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Socioeconomic and Lifestyle Determinants of Obesity in a Transitional Southeast European Population

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Objective: We aimed to assess the prevalence and socioeconomic and behavioral correlates of obesity in adult population of Albania, a transitional country in the western Balkans. **Methods:** A cross-sectional study was conducted in 2007-2009 in the Albanian capital, including a sex-stratified random sample of 997 Tirana residents aged 25-65 years (83% response). A structured interview included data on demographic and socioeconomic characteristics and lifestyle factors. Physical examination included measurement of height, weight, and hips and waist circumferences. Binary logistic regression was used to assess the association of obesity with covariates. **Results:** Half of participants were overweight, and about 30% were obese (36% women and 24% men). Obesity was positively associated with age, but inversely related to education and economic level. Almost every day drinkers were more likely to be obese compared to non-drinkers (OR=2.2, 95% CI=1.4-2.9). Fat and carbohydrate intake were both positively associated with obesity (for fat intake OR [low-moderate vs. high intake]=3.1, 95% CI=2.0-4.2) and for carbohydrate intake OR [low-moderate vs. high intake]=2.8; 95% CI=1.9-3.3). **Conclusions:** Our findings indicate that overweight and obesity pose serious public health concerns in this post-communist country. Health professionals and policy makers should focus particularly on the modifiable risk factors as an effective means of controlling the burden of obesity in Albania. **Key words:** Albania, behavioral factors, lifestyle, obesity, overweight, socioeconomic factors.

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1. INTRODUCTION

Overweight and obesity are emerging as increasingly relevant public health concerns affecting individuals

across all age groups in most nations (1), and becoming so prevalent as to shift the most common health problems related to malnutrition and infectious dis-

ease from their status of major causes of ill health. Estimations of the World Health Organization (WHO) point to hundreds of millions of people likely to be obese until 2025 (2) whereas one in three Americans is considered to be obese (3). In a 25-year period between 1980 and 2004, the prevalence of obesity increased from 15% to 33% among adults whereas the prevalence of overweight went from 6% up to 19% among children (4, 5, 6, 7). There is evidence that overweight children are more likely to become obese later in life (8).

It is common knowledge that obesity is an important risk factor for a number of chronic conditions and closely linked with increased crude mortality rates (8, 9). Thus, obesity represents a complex medical conditions often difficult to be prevented and treated. Furthermore, obesity is linked with problems that might affect everyday activities and subsequently the quality of life (10). In general, obesity-related diseases emerge later in adults' life (11), contributing to further deterioration of morbidity among elderly.

The prevalence of overweight seems to be positively associated with age. Between 1999-2004, elderly people were more likely to be obese compared to younger persons with the only exception being individuals aged 80 years or older which showed similar prevalence as that of 30-39 year old individuals (1). Among individuals aged 20-39 years, 40-59 years and 60-79 years the prevalence of obesity was 26.8%, 34.8% and 35.2%, respectively whereas among those aged 80 years or older 17.3% of them were obese. Among children, the highest prevalence of obesity was found among school age children and teenagers: 11.5% of preschool children, 16.8% of children aged 6-11 years and 16.5% of teenagers 12-19 years old were obese (1). Also, ethnic differences in obesity prevalence are reported as well (1).

Body mass is often associated with socioeconomic status. Nevertheless, the magnitude and the direction of such association tend to vary according to economic development, sex, race and ethnicity (12, 13, 14). In developing countries, body mass could be linked with wellness and prosperity and there could be a positive relationship between socioeconomic status and body mass both in males and females. Historically, in a variety of different contexts, a high body mass, including height, increased muscle mass and increased fat mass, stands for power, dominance, wellbeing or high social class. In developed countries, among males height is positively associated with socioeconomic status whereas among females weight and BMI show a strong negative relationship with socioeconomic status (15, 16). A slim body, which in the past has been a symbol of economic deprivation, limited access to food supplies, or heavy physical work, nowadays requires spending of time, money and energies to be reached and maintained.

Abundant data suggest that the main cause of increased prevalence of obesity is the combination of changes in eating habits with scarce physical activity (2). Lifestyle is an important factor to be taken into account when planning the obesity control measures. Physical activity and weight gain are heavily connected (17). This relationship could be bi-directional: obesity discourages

physical activity and sedentarism encourages weight gain (18). Scarce physical activity increases the risk of cardiovascular disease and while it affects the severity of other risk factors, it could also be an independent risk factor for all causes of mortality, or cardio-vascular related mortality (19). The presence of sedentarism among obese persons justifies the undertaking of intensive efforts to get loose of excessive weight as both obesity and sedentarism potentiate the risk for certain diseases. Diet plays a very important role not only for the development but also for controlling of obesity. Since years there has existed the ambiguity about the role of excessive food consumption on obesity. Nevertheless, a study in 1997 solved such doubts and made clear the association between obesity and excessive food intake (20). For decades, a diet rich in fats has been considered as a major cause of obesity. Fat secures more energy compared to carbohydrates and proteins, for the same weight unit, and contributes a lot to obesity. Meanwhile, no strong evidence exists for the relationship among carbohydrate intake and obesity.

The information about the prevalence and determinants of obesity in Albania is relatively scant. The available evidence suggests that there is an increase in the rate of overweight and obesity in the past two decades due to the transitional period from the socialist regime to a market-oriented economy (21, 22).

In this context, we aimed to determine the prevalence and socioeconomic and behavioral correlates of obesity in the adult population of Albania.

2. METHODS

Study design: A cross-sectional study was conducted in Tirana in January 2007–December 2009.

Study population: A sex-stratified sample of 1200 Tirana residents aged 25-65 years was drawn based on the sampling frame provided by Tirana municipality office. For the calculation of the sample size, WINPEPI was employed (23). Of 1200 individuals, 997 participated (response rate 83%).

Data collection: Two principal methods were engaged for the data collection process: (i) a structured ques-

tionnaire, containing different components of which we will tackle here socio-demographic characteristics (age, sex, marital status, employment status, economic level, education and religion) and lifestyle indicators (alcohol, tobacco, physical activity and eating habits), was administered to all the participants, and; (ii) physical examination including measurement of weight, height and hips and waist circumferences. This enabled calculation of BMI and hip-to-waist ratio (H/W ratio) for each participant.

Data analysis: For numeric (continuous) variables, means and standard deviations were reported. For categorical variables frequencies (absolute numbers) and their respective percentages were reported.

In the analysis, age was categorized into the following categories: 25-35 years, 36-45 years, 46-55 years and 55-65 years; education was categorized into: secondary, high school and university education; employment status was categorized into: employed, not employed and pensioner; marital status was categorized into: married vs. not married (single, divorced, widowed); religion was dichotomized into: Muslim vs. Christian. Life style factors were categorized as follows: alcohol and tobacco (yes vs. no); physical activity (sedentary life, average physical activity and high physical activity); fat consumption, carbohydrate consumption and calories intake were categorized as: low, moderate and high.

For assessing the associations between obesity (BMI) and independent variables (socio-demographic, socioeconomic, lifestyle factors) the binary logistic regression was employed. Models were adjusted for age.

In all cases, the associations were considered to be statistically significant if the P-values were <0.05. The analysis was performed using the statistical package SPSS (Statistical Package for Social Sciences, version 15.0, Chicago, IL).

3. RESULTS

Around 48.6% of the total participants (N=997) were males whereas the mean age of the subjects was 55.3 ± 6.2 years. Around 36.8% of the partic-

Variable	Frequency	Percentage
Sex:		
Men	485	48.6
Women	512	51.4
Age group:		
25-35 years	171	17.1
36-45 years	282	28.3
46-55 years	326	32.7
56-65 years	218	21.9
Education:		
0-8 years	367	36.8
9-12 years	418	41.9
>12 years	212	21.3
Marital status:		
Married	765	76.7
Not married	232	23.3
Religion:		
Christian	372	37.3
Muslim	625	62.7
Employment status:		
Employed	427	42.8
Unemployed	307	30.8
Pensioner	263	26.4
Economic level:		
Lower than average	275	27.6
Average	365	36.6
Higher than average	357	35.8
BMI		
18.0-24.9	197	19.8
25.0-30.0	497	49.8
>30.0	303	30.4
H/W ratio (abdominal obesity)		
Normal	710	71.2
Abdominal obesity	287	28.8

Table 1. Demographic and socioeconomic characteristics of a representative sample of Albanian adults (N=997), Tirana, 2007-2009

ipants had 0-8 years of formal educations whereas 76.7% were married at the time of the survey. Just less than two-thirds (62.7%) of the respondents were Muslim whereas 42.8% were employed at the time of the survey. Details about the socio-demographic and socioeconomic characteristics of the sample are displayed in Table 1.

Mean BMI among males was 28.1 ± 2.7 and among females was 28.9 ± 3.1 whereas the respective mean W/H ratios (hips to waist ratio, an indicator of abdominal obesity) was 0.91 ± 0.04 for males and 0.83 ± 0.05 for females. Less than one quarter (24.3%) of males and more than one third (36.0%) of females were obese whereas the prevalence of being overweight was 56.8% among males and 43.0% among females. Regarding abdominal obesity, it was more prevalent among females than males (32.3% vs. 25.1%, respectively).

The prevalence of alcohol drink-

ing was 72.9% in this sample of subjects, with 22.5% of the participants reporting to drink almost every day whereas the prevalence of tobacco smoking was 35.7% (Table 2). Approximately one in five respondents (20.7%) followed a sedentary life style but 31.4% of the respondents declared to use a diet rich in fats and 41.7% used a diet rich in carbohydrates (Table 2).

Association of obesity with socio-demographic and socioeconomic factors.

Data analysis highlighted a strong positive linear association between age-groups and obesity: individuals aged 56-65 years were more than two times more likely to be obese compared to youngest participants and the association was significant (OR=2.17; 95% CI=1.41-3.41). Females were significantly more likely to be obese compared to males (OR=1.67, 95%CI=1.19-2.36). Education was negatively associated with the prevalence of obesity. For example, highly educated individuals were significantly less likely to be obese compared to low educated individuals (OR=0.53, 95% CI=0.21-0.89). Also, in age-adjusted comparisons there was a significant negative relationship between economic status and obesity with those with high economic level being less likely to be obese compared to those with low economic level (OR=0.64,

95%CI=0.35-0.92) whereas the association with marital status, religion and employment status was not significant (Table 3).

Association of obesity with life style factors.

Table 4 presents the results of age-adjusted associations of obesity with lifestyle factors. There is a significant, although borderline, relationship between alcohol consumption and obesity (P=0.05). Those consuming alcohol almost every day were significantly two times more likely to be obese compared with non drinkers (OR=2.18, 95%CI=1.39-2.91) whereas those consuming alcohol up to 1-2 times per month were less likely to be obese, although the result is not significant (OR=0.94, 95%CI=0.65-1.49). Smoking was also significantly associated with obesity with those smoking being 1.6 times more likely to be obese compared to non-smokers (OR=1.58; 95%CI=1.02-2.13). Physical activity was significantly associated with obesity (P=0.01) and those being physically active were much less likely to be obese compared to those engaging in sedentary lifestyle : (OR=0.34, 95%CI=0.12-0.71). Similarly, fat consumption, carbohydrate consumption and calories intake were all significantly and positively associated with obesity with those consuming much fats being three times more

Variable	Frequency	Percentage
Alcohol:		
No	270	27.1
1-2 times/month	366	36.7
1-2 times/week	137	13.7
Almost every day	224	22.5
Tobacco smoking:		
No	641	64.3
Yes	356	35.7
Physical activity:		
Sedentary lifestyle	206	20.7
Average physical activity	433	43.4
High physical activity	358	35.9
Fat intake:		
Low-moderate	684	68.6
High	313	31.4
Carbohydrate intake:		
Low-moderate	581	58.3
High	416	41.7
Calorie intake:		
Low	218	21.9
Moderate	450	45.1
High	329	33.0

Table 2. Distribution of lifestyle factors in the study population (N=997)

Variable	Number (%)	OR (95% CI)	P
Age-group:			0.01 (3)
25-35 years	171 (17.1)	1.00 (reference)	-
36-45 years	282 (28.3)	1.56 (1.13-2.76)	0.03
46-55 years	326 (32.7)	2.03 (1.34-3.19)	0.01
56-65 years	218 (21.9)	2.17 (1.41-3.41)	<0.01
Sex:			
Male	485 (48.6)	1.00 (reference)	-
Female	512 (51.4)	1.67 (1.19-2.36)	0.02
Education level:			0.03 (2)
0-8 years	367 (36.8)	1.00 (reference)	-
9-12 years	418 (41.9)	0.74 (0.49-1.23)	0.12
>12 years	212 (21.3)	0.53 (0.21-0.89)	<0.01
Marital status:			
Married	233 (23.3)	1.00 (reference)	-
Not married	765 (76.7)	1.09 (0.63-1.42)	0.37
Religion:			
Christian	372 (37.3)	1.00 (reference)	-
Muslim	625 (62.7)	1.13 (0.83-1.29)	0.26
Economic level:			0.02 (2)
Lower than average	275 (27.6)	1.00 (reference)	-
Average	365 (36.6)	0.86 (0.68-1.32)	0.23
Higher than average	357 (35.8)	0.64 (0.35-0.92)	0.02
Employment status:			0.19 (2)
Employed	427 (42.8)	1.00 (reference)	-
Unemployed	307 (30.8)	1.16 (0.80-1.42)	0.21
Pension	263 (26.4)	1.24 (0.91-1.39)	0.18

Table 3. Association of obesity (BMI \geq 30) with socio-demographic and socioeconomic factors; age-adjusted odds ratios (OR) from binary logistic regression.

likely to be obese compared to those consuming low-moderate amounts of fats (OR=3.14, 95%CI=2.03-4.17) and those consuming much carbohydrates being almost three times more likely to be obese compared to those who consume low-moderate amounts of carbohydrates (OR=2.76, 95% CI=1.87-3.27) [Table 4].

4. DISCUSSION AND CONCLUSIONS

Our study provided original data about the prevalence of obesity in Albania. In the context of a developing country with health indicators comparable to European ones, the prevalence of obesity in Albania (24), as in other transitional countries of South-East Europe (21), is increasing. Our study evidenced that overweight and obesity are prevalent in Tirana community. Mean BMI was higher than the upper limit of normality (>25) and the prevalence of obesity among persons aged 25-65 years was 30.4% (24.3% in males and 36.0% in females) and the prevalence of overweight was 49.8% (56.8% in males and 43.0% in females). The prevalence of obesity and overweight is higher in

our study compared to other studies from Mediterranean countries like Spain and Italy and this is a concerning issue. Only 7% of Italian males and 6% of Italian females aged 15 years or older were obese in 1990 (25). In a Spanish study in 1997, it resulted that only 12% of males and females aged 16 and above were obese (26). And our estimates are higher compared to those reported by a previous study among 1120 adults aged 25 years or older in Tirana in 2001, which found that 22% of males and 31% of females were obese (21). Overweight and obesity comprise a serious public health concern in Albania as

a result of changes in life style and dietary habits which have accompanied social and economic development (27). The scarcity of previous data about obesity and overweight in Albania do not allow us to check for the changes of prevalence over time. However, there are reasons to believe that during the last decade there has been a considerable increase of BMI in both genders. Based on data from other transitional countries (28, 29, 30) it is possible for the increasingly urbanization process and modernization of life style (31) such as dietary changes, higher prevalence of sedentary life style, tobacco smoking etc. to have shaved the path for such changes in Albania as well.

Another interest-

ing finding from our study was the prevalence of diabetes among elderly respondents. A study carried out in 2009 classified both Albania and Turkey as high obesity prevalence countries among their elderly population. Nations of Middle East such as Turkey, Iran and Saudi Arabia are characterized by high prevalence of elderly obesity which might be explained based on cultural local grounds where overweight is still considered as a symbol of affluence and beauty (32, 33, 34).

We spotted clear gender differences of overweight and obesity prevalence with females being more likely to be obese based on BMI and males more likely to have abdominal obesity based on H/W ratio. Such findings cannot be entirely explained by the distribution of socio-demographic, socioeconomic and life-style factors explored in this survey, but there might be a role for differences in physical activity during leisure time as well.

Amid the array of socioeconomic factors analyzed for this survey, the level of education, employment status and economic status were significantly associated with the likelihood of being obese. In accordance with other studies, we found that the prevalence of obesity was negatively associated with educa-

Variable	Number (%)	OR (95% CI)	P
Alcohol consumption:			0.05 (3)
No	270 (27.1)	1.00 (reference)	-
1-2 times/month	366 (36.7)	0.94 (0.65-1.49)	0.58
1-2 times/week	137 (13.7)	1.45 (0.89-2.01)	0.09
Almost everyday	224 (22.5)	2.18 (1.39-2.91)	0.01
Tobacco smoking:			
No	641 (64.3)	1.00 (reference)	-
Yes	356 (35.7)	1.58 (1.02-2.13)	0.05
Physical activity:			0.01 (2)
Sedentary lifestyle			-
Average physical activity	206 (20.7)	1.00 (reference)	-
High physical activity	433 (43.4)	0.67 (0.43-0.92)	0.03
	358 (35.9)	0.34 (0.12-0.71)	<0.01
Fat intake:			
Low-moderate	684 (68.6)	1.00 (reference)	-
High	313 (31.4)	3.14 (2.03-4.17)	<0.01
Carbohydrate intake:			
Low-moderate	581 (58.3)	1.00 (reference)	-
High	416 (41.7)	2.76 (1.87-3.27)	<0.01
Calories intake:			<0.01 (2)
Low	218 (21.9)	1.00 (reference)	-
Moderate	450 (45.1)	1.92 (1.23-2.39)	-
High	329 (33.0)	3.14 (2.19-4.01)	0.01
			<0.01

Table 4. Associations of obesity (BMI \geq 30) with lifestyle factors; age-adjusted odds ratios (OR) from binary logistic regression

tion and economic level.

Furthermore, we found important relationships between lifestyle factors and obesity. Alcohol consumption, fat intake and physical activity were the most important lifestyle predictors of obesity. Data on physical activity in transitional countries of South-East Europe are scarce, especially with regards to Albania, which, until the collapse of Stalinist regime in 1990, was the most isolated communist country in Europe. A major socioeconomic revolution followed accompanied by massive emigration (35). As a result, subsequent changes of lifestyle are thought to have included the reduction of physical activity as well (36).

The prevalence of physical activity during communist regime, in a context where until the end of '90s people were not allowed to own private cars and agriculture was suffering from lack of technology, is believed to have been higher (37) compared to present times. After this period, the number of private owned cars increased quickly thus limiting further the spaces for pedestrians especially in Tirana and reflecting a fast transition toward a technological society in which the physical activity during leisure time became an indicator of total physical activity among adults. A few studies (22, 38) reported that the spare time is dominated by sedentary activities (mainly reading or watching TV) for about 50% of males and 58% of females in Tirana (38). The very limited time dedicated to physical activities during spare time among Albanian adults is a highly concerning public health issue, affecting the future trajectory of obesity, glucose intolerance and cardio-vascular diseases.

Recommendations

Prevention of obesity will likely require a multidimensional approach – similar to those engaged when dealing with other important health issues as for example with tobacco control or prevention of road traffic accidents. Prevention efforts should be offered throughout life span of the individuals (thus targeting the total population) beginning from infancy and up to later stages of life. As a result, there is need for the development of innovative ways for ensuring access and less expensive

programs for the people.

In order to achieve a considerable weight and obesity symptoms' reduction, we recommend a low calorie diet and regular physical activity as the first line of interventions to control overweight and obesity.

To prevent cardio-vascular diseases people should engage in at least 30 minutes of daily physical activity of moderate or high intensity during more than half of week's days. At least two international events have suggested that 45-60 minutes of physical activity with moderate or high intensity during most days of week would be enough to prevent weight gain (37, 38).

Based on the health impact of increasingly overweight and obesity incidence and prevalence in Albania, and because of the lack of appropriate information to objectively assess the prevalence and risk factors of obesity, especially in certain age-groups, we recommend the establishment of a national surveillance system which would incorporate at least information about the basic indicators of overweight and obesity such as weight, height and abdominal circumference.

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