7)
1,04+	75 (41.4)	26 (10.6)

**Table 3.** Physical activity (hours per week)

	Men (n=181) N (%)	Women (n=245) N (%)
<b>Walking</b>		
0	14 (7.8)	18 (7.5)
0,5-7,0	96 (53.3)	146 (61.1)
7,1+	70 (38.9)	75 (31.4)
<b>Cycling</b>		
0	169 (93.4)	234 (97.5)
0,5+	12 (6.6)	6 (2.5)
<b>Sports</b>		
0	106 (58.6)	152 (62.3)
0,5+	75 (41.4)	92 (37.7)
<b>Household tasks</b>		
0	100 (55.9)	8 (3.3)
0,5-7,0	65 (36.3)	50 (20.7)
7,1+	14 (7.8)	184 (76.0)
<b>Gardening/ home repairs</b>		
0	69 (38.5)	120 (49.4)
0,5-7,0	64 (35.8)	72 (29.6)
7,1+	46 (25.7)	51 (21.0)
<b>MET*- Hours of daily activity</b>		
<25,65	73 (42.2)	29 (12.6)
25,66-28,49	50 (28.9)	49 (21.2)
28,50-31,96	25 (14.5)	77 (33.3)
31,97+	25 (14.5)	76 (32.9)

\* MET = metabolic equivalent. (The categories listed in quarters derived from the whole sample (men and women together).

**Table 4.** Habits of life

	Men (n=181) N (%)	Women (n=245) N (%)
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<b>Alcohol consumption (glasses/day)</b>			
0	16 (8.8)	54	(22.0)
<1	76 (42.0)	147	(60.0)
2-3	80 (44.2)	43	(17.6)
4+	9 (5.0)	1	(0.4)
<b>Smoking</b>			
Non- smokers	57 (31.5)	190	(77.6)
Former smokers	99 (54.7)	27	(11.0)
Smokers	25 (13.8)	28	(11.4)

**Table 5.** Logistic regression of history of coronary heart disease on the mentioned independent variables.

	OR	95% CI	p value
<b>Sex</b> (female to male)	0.31	0.15 – 0.66	0.002
<b>Age</b> (per 5 years)	0.87	0.70 – 1.09	0.252
<b>Smoking</b> (gradient: never/ former and present with <20 cigarettes/day, former and current ≥ 20 cigarettes/day)	1.28	0.87 – 1.87	0.208
<b>Physical activity</b> (per 1 MET-hour)	0.96	0.90 – 1.03	0.227
<b>Diabetes</b> (yes to no)	1.77	0.97 – 3.23	0.065

**Table 6.** Logistic regression of prostate hyperplasia history on physical activity.

	OR	95% CI	P value
<b>Age</b> (per 5 years)	1.02	0.76 – 1.37	0.889
<b>BMI</b> (per 5 kg/m <sup>2</sup> )	1.20	0.78 – 1.84	0.419
<b>Physical activity</b> (per 1 MET-hour)	0.93	0.86 – 1.01	0.103