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Prevalence of adult overweight and obesity in 20 European countries, 2014

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Background: Monitoring obesity and overweight prevalence is important for assessing interventions aimed at preventing or reducing the burden of obesity. This study aimed to provide current data regarding the prevalence of overweight and obesity of adults, from 20 European countries. **Methods:** Participants were 34 814 (16 482 men) adults with mean age 50.8 ± 17.7. Data from European Social Survey round 7, 2014, were analysed. Body mass index (BMI) was calculated from self-reported height and weight. **Results:** The proportion of underweight was only 2%, and 44.9% for normal weight. Overweight and obese accounted for 53.1%. More men than women were overweight (44.7% vs. 30.5%). Older adults were significantly more overweight (42.4%) and obese (20.9%) than middle age and younger adults. Retired people account for a greater proportion of overweight (42.0%) and obese (21.5%), when compared with employed, unemployed and students. People from rural areas were significantly more overweight (39.1 vs. 36.1%) and obese (17.0 vs. 15.3%) than those who lived in urban areas. The estimates indicate that the highest prevalence of overweight was in Czech Republic (45.2%), Hungary (43.7%) and Lithuania (41.7%). For obesity, Slovenia (20.8%), Estonia (19.7%) and the United Kingdom (19.2%) were the countries with the highest prevalence. **Conclusion:** Even though data was self-reported, and individuals tend to overestimate their height and underestimate their weight, the prevalence of overweight and obesity is considered high. More than half of the European population is overweight and obese. This study strengthens and updates the claims of an excessive weight epidemic in Europe.

Introduction

In recent years, a levelling off has been reported in the prevalence of overweight and obesity among children[1,2] and adults[3,4] in several countries. Despite this, the prevalence of overweight and obesity is still high and is a clinical and public health burden worldwide.[5–7] Obesity is a major risk cause of several comorbidities such as cardiovascular diseases, cancers, type II diabetes and other health problems, which can lead to morbidity and mortality.[8] It is also associated with osteoarthritis, asthma and depression.[9] Besides the health burdens, overweight and obesity are also related to substantial economic costs. If health-related comorbidity is included, it is estimated that overweight and obesity account for between 54 and 59% of the estimated medical costs.[10] Thus, overweight and obesity are the focus of many public health concerns regarding prevention, control and the decrease of prevalence.[11–13]

Studies in the European and worldwide populations have shown that the prevalence of overweight and obesity is high. In Europe the prevalence of overweight is estimated to be near 50%[14,15] and the prevalence of obesity to be around 16%[16,17] of the population. Additionally, a recent OECD report shows that the prevalence of obesity increased from 11% in 2000 to 16% in 2014, on average across European member states.[16] Results of the European population studies are in line with the worldwide increasing trend in obesity.[18] Thus, monitoring obesity and overweight prevalence is important for assessing interventions aimed at preventing or reducing the burden of obesity. The purpose of this study was to provide current data regarding the prevalence of overweight and obesity of adults, from 20 European countries. A relationship was observed between the prevalence of overweight and obesity and socio-economic characteristics of European adults.

Methods

Study design, participants and procedures

Data from European Social Survey round 7, 2014, were analysed. The European Social Survey is an academically driven cross-national survey that has been conducted every two years across Europe and Israel since 2000. The survey measures the attitudes, beliefs and behaviour of European people. The European Social Survey uses a probability cluster sampling design to provide national representative samples among countries. According to national options, participants were sampled by means of postal code address files, population registers, social security register data, or telephone books. In each country information was collected using a questionnaire filled-in through an hour-long face-to-face interview that included questions on the use of medicine, immigration, citizenship, socio-demographic and socioeconomic issues, health perception and physical activity. The questionnaire was translated, by language experts, into the language of each of the participating countries. Further details about European Social Survey are available

elsewhere.[19] The study protocol subscribes the Declaration on Professional Ethics of the International Statistical Institute (http://www.europeansocialsurvey.org/about/ethics.html).

The European Social Survey round 7, 2014, included participants from Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, UK, comprising 40 185 participants. For the present study, only adults were selected, thus participants younger than 18 years of age were excluded ($n = 1215$). Since Israel is not a European country, its citizens were excluded ($n = 2562$). Those who did not report height and weight ($n = 1379$), and at least 4 socio-demographic characteristics ($n = 215$) were also excluded. The final sample comprised 34814 (16 482 men, 18 332 women) with mean age 50.8 ± 17.7 (50.3 ± 17.6 men, 51.2 ± 17.8 women).

Measures

Body mass index

Body mass index was calculated from self-reported height and weight (kg/m^2). BMI categories were calculated in accordance with World Health Organization guidelines:[20] underweight $<$ (18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25–29.9 kg/m^2) and obese ($\geq$30 kg/m^2).

Socio-demographic characteristics

Participants reported their gender and age. Using reported age, participants were categorized into three age groups (18–39, 40–59 and $\geq$60 years). Based on the International Standard Classification of Education,[21] participants were grouped into less than high school, high school education and superior education. Participants were asked to report what they were doing for the last 7 days. Response options were: paid work (employed), studying (education), unemployed actively looking for a job, unemployed but not actively looking for a job, retired, military service and others. Both unemployed categories were classified into a single category: unemployed. Those who were doing military service were considered employed. To determine the living place, participants were asked to report whether they lived in a big city, suburbs or outskirts of a big city, town or small city, country village, or home in countryside. Those who indicated that they lived in a big city, or suburbs, or outskirts of a big city were grouped into a new category named urban areas; those who responded that they lived in country village or home in countryside were grouped into rural areas. Respondents were asked to describe whether they lived with or without a husband/wife/partner, and their correspondent legal status (e.g. married, civil union, illegally recognized). Response options were dichotomized into live with or without a partner. Household income was determined based on decile. Using this data, 1st to 3rd decile, 4th to 7th decile, and 8th to 10th were grouped to create three groups: low, middle and high, respectively.

Statistical analysis

Descriptive statistics were calculated for all variables (means, standard deviation and percentages). Regarding the prevalence of weight status, according to socio-demographic characteristics and by countries, the percentage was calculated, with a 95% confidence interval (CI). The differences between participants' socio-demographic characteristics and weight status were tested by Chi-square test. Data analysis was performed using IBM SPSS Statistics version 22 (SPSS Inc., an IBM Company, Chicago, IL). When statistical tests were applied, the level of significance was set at $P < 0.05$.

Table 1 Participants' characteristics

Socio-demographic variables	Total ($n = 34\,814$) n (%) or M $\pm$ SD
Sex	
Male	47.3
Female	52.7
Age	
18–39 years	30.2
40–59 years	35.6
≥60 years	34.2
Education level	
Less than high school	26.2
High school	51.5
Superior education	22.3
Occupation	
Employed	61.3
Unemployed	5.7
Students	5.1
Retired	27.8
Living place	
Urban area	64.2
Rural areas	35.8
Partnership status	
Live without partner	61.6
Live with partner	38.4
Household income	
1st–3rd decile	30.6
4th–7th decile	42.6
8th–10th decile	26.8
BMI	25.8±4.7
BMI category	
Underweight	2.0
Normal weight	44.9
Overweight	37.2
Obese	15.9

BMI, body mass index; M, mean; SD, standard deviation.

Results

Table 1 presents the participants' characteristics. For the total sample, the average BMI was 25.8 ± 4.7. The proportion of underweight was only 2%, and 44.9% for normal weight. Overweight and obese accounted for 53.1%.

The prevalence of weight status according socio-demographic characteristics is presented in table 2. Significantly more women than men were underweight (3.1%, 95% CI: 1.6–4.5 vs. 0.8%, 95% CI: −0.7 to 2.3%). Conversely, more men than women were overweight (44.7%, 95% CI: 43.6–45.8 vs. 30.5%, 95% CI: 29.3–31.7%). Older adults were significantly more overweight (42.4%, 95% CI: 41.0–43.7%) and obese (20.9%, 95% CI: 19.3–22.5%) than middle age and younger adults. Perhaps related with age, retired people account for a greater proportion of overweight (42.0%, 95% CI: 40.5–43.6%) and obese (21.5%, 95% CI: 19.7–23.3%), when compared with employed, unemployed and students. People from rural areas were significantly more overweight (39.1%, 95% CI: 37.7–40.4% vs. 36.1%, 95% CI: 35.1–37.2%) and obese (17.0%, 95% CI: 15.4–18.6% vs. 15.3%, 95% CI: 14.1–17.7%) than those who lived in urban areas. Forty per cent (95% CI: 39.0–41.1%) of those who live without a partner were overweight compared with 32.9% (95% CI: 31.5–34.2%). For household income, the prevalence of obesity of people from 1st to 3rd decile was 19.3% (95% CI: 17.4–21.2%), higher than those from 4th to 7th decile (15.6%, 95% CI: 13.9–17.2%) and 8th to 10th decile (12.8%, 95% CI: 10.7–14.9%).

European countries estimates of the prevalence of overweight and obesity are shown in table 3. The estimates indicate that the highest prevalence of overweight was in Czech Republic (45.2%, 95% CI: 41.9–48.5%), Hungary (43.7%, 95% CI: 40.0–47.3%) and Lithuania (41.7%, 95% CI: 38.4–45.1%). For obesity, Slovenia (20.8%, 95% CI:

Table 2 Prevalence of weight status according to socioeconomic characteristics

	(95% CI) %				
	Underweight	**Normal weight**	**Overweight**	**Obese**	***P***
Sex					<0.001
Male	0.8 (−0.7, 2.3)	38.6 (37.4, 39.8)	44.7 (43.6, 45.8)	15.9 (14.5, 17.3)	
Female	3.1 (1.6, 4.5)	50.6 (49.6, 51.6)	30.5 (29.3, 31.7)	15.9 (14.5, 17.2)	
Age					<0.001
18–39 years	3.7 (1.9, 5.6)	59.5 (58.2, 60.7)	28.0 (26.4, 29.7)	8.8 (6.9, 10.6)	
40–59 years	1.2 (−0.5, 3.0)	41.6 (40.2, 42.9)	40.0 (38.7, 41.4)	17.1 (15.5, 18.7)	
≥60 years	1.2 (−0.6, 3.0)	35.5 (34.1, 37.0)	42.4 (41.0, 43.7)	20.9 (19.3, 22.5)	
Education level					0.018
Less than high school	2.1 (0.0, 4.1)	46.3 (44.8, 47.8)	36.5 (34.9, 38.1)	15.1 (13.2, 17.0)	
High school	1.9 (0.5, 3.4)	44.1 (43.0, 45.2)	37.8 (36.6, 38.9)	16.2 (14.9, 17.6)	
Superior education	2.0 (−0.2, 4.2)	45.1 (43.5, 46.8)	36.8 (35.1, 38.6)	16.1 (14.0, 18.1)	
Occupation					<0.001
Employed	1.8 (0.4, 3.1)	47.5 (46.5, 48.5)	37.0 (35.9, 38.1)	13.7 (12.4, 15.0)	
Unemployed	3.3 (−1.1, 7.7)	47.4 (44.2, 50.7)	33.0 (29.4, 36.7)	16.2 (12.1, 20.3)	
Students	5.9 (1.3, 10.5)	68.6 (65.9, 71.2)	20.6 (16.3, 24.8)	4.9 (0.3, 9.6)	
Retired	1.3 (−0.8, 3.3)	35.2 (33.6, 36.9)	42.0 (40.5, 43.6)	21.5 (19.7, 23.3)	
Living place					<0.001
Urban area	2.2 (0.9, 3.5)	46.4 (45.4, 47.3)	36.1 (35.1, 37.2)	15.3 (14.1, 16.5)	
Rural areas	1.6 (−0.1, 3.3)	42.4 (41.0, 43.7)	39.1 (37.7, 40.4)	17.0 (15.4, 18.6)	
Partnership status					<0.001
Live without partner	1.5 (0.2, 2.9)	42.0 (41.0, 43.0)	40.0 (39.0, 41.1)	16.4 (15.2, 17.7)	
Live with partner	2.7 (1.0, 4.4)	49.5 (48.3, 50.7)	32.9 (31.5, 34.2)	14.9 (13.4, 16.5)	
Household income					<0.001
1st–3rd decile	2.2 (0.1, 4.3)	42.9 (41.3, 44.5)	35.5 (33.8, 37.2)	19.3 (17.4, 21.2)	
4th–7th decile	1.9 (0.1, 3.6)	44.4 (43.1, 45.7)	38.2 (36.8, 39.6)	15.6 (13.9, 17.2)	
8th–10th decile	1.5 (−0.8, 3.7)	47.5 (45.9, 49.1)	38.2 (36.4, 40.0)	12.8 (10.7, 14.9)	

Differences between weight status and socio-demographic characteristics were tested by Chi-square.

15.6–26.0%), Estonia (19.7%, 95% CI: 15.7–23.7%) and the United Kingdom (19.2%, 95% CI: 15.3–23.0%) were the countries with the highest prevalence.

Figure 1 presents the results of overweight and obesity, as excess weight, by European country. For all countries, the prevalence of overweight and obesity account for 46.9%. The countries, with figures, were Hungary (61.6%), Czech Republic (60.1%) and Lithuania (59.6%). These countries contrasted with Switzerland (43.3%), France (45%) and Denmark (45.2%), which had the lowest prevalence.

Discussion

This study provides current data regarding the prevalence of overweight and obesity in adults from 20 European countries. In 2014, the prevalence of adult overweight and obesity in European countries was 53.1%. The overall prevalence was higher in Eastern European countries when compared with central and northern countries. Moreover, the prevalence of overweight and obesity was related with socioeconomic characteristics, which indicated that there may be a relationship with social iniquities.

The prevalence of overweight was higher among men than among women, which is in accordance with recent studies findings.[22–24] Also, overweight and obesity was greater among adults above 64 years old, which is similar to other studies stating an increased overweight and obesity prevalence with age.[24–26] Age and gender findings suggest that the older population, and older men in particular, should be considered a priority group for overweight and obesity prevention in Europe.

Low socioeconomic status is previously described as associated to obesity,[27,28] as observed in the present study. The socioeconomic status may indirectly influence weight status through dietary habits,[27,29] good access to exercise facilities,[30] health literacy[31] and physical activity participation.[29,32] Similar to the older population, low-income households should receive attention for overweight and obesity prevention in Europe.

Those living in rural areas presented a higher prevalence of overweight and obesity. Although results are in line with previous research,[24,33] to better understand the relationship between obesity and living place one should also consider the degree of rurality, the socioeconomic status and the geography.[33]

The prevalence of overweight and obesity was different across European countries, from approximately 32 to 45% for overweight and 11–20% for obesity. Eastern European countries (e.g. Hungary, Chez Republic, Lithuania and Slovenia) presented a higher prevalence of combined overweight and obesity than central Europe (e.g. Switzerland, France and Belgium), and northern European countries (e.g. Denmark and Sweden). To a certain extent, the variations in the prevalence of overweight and obesity may be the result of differences in sedentary lifestyle and lack of physical activity.[34–37] However, other factors may also explain this variation on the European continent: the built environment, eating habits and physiological and genetic differences.[34] It is interesting to notice that the prevalence of overweight and obesity is higher in eastern European countries and among those from lower socioeconomic status. Since eastern European countries are known to have less economic power than centre and northern European countries and possibly more population from the lower socioeconomic status, these two findings could be connected. This connection strengthens the idea that overweight and obesity may be related with social iniquities and that social and geographic differences across Europe are responsible for the differences in the prevalence of overweight and obesity. Thus, it is important to develop effective healthy lifestyles programs enhancing health literacy, especially regarding eating behaviours and physical activity. Also, understanding and improving the built environment in order to promote opportunities to engage in physical activity are necessary actions to prevent these conditions.

This study has limitations that should be acknowledged. Whereas, the BMI classification system possesses important utility in studying population health, it has limitations. BMI can be biased when based on self-reported height and weight, with individuals traditionally

Table 3 Prevalence of weight status by European countries

Countries	% (95% CI)			
	Underweight	**Normal weight**	**Overweight**	**Obese**
Austria	1.1 (–3.7, 5.8)	48.2 (44.7, 51.6)	38.4 (34.6, 42.1)	12.4 (8.0, 16.9)
Belgium	2.1 (–2.7, 6.9)	51.1 (47.7, 54.5)	33.0 (29.0, 36.9)	13.8 (9.4, 18.3)
Czech Republic	1.9 (–2.5, 6.3)	38.0 (34.5, 41.5)	45.2 (41.9, 48.5)	14.8 (10.7, 19.0)
Denmark	2.2 (–3.0, 7.4)	52.6 (49.0, 56.2)	32.6 (28.3, 37.0)	12.5 (7.6, 17.5)
Estonia	2.1 (–2.3, 6.5)	42.7 (39.3, 46.0)	35.5 (31.9, 39.1)	19.7 (15.7, 23.7)
Finland	1.0 (–3.4, 5.4)	43.5 (40.2, 46.9)	36.8 (33.2, 40.3)	18.7 (14.7, 22.8)
France	3.8 (–0.8, 8.3)	51.2 (48.0, 54.4)	31.9 (28.1, 35.7)	13.1 (8.8, 17.4)
Germany	2.0 (–1.7, 5.6)	43.2 (40.4, 45.9)	37.1 (34.1, 40.0)	17.8 (14.5, 21.19
Hungary	1.8 (–3.0, 6.7)	36.6 (32.7, 40.5)	43.7 (40.0, 47.3)	17.9 (13.5, 22.4)
Ireland	2.0 (–2.2, 6.3)	47.1 (44.0, 50.3)	38.4 (35.1, 41.8)	12.4 (8.4, 16.4)
Lithuania	1.4 (–3.0, 5.7)	39.1 (35.7, 42.5)	41.7 (38.4, 45.1)	17.8 (13.8, 21.8)
Netherlands	1.8 (–2.7, 6.3)	48.2 (44.9, 51.4)	36.0 (32.4, 39.7)	14.0 (9.8, 18.3)
Norway	1.3 (–4.1, 6.7)	47.2 (43.3, 51.1)	39.4 (35.2, 43.6)	12.1 (7.0, 17.2)
Poland	2.7 (–2.3, 7.7)	43.7 (39.9, 47.5)	35.3 (31.2, 39.3)	18.3 (13.8, 22.9)
Portugal	2.2 (–3.4, 7.8)	40.7 (36.3, 45.0)	39.4 (35.0, 43.8)	17.8 (12.6, 22.9)
Slovenia	1.6 (–4.2, 7.3)	39.5 (35.0, 44.0)	38.1 (33.5, 42.7)	20.8 (15.6, 26.0)
Spain	1.9 (–2.7, 6.5)	44.3 (40.8, 47.7)	36.8 (33.1, 40.5)	17.1 (12.8, 21.3)
Sweden	1.5 (–3.3, 6.2)	48.5 (45.1, 51.9)	35.8 (32.0, 39.6)	14.2 (9.8, 18.6)
Switzerland	2.7 (–2.4, 7.9)	54.0 (50.4, 57.5)	32.4 (28.1, 36.6)	10.9 (6.0, 15.8)
United Kingdom	2.8 (–1.4, 7.0)	42.3 (39.0, 45.6)	35.7 (32.3, 39.2)	19.2 (15.3, 23.0)

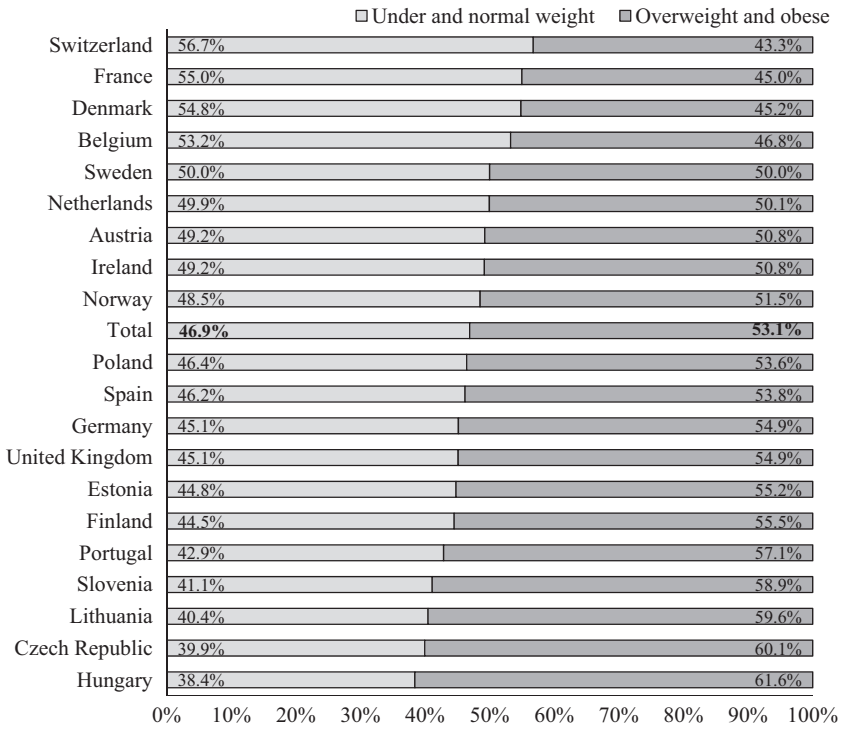

Figure 1 Prevalence of overweight and obesity in European countries

overestimating their height and underestimating their weight.[38] In addition, BMI classifications can be inaccurate for certain groups (e.g. professional athletes or those possessing a high level of muscle mass),[39] because it does not distinguish between body fat and muscle mass.

Even though data was self-reported, and individuals tend to overestimate their height and underestimate their weight, the prevalence of overweight and obesity is considered high. As findings suggest that more than half of the European population is overweight and obese, this study strengthens and updates the claims of an excessive weight epidemic in Europe. There are certain risk factors for obesity that appear to be universal, transcending national boundaries and operating in the dense network of interconnections between biology and culture, but also indications of specific risk factors operating with selective potency in particular countries.[34] Therefore, there is a need for a medical management approach to overweight and obesity, and shifts in public health policy, at the European and country-specific levels. Health care professionals should advise patients on the importance of maintaining a healthy weight.[40] Considering that even slight weight loss (roughly 5% of initial weight) is considered to be associated with significant improvements in health, and with reduced costs to the health care system and society at large, it is important to develop effective healthy lifestyles programs enhancing health literacy about these conditions.

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Conflicts of interest: None declared.

Key points

- More than half of the European population is overweight and obese (the proportion of underweight was only 2%, and 44.9% for normal weight, overweight and obese accounted for 53.1%).
- The overall prevalence was higher in Eastern European countries when compared with central and northern countries.
- The prevalence of overweight and obesity was related with socioeconomic characteristics, which indicated that there might be a relationship with social iniquities.
- Older population, low-income households should receive attention for overweight and obesity prevention in Europe.
- It is important to develop effective healthy lifestyles programs enhancing health literacy about these conditions.

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