Socio-economic inequalities in overweight among adults in Turkey: a regional evaluation

Isil Ergin[1],*, Hur Hassoy[1] and Anton Kunst[2]

[1]Department of Public Health, School of Medicine, Ege University, Bornova, 35100 Izmir, Turkey: [2]Department of Public Health, Academic Medical Centre (AMC), University of Amsterdam, Amsterdam, The Netherlands

Abstract

Objective: Patterns of socio-economic inequalities in obesity and overweight have not been documented for Turkey. The present study aimed to describe educational and wealth-related inequalities for overweight in Turkey, taking a regional perspective.
Design: Cross-sectional self-reported data of the World Health Survey 2002 for Turkey were used. BMI $\geq 25\cdot00\,\text{kg/m}^2$ was considered as overweight. Respondents were classified according to education years and a wealth score derived from the availability of household assets. Logistic regression analysis was applied to assess the relationship between overweight and socio-economic factors. Analyses were stratified by sex and region (West, Mediterranean, Middle, Black Sea and East).
Setting: Turkey.
Subjects: Among the respondents 20 years and older, 3790 women and 4057 men had data on self-reported height and weight.
Results: Age-adjusted overweight prevalence was 48·4% for women and 46·1% for men. For men, education was not systematically related to overweight while overweight was significantly increased among the highest wealth groups. For women, the prevalence of overweight was highest for low-educated and middle-wealth groups. The size of the inequalities in overweight showed only small regional variations. In the East, however, overweight prevalence was more related to higher socio-economic position than in the other regions.
Conclusions: Socio-economic inequalities for overweight in Turkey are at a similar level as in most European countries, and especially comparable to Southern Europe. The smaller inequalities in the East correspond to the low level of socio-economic development in this part of the country. Prevention of overweight should focus on lower educational groups throughout the entire country and especially on low-educated women.

The wealth of a nation affects overweight prevalence, its distribution among different socio-economic groups and the size of these inequalities[1–3]. With excess body weight being related to a range of major non-communicable diseases, socio-economic differences in overweight could contribute strongly to broader socio-economic inequalities in health. Assessing inequalities in overweight is therefore essential for the formulation of policies to tackle non-communicable diseases and to reduce inequalities in health.

A landmark review in 1989 concluded that high socio-economic status (SES) was positively related to obesity in developing countries, which was in contrast to the situation in developed countries[4]. The generalizability of this view has been disputed since then, as studies from some developing countries have shown important increases in obesity among lower socio-economic groups[2,5,6].

Attention has been called to the nutrition transition and the changing lifestyle in the rapidly growing urban populations of developing countries[7]. International overviews based on available nationally representative data (generally data from Demographic Health Surveys, DHS) have recently indicated that belonging to the lower SES group confers a strong protection against obesity in lower-income countries, but is associated with increased risk for obesity in upper-middle-income countries. However, social inequalities for obesity do not emerge at a uniform pace among all countries[8–11] and the onset of this shift occurs differently for the two sexes[3].

However, there is limited availability of nationally representative data for several parts of the world. Turkey is an exemplary case. This country has nationally representative data for obesity prevalence rates derived from epidemiological studies of metabolic syndrome, CVD or

Corresponding author: Email isil.ergin@ege.edu.tr

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diabetes[12,13]. However, socio-economic inequalities in obesity have not been mapped for Turkey. Studies on educational, income and regional inequalities have concentrated on maternal and child health issues[14,15]. However, given the advancement of the epidemiological and nutrition transitions, obesity and other non-communicable diseases are likely to become equally important to inequalities in mortality and morbidity in Turkey[16].

A regional evaluation is necessary because each Turkish region represents different levels of economic development and therefore may be in a different stage of the obesity epidemic. In addition, Turkish regions differ in many other respects that may be relevant to overweight. For example, dietary patterns differ substantially among regions and there are marked regional and urban/rural differences in the degree of mobility and autonomy of women[17,18]. Therefore, it is important to assess whether the pattern and the size of inequalities in obesity among men and women vary within the country.

The present study aimed to determine educational and wealth inequalities for overweight in Turkey, taking a regional perspective. Data from the World Health Survey (WHS) for Turkey in 2002 were used. These data have two main advantages compared with previous studies: (i) they cover a large survey sample, representative for the country; and (ii) they enable socio-economic inequalities in overweight in each Turkish region to be mapped.

Materials and methods

Data
WHS 2002 country data for Turkey were used in the present study. Household face-to-face surveys were used for the data collection in Turkey. Permission to use the official data of WHS and to perform the study was given by the WHO. Household questionnaire and individual questionnaire data[19] are used herein.

The database of WHS combined information from individual and household questionnaires. Among the 11 479 people in the individual questionnaire database, 263 who did not match with the household database were excluded. Respondents 20 years and older were selected for analysis.

Variables
In the WHS, five Turkish regions were distinguished: West, Mediterranean, Middle, Black Sea and East. Using the socio-economic development scores for cities developed by Turkish State Planning Organization[20] the regions were found to differ strongly. If '1' represents the most developed group of cities in various terms and '5' the least developed, region West is at 1·73, Mediterranean is at 2·88, Middle is at 3·09, Black Sea is at 3·50 and East is at 4·65.

Education was queried as years of education in the WHS questionnaire. The years have been grouped as 0–4,

5–7, 8–10 and 11+ years, considering that primary education takes five years, secondary education takes three more years, while the completion of higher levels of education takes at least another three years.

For household wealth, questions on household assets were used. Ownership of eleven items associated with wealth was queried in the WHS: stereo system, washing machine for clothes, washing machine for dishes, vacuum cleaner, refrigerator, fixed line telephone, mobile/cellular telephone, computer, access to the Internet, subscriptions to magazines and/or newspaper, and a security system in the home. For the present study, the responses given on each of these eleven items were scored as 0 (does not have the item) or 1 (has the item) and these scores were summed to define the total household wealth score for each respondent. Some respondents had missing data for one or more of the items. In these cases, the scoring was adjusted by the factor 11/number of items answered. The wealth scores have been grouped as 8–11 (highest), 6–7 (second highest), 5 (middle), 4 (second lowest) and 0–3 (lowest). Several classifications were evaluated for the grouping of the wealth scores, with similar results. For the present analysis, we used a classification that resulted in a reasonable number of respondents in each wealth group in each region.

The characteristics of the surveyed population according to region and sex are presented in Table 1. Among the surveyed population, 76·6 % of women and 59·8 % of men had education years below 8 years. Some 41·5 % of women and 40·2 % of men belonged to wealth levels equal to or below middle. The proportion of the population with low education (<8 years) was highest in the East (84·2 % for women, 65·7 % for men). The lowest wealth groups were most prevalent in the East (23·7 % for women, 24·6 % for men) and least prevalent in the West (7·4 % for women, 7·5 % for men) for both sexes.

WHS data included self-reported height in centimetres and weight in kilograms. This information was used to calculate the BMI for each respondent. The respondents were classified according to BMI as underweight (<18·50 kg/m^2), normal weight (18·50–24·99 kg/m^2), overweight (25·00–29·99 kg/m^2) or obese (≥30·00 kg/m^2). In the analyses presented herein BMI was dichotomized, with the cut-off point at BMI = 25·00 kg/m^2. In the present paper, BMI ≥ 25·00 kg/m^2 is referred to as 'overweight'. We applied standard exclusion criteria of the Oxford cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC–Oxford) to exclude unlikely values of height and weight[21]. The exclusion criteria for men were height under 100 cm or over 213 cm, and weight under 30 kg. For women these were height under 100 cm or over 198 cm, and weight under 20 kg.

Among the respondents, 1249 women had missing data on self-reported weight and 2267 for height. For men, the missing data of anthropometric self-reports were 316 and 508, respectively. In total, 3790 women (61·4 %)

Table 1 Distribution of the surveyed population (in percentage of the total population) according to sex, socio-economic indicator and region: adult respondents aged 20 years and over, World Health Survey 2002, Turkey

	West	Mediterranean	Middle	Black Sea	East	Total
Women						
Education group	(*n* 2030)	(*n* 803)	(*n* 981)	(*n* 732)	(*n* 1631)	(*n* 6177)
<8 years	72.9	73.2	76.5	74.2	84.2	76.6
≥8 years	27.1	26.8	23.5	25.8	15.8	23.4
Wealth group	(*n* 2028)	(*n* 803)	(*n* 980)	(*n* 732)	(*n* 1631)	(*n* 6174)
Highest	26.6	23.2	20.3	20.5	14.1	21.1
Second highest	42.9	36.2	36.5	37.6	31.6	37.4
Middle	16.7	16.2	17.6	17.1	17.7	17.1
Second lowest	6.5	10.7	10.9	9.7	12.9	9.8
Lowest	7.4	13.7	14.7	15.2	23.7	14.6
Men						
Education group	(*n* 1427)	(*n* 613)	(*n* 694)	(*n* 569)	(*n* 1324)	(*n* 4627)
<8 years	56.3	62.0	60.7	51.3	65.7	59.8
≥8 years	43.7	38.0	39.3	48.7	34.3	40.2
Wealth group	(*n* 1427)	(*n* 613)	(*n* 694)	(*n* 568)	(*n* 1324)	(*n* 4626)
Highest	27.9	25.9	20.0	27.1	13.2	22.2
Second highest	43.9	38.7	34.3	35.9	33.0	37.7
Middle	14.5	15.5	15.0	17.4	17.0	15.8
Second lowest	6.2	8.7	14.8	8.6	12.2	9.8
Lowest	7.5	11.3	15.9	10.9	24.6	14.6

Table 2 Percentage of the surveyed population with weight and/or height unknown according to sex, socio-economic indicator and region: adult respondents aged 20 years and over, World Health Survey 2002, Turkey

	West	Mediterranean	Middle	Black sea	East
Women					
Education group	(*n* 2030)	(*n* 803)	(*n* 981)	(*n* 732)	(*n* 1631)
<8 years	44·5	45·6	53·6	49·9	45·3
≥8 years	11·8	10·2	15·2	10·6	9·3
Wealth group	(*n* 2028)	(*n* 803)	(*n* 980)	(*n* 732)	(*n* 1631)
Highest	23·6	18·3	23·6	20	20·4
Second highest	33·1	29·9	41·1	34·9	34·3
Middle	42·6	48·5	52·9	46·4	43·4
Second lowest	47·7	52·3	58·9	42·3	48·3
Lowest	66·7	55·5	61·1	69·4	50·5
Men					
Education group	(*n* 1427)	(*n* 613)	(*n* 694)	(*n* 569)	(*n* 1324)
<8 years	15·4	16·3	18·8	16·4	17·5
≥8 years	6·6	4·7	8·4	3·3	4·6
Wealth group	(*n* 1427)	(*n* 613)	(*n* 694)	(*n* 568)	(*n* 1324)
Highest	6·5	9·4	9·4	5·8	6·9
Second highest	11·7	6·3	11·8	6·4	10·1
Middle	12·6	11·6	20·2	10·1	13·8
Second lowest	20·2	17	13·6	24·5	18·6
Lowest	20·6	33·3	23·6	21	17·2

and 4057 men (87·7 %) had data available for both height and weight. The proportions missing according to wealth and education groups are presented in Table 2. Chi-square analysis revealed that the percentage of respondents with missing values varied by age, sex, education and wealth with statistical significance. The percentage was lowest for women ($\chi^2 = 922\cdot194$, $P < 0\cdot001$), old ($\chi^2 = 231\cdot796$, $P < 0\cdot001$), illiterate ($\chi^2 = 1541\cdot439$, $P < 0\cdot001$) and lowest wealth ($\chi^2 = 426\cdot725$, $P < 0\cdot001$) groups. For women, the highest proportion of missing was for the lowest wealth level and the lowest education group, especially in the West and Black Sea. For men, the highest proportion was also for the lowest wealth level and the lowest education group, especially in the Mediterranean region.

In the total population, the percentage of respondents with missing height and weight was lowest in the Middle region ($\chi^2 = 26\cdot986$, $P < 0\cdot001$).

Statistical analysis

Prevalence rates were age standardized using the direct method. The age distribution of the Turkish population in the year of 2003 was used as the reference population[22].

Logistic regression analysis was applied to explore the relationship of wealth or education with overweight. Control was made for age only. Regression coefficients and their standard errors were used to calculate odds ratios. Groups with the lowest SES were taken as the reference categories.

Results

Age-adjusted prevalence rates for both sexes and each region are presented in Fig. 1. The national prevalence for overweight was 48·4% for women and 46·1% for men. For women, overweight prevalence rates did not show substantial regional differences and ranged from 47·7% (Black Sea) to 49·0% (East). The range for men was larger, going from 42·7% (East) to 48·9% (Mediterranean).

The prevalence rates according to household wealth and the corresponding odds ratios are presented in Table 3. Wealth-related inequalities in overweight existed for both
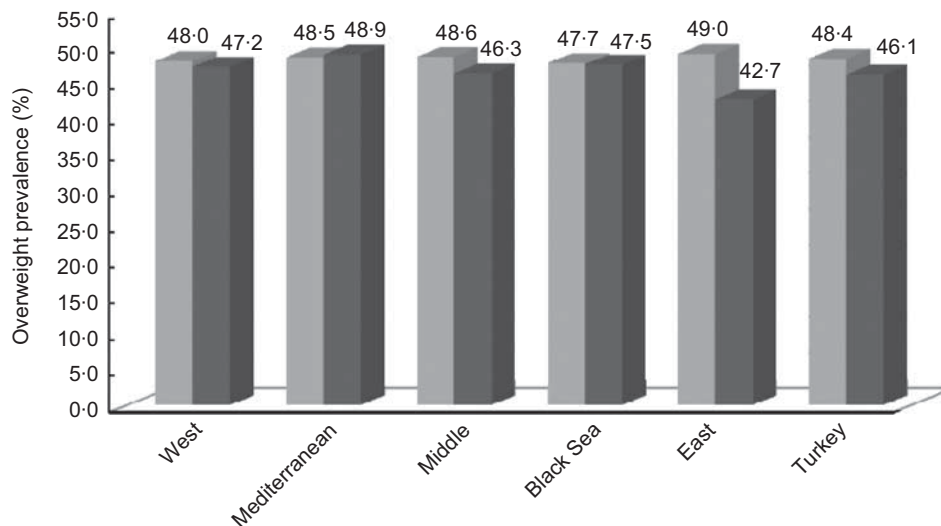
Fig. 1 Age-standardized prevalence (%) of overweight (BMI ≥ 25·00 kg/m^2) by sex (■, men; ▢, women) and region: adult respondents aged 20 years and over, World Health Survey 2002, Turkey

Table 3 Age-standardized prevalence rates, odds ratios and 95% confidence intervals for overweight (BMI ≥ 25·00 kg/m^2) according to region, wealth group and sex: adult respondents aged 20 years and over, World Health Survey 2002, Turkey

	Women			Men		
	Prevalence rate (%)	OR	95% CI	Prevalence rate (%)	OR	95% CI
West						
Highest	45·97	1·14	0·60, 2·18	48·03	1·94*	1·17, 3·21
Second highest	49·20	1·38	0·74, 2·60	50·20	2·00*	1·23, 3·26
Middle	52·54	1·62	0·83, 3·19	47·92	1·64	0·95, 2·82
Second lowest	39·86	1·09	0·49, 2·40	33·67	0·97	0·49, 1·90
Lowest (reference)	41·48	1·00		35·02	1·00	
Mediterranean						
Highest	39·83	1·04	0·50, 2·17	54·52	2·04*	1·02, 4·08
Second highest	55·22	2·18*	1·08, 4·40	48·11	1·54	0·80, 2·99
Middle	56·07	2·62*	1·14, 6·03	54·70	1·99	0·94, 4·24
Second lowest	38·20	1·25	0·50, 3·16	33·96	0·87	0·36, 2·09
Lowest (reference)	40·45	1·00		34·45	1·00	
Middle						
Highest	46·51	1·01	0·50, 2·02	51·13	3·01**	1·64, 5·52
Second highest	46·93	1·50	0·77, 2·92	46·77	2·32*	1·33, 4·02
Middle	56·71	2·10	0·99, 4·47	51·05	3·12*	1·62, 6·01
Second lowest	64·82	2·72*	1·13, 6·55	42·21	1·88	0·98, 3·59
Lowest (reference)	39·17	1·00		30·76	1·00	
Black Sea						
Highest	44·46	1·22	0·53, 2·77	47·78	2·69*	1·29, 5·61
Second highest	52·80	1·92	0·87, 4·21	52·62	3·05*	1·49, 6·23
Middle	49·74	1·63	0·68, 3·91	44·63	2·30*	1·06, 4·98
Second lowest	44·08	1·66	0·63, 4·38	53·34	3·69*	1·43, 9·57
Lowest (reference)	35·96	1·00		25·78	1·00	
East						
Highest	58·00	1·86*	1·19, 2·89	56·76	3·03**	2·01, 4·57
Second highest	51·38	1·50*	1·02, 2·21	46·95	2·00**	1·44, 2·79
Middle	50·42	1·44	0·91, 2·27	42·42	1·80*	1·22, 2·66
Second lowest	44·93	1·09	0·65, 1·82	32·11	1·04	0·66, 1·64
Lowest (reference)	41·01	1·00		32·91	1·00	

*$P < 0.05$, **$P < 0.001$.

Table 4 Age-standardized prevalence rates, odds ratio and 95 % confidence intervals for overweight (BMI $\geq 25{\cdot}00\,kg/m^2$) according to region, education group and sex: adult respondents aged 20 years and over, World Health Survey 2002, Turkey

	Women			Men		
	Prevalence rate (%)	OR	95 % CI	Prevalence rate (%)	OR	95 % CI
West						
$\geq$8 years	38·09	0·47**	0·37, 0·60	46·63	1·02	0·80, 1·29
<8 years (reference)	54·33	1·00		48·92	1·00	
Mediterranean						
$\geq$8 years	37·26	0·35**	0·23, 0·53	50·78	1·13	0·79, 1·63
<8 years (reference)	56·89	1·00		48·75	1·00	
Middle						
$\geq$8 years	33·04	0·36**	0·24, 0·53	48·05	1·15	0·80, 1·66
<8 years (reference)	56·08	1·00		46·79	1·00	
Black sea						
$\geq$8 years	37·81	0·47**	0·31, 0·72	48·00	1·05	0·72, 1·55
<8 years (reference)	53·90	1·00		47·1	1·00	
East						
$\geq$8 years	40·44	0·62*	0·44, 0·87	46·37	1·20	0·93, 1·56
<8 years (reference)	51·06	1·00		41·89	1·00	

*$P < 0{\cdot}05$, **$P < 0{\cdot}001$.

sexes, although the results differed between the sexes. In men, in most regions, the three higher wealth groups (highest, second highest and middle) had an increased risk of overweight compared with the lowest wealth groups. The group at most risk differed by region. The East showed a regular inverse gradient, with the highest prevalence for highest wealth groups which gradually decreased towards the lowest. Similar patterns were observed for women as well. Most regions showed an inverted U-shaped pattern. For example in the Mediterranean, the middle and second highest wealth groups were at significantly higher risk (with odds ratios of 2·62 and 2·18, respectively) compared with the lowest and highest wealth groups. In the East, overweight among women steadily increased with increasing level of household wealth.

The results for education groups are presented in Table 4. Educational inequalities were more pronounced than wealth inequalities, especially for women. Table 4 shows that overweight prevalence was much lower among the high educated. However, inequalities were smaller in the East. In this region, the prevalence of overweight among high-educated women was higher than in the other regions, while the prevalence among low-educated women was lower than elsewhere. No large or statistically significant differences in overweight between education groups were observed among men. Similar patterns were observed for each region, with the East being the main exception again. This East–rest contrast in overweight (Fig. 1) was observed only among low-educated men.

Discussion

Summary of findings

In the present study, we observed a diverse pattern of socio-economic inequalities in overweight. Among women,

the prevalence of overweight was increased for middle-wealth groups (compared with the poorest and richest groups) and low-educated groups (compared with high educated). Among men overweight prevalence was related especially to higher household wealth, whereas no large differences were observed according to men's educational level. The pattern and size of the inequalities showed only modest regional variations, the main exception being the East region. Generally, overweight prevalence tended to be more related to higher socio-economic position in the East than in the other regions.

Limitations

Data problems that could have affected the validity of the key findings relate to the self-report of height and weight. It has been shown that people with high BMI tend to underestimate their weight and overestimate their height[23,24]. As a result, measures of relative weight based on self-reports will be biased downwards[25]. The accuracy of reporting may depend on the level of education and wealth[26–29]. There are no data for Turkey on socio-economic determinants of self-report of anthropometric measurements. However, socio-economic differences in the proportions missing (see below) warn that BMI may be underestimated especially for low socio-economic groups.

In the present study, the proportion of respondents with missing data on height or weight increased with age, low education and low wealth. This was a problem especially among women. Previous studies also found a higher proportion of missing BMI information among women and older subjects. It has also been found that failure to report weight was higher among people with high BMI[30]. As a consequence, our estimates of the prevalence of overweight may be underestimated. This implies that especially the lower educational groups or lower wealth groups may have a higher prevalence of overweight than observed herein.

Given these potential problems, it is useful to compare our estimates of overweight prevalence with other Turkish studies. In the 2000 year of the TEKHARF (Turkish Adult Cardiovascular Risk Factor) cohort study, the prevalence of obesity (BMI ≥ 30·00 kg/m^2) was 21% among men and 43% among women. The TOHTA (Turkish Obesity and Hypertension Study) in 2000 revealed that overweight (BMI ≥ 25·00 kg/m^2) prevalence was 40% in men and 50% in women[31]. In the Turkish DHS, among 15–49-year-old married women, the prevalence of overweight (BMI ≥ 25·00 kg/m^2) was 52% in 1998 and 57% in 2003[14,32]. The prevalence rates estimated in our study (48% for women and 46% for men) are in the same range as the TOHTA study, but are low compared with the other studies. Even though differences can be due to differences in study design and populations, this comparison warns that the prevalence of overweight may have been underestimated in the present study.

Household assets were counted to measure levels of household wealth. The use of indicators based on household assets has been shown to be useful for mapping health inequalities[33]. For instance, current income (and derived measures such as living below poverty lines) has been found to be less adequate, compared with accumulated wealth and housing tenure, in measuring the magnitude of socio-economic inequalities in smoking[34,35]. Studies from different countries observed that, compared with current income, measures of accumulated wealth were most strongly related to the prevalence of overweight or related outcomes[36–38]. Asset-based household wealth indicators are likely to indicate cumulative prosperity, whereas income measures the purchasing power and financial situation at one moment in time only.

Interpretation of variations by gender and socio-economic indicators

The magnitude of inequalities in overweight depended on what aspect of socio-economic position we studied. Educational level usually shows the strongest relationship with overweight[39–41]. Education reflects socio-economic circumstances in youth and shapes cognitive abilities including receptivity to health education messages[42], as well as shaping socio-economic and other opportunities of later life. When obesogenic environments trigger the onset of overweight, education may be a protective factor for those who are able to act on the knowledge about harmful effects[40].

In previous international studies, women have been shown to have larger inequalities in overweight and obesity than men[39,42,43]. In the present study as well, we observed large educational differences in overweight prevalence among women, while no consistent differences were observed among men. This sharp gender contrast was also observed for Spain, Italy and Greece. In these countries, there is no relationship for men but a strong relationship for women, whereas the gender contrast is much weaker in

other European regions[3]. The large gender difference that we observed for Turkey thus suggests that there might be a more generalized 'Mediterranean' pattern of educational inequalities in overweight.

In Europe, a higher income is related with less overweight[3]. The gradients in Turkey are somewhat different, mainly because of the low prevalence of overweight in the poorest 20 or 40% of the population. This lower prevalence might be the result of the dietary deficiencies. The protective effect of absolute poverty against obesity was implied in earlier studies[44]. If this explanation holds, the high prevalence of overweight in middle-wealth groups in Turkey suggests that these groups have moved from food shortage to a situation of abundance. Rapid urbanization and the changes introduced in food production, processing, storage and distribution all result in the nutrition transition[45,46]. As others have suggested, groups most affected by the nutrition transition are likely to be those who have just escaped from poverty[1,44,47].

Interpretation of variations by region

The East presented a substantially different profile of socio-economic inequalities in overweight compared with the rest of the country, with a relatively low prevalence of overweight among the poor. The East of Turkey is the least developed region of the country. The terrain is highly mountainous and the most important economic activity is husbandry. The rate of population growth is low because of out-migration. Per capita income is the lowest among Turkey[17]. Infant mortality and maternal mortality are at very high levels compared with other regions[14,48]. Moreover, the military conflict in this region during the last decades has been an important barrier for development. The inverse gradients for overweight that we observed for the East correspond to its low socio-economic development and seem to reflect an earlier stage of the obesity epidemic[2].

In Turkey, dietary patterns differ substantially between regions and specific cuisines are named regionally: Southeastern, Middle Anatolia, Black Sea and Mediterranean. Fat, fibre, fruit and vegetable consumptions in these cuisines are fairly different from each other[49]. Moreover, the availability and thus the price of certain food groups differ between regions because of geographical circumstances, agricultural opportunities and seasonal reasons[49]. For example, meat is cheaper in Middle Anatolia and East than in the West and Mediterranean, while the situation is vice versa for fruit and vegetables. Fish is the cheapest and most available food in the Black Sea region. Thus, access to some food groups may differ among regions and socio-economic groups. It has been shown previously that high intakes of fat, low intakes of fibre and low intakes of fruit and vegetables are associated with overweight[50]. The ability to afford food has been suggested to be an important factor in the socio-economic patterning of weight[1]. From this perspective, it is surprising that we did not observe

large regional differences in the overall prevalence of overweight or in socio-economic inequalities in overweight. Additional surveys are needed on the effects of changes in food availability, food prices and dietary patterns on socio-economic inequalities in overweight in countries such as Turkey.

Access to opportunities for physical exercise is less for women in the Middle, East and Black Sea regions. There are gender-based barriers that restrict women from leaving their homes for recreational activities. In Turkey, many decisions of women – even the decision of pregnancy – is generally in the domain of men due to patriarchal ideology[51]. This ideology is less pronounced in the West and Mediterranean than in the East, Middle and North[17]. This ideology also affects women's access to education and welfare, and their enrolment in the labour market. The percentage of employed women is relatively high in the West, reaching 10·4 % employment rate, while it is as low as 2·7 % in the East[20]. Moreover, conservative approaches based on religion are correlated with geographical region, where more conservative areas are located towards the East and Middle. As a result, aesthetic norms or cultural expectations with respect to weight standards may vary regionally and across different SES groups. Finally, fertility rates – important to weight gain among women – show important regional variations, with total fertility rates being close to 2 in western provinces, compared with 4 and above in more eastern provinces[15].

Despite these large variations in potential determinants of overweight between Turkish regions, most of these regions, except the East, are highly similar regarding the overall prevalence and socio-economic inequalities in overweight. This suggests that inequalities in overweight in Turkey are mostly determined by the general socio-economic development and urbanization – processes that have occurred in most Turkish regions except the East. More specific factors of a cultural or geographical nature seem to play only a modest role at regional level.

Conclusions

The size and pattern of the inequalities in overweight in Turkey are comparable to those of most European countries, and bear special resemblance to Southern European countries. The different patterns in the East region are likely to reflect the low socio-economic development of this part of the country. The similarities between the other regions suggest that more specific factors of a cultural or geographical nature influence overweight inequalities to only a modest extent.

The overweight inequalities being more pronounced for women has important policy implications for countries like Turkey, because women already bear large inequalities with respect to infectious diseases (i.e. tuberculosis[52], sexually transmitted diseases[53]), nutritional deficiencies, maternal and perinatal conditions[53,54]. Thus, overweight inequalities will contribute to already large health inequalities among women. Prevention of obesity should focus on lower educational groups throughout the entire country and especially on low-educated women.

Acknowledgements

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