



## OBESITY AND PARTICIPATION IN EXERCISE ON GREEK WOMEN ON FIVE DECADES OF THEIR LIFE

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The aim of the present study was to investigate obesity on women. For this reason 237 women that separated on five groups by age, were examined. Group A consisted of women on the 3<sup>rd</sup> decade of their life (20-29 years old), Group B of women on the 4<sup>th</sup> decade (30-39 years old), Group C of women on the 5<sup>th</sup> decade (40-49 years old), Group D of women on the 6<sup>th</sup> decade (50-59 years old) and Group E of women on the 7<sup>th</sup> decade (60-69 years old). Measurements of women's height and body weight were performed. The Body Mass Index (BMI) was used for the evaluation of the degree of overweight and obesity, according to the values for adults set by World Health Organisation (WHO). For the statistical analysis the statistic packet SPSS/PC version 12.0 for windows was used. From data statistical analysis it was found out that group A had BMI  $21.84 \pm 3.70$  kg/m<sup>2</sup>, group B  $23.47 \pm 3.47$  kg/m<sup>2</sup>, group C  $25.64 \pm 3.97$  kg/m<sup>2</sup>, group D  $26.49 \pm 3.79$  kg/m<sup>2</sup>, and group E  $26.74 \pm 3.93$  kg/m<sup>2</sup>. Women's classification as for BMI showed that the 8.7% of Group A was underweight, 73.9% had normal weight and 17.4% was overweight and/or obese. In regard on women of group B, only a 1.8% of them were underweight, 71.7% had normal weight and 26.5% was overweight and/or obese. In group C, a 1.5% of the women were underweight, 45.3% had normal weight and 53.2% were overweight and/or obese. In group D, there was no underweight woman, while the bigger percentage (60.0%) were overweight and/or obese, while smaller percentage of them (40.0%) had normal weight. Finally, in Group E, the overweight and/or obese women percentage increases dramatically to 72.8%, while the normal weight women percentage decreases even more to 27.2%. In addition, one-way Anova showed that the decade of life influence the years of participation in exercise ( $F=8.22$ ,  $p<0.001$ ), indicating that as the decade of life increased, the years of participation in exercise decreased. Correlation analysis showed that BMI was correlated negatively to the years of participation in exercise ( $r=-0.307$ ,  $p<0.01$ ). Consequently, it could be said that, although there were observed high percentages of excess weight and obesity that increased with the age, these percentages could decreased with the regular and not occasional participation in exercise during the whole life.

**Key-Words:** aging, overweight, obesity, prevention, inactivity, physical activity, diet

### Introduction

In prehistoric ages obesity could play a role of fat deposit and could ensure survival in periods of starvation. However, today the only thing that ensures is the reduction of survival. Thus, obesity is a serious threat for health and an enemy for body aesthetics. Moreover, it has been proved that obesity is associated with a number of co-morbidities, such as diabetes, hypertension, stroke, hypercholesterolemia, coronary heart diseases, kidney stones, osteoarthritis, and some cancers (Ronnemaa et al., 1998). However, obesity doesn't happen alone, but is a result of many factors and, undoubtedly, a result of inactivity and of lifestyle.

Lifestyle modulates health state and blunts the changes that derive as a result of the age. However, most people acquire the habit of sedentary life, which is characterized by intense lack of any form of physical activity (Berger & Hecht, 1989; Berger & McInman, 1993; Duda & Tappe, 1988; Smith & Serfass, 1981). Thus, the functional ability low level, that is observed in many people, mainly old people, is not the result of the age, but the result of their lifestyle (Vuori, 1995), and certainly of sedentary life. Due to sedentary life and inactivity the metabolism changes. The organism does not proceed in combustions, as there are not special requirements and needs to be covered. If in this stage human dietary habits do not change, so that the organism compensates the lack

of movement, then all the unnecessary calories that are consumed, will be stored as adipose tissue (fat) adding thus more weight, which could lead in obesity (Deligiannis, 1992). Unfortunately, the modern man has been impelled in a sedentary life, due to “clever” machines that created in order to facilitate and cover individual needs (Corbin et al., 2001).

However, physical activity is necessary for the maintenance of physical health and psychological well-being (Berger, 1996; Blair, 1995). More specifically, the participation in physical activities is the best preventive means for chronic diseases such as arteriosclerosis, hypertension, cardiovascular diseases, mellitus diabetes type II, osteoarthritis, osteoporosis, obesity, some forms of cancer, disturbances in the peptic system, as well as for premature mortality, functional limitations, and disability (Antonakoudis & Antonakoudis, 2003; Nelson et al., 2007; Paffenbarger, 1996).

For these reasons the aim of the present study was to examine obesity frequency and exercise participation on Greek women on five decades of their life.

**Content and Methods**

**Sample:** 237 Greek women that separated on five groups by age, were examined. Group A consisted of women on the 3<sup>rd</sup> decade of their life (20-29 years old), Group B of women on the 4<sup>th</sup> decade (30-39 years old), Group C of women on the 5<sup>th</sup> decade (40-49 years old), Group D of women on the 6<sup>th</sup> decade (50-59 years old) and Group E of women on the 7<sup>th</sup> decade (60-69 years old).

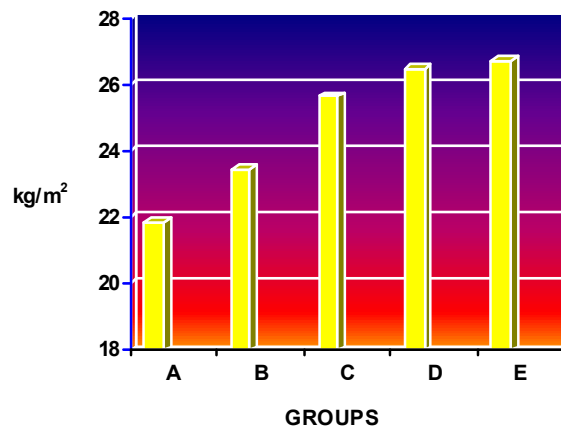
**Measurements.** Measurements of women’s height and body weight were performed. The Body Mass Index (BMI) was used for the evaluation of the degree of overweight and obesity, according to the values for adults set by World Health Organisation (WHO). BMI is objective, highly reliable, and has a high correlation ( $r=0.7-0.8$ ) with the body fat content in adults (Albert & DiGuseppi, www.vnh.org/ GCPS2/31.html; Corbin et al., 2001).

**Questionnaire.** All the women answered to questionnaires with regard to the years they participate in exercise.

**Statistical Analysis.** The statistic packet SPSS/PC Version 12.0 for windows was used. The *non-parametric test Kolmogorov-Smirnov* was used to evaluate samples’ normal distribution. To evaluate significant differences between the five groups of women *student t-test* and *oneway ANOVA* were used. The level of significance was set to  $p<0.05$ .

**Results**

In Figure 1, BMI for all age groups is presented. As it is shown BMI was progressively increased from one age group to another. More specifically, group A had BMI  $21.84\pm3.70$  kg/m<sup>2</sup>, group B  $23.47\pm3.47$  kg/m<sup>2</sup>, group C  $25.64\pm3.97$  kg/m<sup>2</sup>, group D  $26.49\pm3.79$  kg/m<sup>2</sup>, and group E  $26.74\pm3.93$  kg/m<sup>2</sup>.



In Figures 2 and 3, women’s classification as for BMI is presented. As it is shown, the 8.7% of Group A was underweight, 73.9% had normal weight and 17.4% was overweight and/or obese. In regard to women of group B, only a 1.8% of them were underweight, 71.7% had normal weight and 26.5% was overweight and/or obese. In group C, a 1.5% of the women were underweight, 45.3% had normal weight and 53.2% were overweight and/or obese. In group D, there was no underweight woman, while the bigger percentage (60.0%) were overweight and/or obese, while smaller percentage of them (40.0%) had normal weight. Finally, in Group E, the overweight and/or obese women percentage increases dramatically to 72.8%, while the normal weight women percentage decreases even more to 27.2% (Figure 2 and 3).

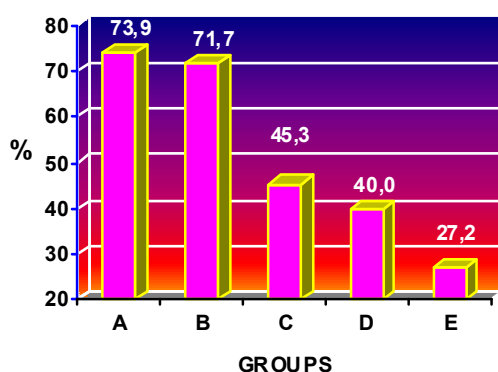


Figure 2. Percentages of women with normal weight

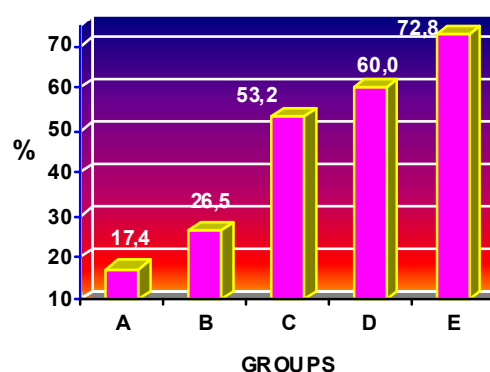


Figure 3. Percentages of overweight and obese women

In addition, one-way Anova showed that the decade of life influence the years of participation in exercise ( $F=8.22$ ,  $p<0.001$ ), indicating that as the decade of life increased, the years of participation in exercise decreased.

Table1. Correlations between BMI and years of participation in exercise

	BMI	Years of participation in exercise
BMI	1	-0.307**
Years of participation in exercise	-0.307**	1

\*\* correlation is significant at the 0.01 level

Finally, in Table 1 the existence of a very high negative correlation ( $r=-0.307$ ,  $p<0.01$ ) between BMI and the years of participation in exercise is shown. The correlation indicates that as the years of participation in exercise increased then BMI is, contemporaneously, decreased and the opposite.

### Discussion

The aim of the present study was primary to examine obesity frequency on Greek women on five decades of their life, in order to test its progression throughout the life. The 1999-2000 National Health and Nutrition Examination Survey indicates that an estimated 64% of USA adults are either overweight or obese (Flegal et al., 2002). Moreover, obesity prevalence in adult women in Europe is ranging between 10-25%, a percentage which has been increased the last 10 years (International Obesity Task Force, [www.who.int](http://www.who.int)). In agreement, high percentages of overweight and obesity were found in the five examined age groups in the present study, starting from 17.4% in the group being at the third decade of life and resulting to 72.8% in the group being at the seventh decade of life. More specifically, from the results it was found out that the 1/6 of the women being at the 3<sup>rd</sup> decade of life, the 1/4 of the women being at the 4<sup>th</sup> decade of life, the 1/2 of the women being at the 5<sup>th</sup> decade of life, the 3/5 of the women being at the 6<sup>th</sup> decade of life and the 3/4 of the women being at the 7<sup>th</sup> decade of life, were overweight and/or obese. Thus, it is obvious that unfortunately overweight and obesity percentages are extremely high. Moreover a progressive and, also, significant increase in overweight and obesity percentages has been observed.

These observed, in the present study, progressive increases of BMI between the 3<sup>rd</sup> and the 7<sup>th</sup> decade of life can be explained from relative with the age, changes. Although the energy consumption tends to be decreased after the second decade, this reduction is insufficient to compensate the bigger reduction in the amount of the consumed energy, due to high levels of inactivity and of fatty foods consumption (Bray, 1983). Therefore, obesity constitutes a simple subject of energy balance. Energy reception that is bigger than the consumption leads in a body weight accumulation (Epstein & Wing, 1980). Moreover, population studies show that overweight prevalence, which is relative with the age, has been increased in adults from 25%, in 1970 in 33% in 1988-1991 (Kuczmarski et al., 1994). This increase is obvious in both sexes. This phenomenon is believed to happen due the high levels of inactivity in combination with the easy access in fatty foods (Blackburn & Prineas, 1983).

Thus, a loss of body weight is essential, because obesity is not just a problem in body image, but contributes to the increase of death frequency 12 times at ages 25-35 years, 6 times at ages 35-44 years and 3 times at ages 45-54 years (Pavlou, 1993). Moreover, the Framingham study shows, that cardiovascular diseases is possible to be decreased at 25%-35%, if the ideal body weight is reached. A loss of body weight even of 5-10% can decrease

the risk factors (Anderson et al., 1987). A body weight loss can happen when an individual participates in an acceptable level of exercise, systematically, and the calories consumption balanced with the combustions (Pavlou, 1993). Moreover, the 30% of obesity new cases could be prevented with the adoption of a relatively active life style, that is less from 10 h/wk tv watching and more or equal with 30 min/d vigorous walking (Hu et al., 2003). Thus, the regular participation in exercise is extremely beneficial in relation to body weight and BMI reduction. This was, also, found in the present study, where a very high negative correlation between BMI and the years of participation in exercise was found indicating that as the years of participation in exercise increased then BMI is, contemporaneously, decreased.

Unfortunately, the 60% of adults do not have the essential quantity of regular physical activity, while the 25% of adults do not exercise at all. The non-participation in physical activity increases with the age and is more frequent in women in comparison to men (A Report of Surgeon General, 1997). In agreement, in the present study it was found out that the decade of life influence the years of participation in exercise. More specifically, it was found out that as the decade of life increased, the years of participation in exercise decreased. This in combination with the high negative correlation between BMI and the years of participation in exercise explains the fact that BMI was observed significantly more increased in high ages. In addition, it is worth to be mentioned that the combination of an exercise program with a balanced diet could lead to better results and be maintained for a bigger period (Garrow, 1986).

Summing up, from the results of the present study, the problem of excess weight and obesity is established. A problem that observed to be increased from the 3<sup>rd</sup> to the 7<sup>th</sup> decade of life is becoming extremely serious with the increased age and consequently needs prevention, as it constitutes a cause for premature and chronic disorders and illnesses that could lead in increased mortality. Consequently, it could be said that although there were observed high percentages of excess weight and obesity that increased with the age, these percentages could decrease with the regular and not occasional participation in exercise throughout the life.

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