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Sociodemographic variations in obesity among Ghanaian adults

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Abstract

Objectives: To determine the sociodemographic associations of obesity in Ghana.
Design: A cross-sectional descriptive study was conducted on a sample of 6300 adults aged 25 years and over who were selected by random cluster sampling.
Setting: Two urban (high-class and low-class suburbs) and a rural community in Accra, Ghana.
Subjects and methods: In total, 4731 (1857 males, 2874 females) subjects participated. Demographic data were obtained by a questionnaire and height and weight were determined with subjects in light clothing and without shoes.
Results: The overall crude prevalence of overweight and obesity was 23.4 and 14.1%, respectively. The rates of overweight (27.1 vs. 17.5%) and obesity (20.2 vs. 4.6%) were higher in females than males. Obesity increased with age up to 64 years. There were more overweight and obesity in the urban high-class residents compared with the low-class residents and in urban than rural subjects. Overweight and obesity were highest among the Akan and Ga tribes and relatively low among Ewes. Subjects with tertiary education had the highest prevalence of obesity (18.8%) compared with less literate and illiterate subjects (12.5–13.8%). Subjects whose jobs were of a sedentary nature had higher levels of obesity (15%) than subjects whose jobs involved heavy physical activity (10%). Subjects who did not engage in leisure-time physical activity were more obese than those who had three or more sessions of leisure-time physical activity per week (15.3 vs. 13.5%).
Conclusions: Overweight and obesity are common among residents in the Accra area. Older age, female gender, urban, high-class residence, sedentary occupation and tertiary education were associated with higher levels of obesity. Policies and programmes that promote healthy lifestyles may prove beneficial.

Keywords
Obesity
Overweight
Prevalence
Population
Ghana
Adults
Urban
Rural
Physical activity
Demography

The prevalences of overweight and obesity appear to be increasing rapidly in many countries and reflect an overall increase in general fatness[1–4]. Excess body weight is associated with increased risk for cardiovascular disorders[5], type 2 diabetes[6], dyslipidaemia[5,6], endocrine disorders[7], stroke, osteoarthritis, some cancers and gallbladder disease[8–10]. Obesity and overweight appear to be increasing in developing countries as these nations undergo acculturation with alterations in diet and physical activity patterns[3,11]. In Africa, past attention focused more on undernutrition and food security with neglect of obesity[3]. Therefore there are few data on obesity in Africans. However, although relatively low rates of obesity prevalence (0.6–3.6%) have been reported in black Africans from East and West Africa[12,13], relatively higher rates have been recorded elsewhere in black men (10%) and women (44%) on the continent[14].

Ghana is a tropical country in West Africa with a surface area of 238 533 km^2. The population is 19.7 million with a gross domestic product of US$7.4 billion. The capital city, Accra, has undergone considerable demographic changes since independence in 1957. It is now the most urbanised and densely populated area in the country, with an urban population of 1.6 million[15]. In 1987–1988, the rate of obesity was reported to be very low among Ghanaians (0.9%)[13]. In this paper, current data on the prevalence and sociodemographic aspects of overweight and obesity among residents from rural and urban Accra are presented.

Subjects and methods

Target population and sample design

Two urban and a rural community in the Greater Accra area of Ghana were purposely selected for a comprehensive survey on non-communicable disease[16]. For ease of survey implementation, two urban communities in the Accra metropolis (Labadi/Cantoments and Teshie) and one

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community in rural Accra (Danfa/Abokobi, 20 villages) were purposely selected. Labone/Cantoments, a high-class urban housing area, is contrasted with the township of Teshie, a lower-class urban residential area (Ghana Statistical Service). A stratified two-stage cluster sampling technique was used.

Sample size determination

A sample size of 752 was determined based on an estimate of diabetes prevalence of 2%, an absolute precision of 1% and a confidence interval of 95%, in accordance with the Statcalc function of Epi Info, Version 6 (Centers for Disease Control and Prevention, Atlanta, GA, USA/World Health Organization, Geneva, Switzerland). This sample size was multiplied by the maximum design effect for clustering of 2 to give a sample of 1504. To allow for a non-response rate of 20% and a non-participation rate of 10%, 1504 was multiplied by (100/100−30) to arrive at a sample of 2100 per study area.

Sampling frame and sample allocation

The Ghana Statistical Service randomly selected 14 census enumeration zones from each of the two urban communities. From each zone, adults aged 25 years and above were listed. One hundred and fifty eligible subjects were subsequently selected per enumeration area to participate in the study by systematic random sampling. In the rural area, all eligible adults were listed and randomised. From each of the three survey communities, 2100 subjects were recruited into the study.

To standardise survey measurements and procedures, the survey team was trained using specially prepared survey manuals that conformed to recommended non-communicable disease survey protocols[16]. Before the main survey, a field trial was conducted. This involved 60 subjects from outside the three survey communities. The field trial enabled fine-tuning of survey procedures and measurements. During the main survey, the weighing scale was checked against two reference scales each morning before commencement of weighing. Finally, data collection instruments were checked for accuracy and completeness of entries before subjects were discharged home from the survey site.

Subjects were requested to report to a central survey site (two sites in the rural area) early in the morning, after an overnight fast. Anthropometric measurements were performed on subjects in light clothing and without shoes. Weight was measured with a heavy-duty Seca 770 floor digital scale (Seca, Hamburg, Germany) to the nearest 0.1 kg. Height was measured with a stadiometer to the nearest 0.1 cm[16].

Data analysis

Body mass index (BMI) was determined from the weight and height measurements. Relative weight (BMI) was categorised as follows[17]: underweight, $<18.5\,kg\,m^{-2}$; normal, $18.5–24.9\,kg\,m^{-2}$; overweight, $25–29.9\,kg\,m^{-2}$; obese, $\geq 30\,kg\,m^{-2}$. Prevalence estimates of overweight and obesity were age-standardised to the new standard world population[18] by the direct method[19].

The statistical package SPSS 10.0 for Windows (SPSS, Inc., Chicago, IL, USA) was used for the analyses. The results are expressed as means or percentages with 95% confidence intervals, unless specified otherwise.

Ethics

The study was approved by the Ethical Review Committee of the University of Ghana Medical School and complied with the Helsinki Declaration of 1975 (revised in 1983) on human experimentation. Informed consent was obtained from each subject before participation.

Results

In total, 4731 (1857 males, 2874 females) adult Ghanaians, aged 25 years and above with a mean age 44.3 years, took part in the study, representing a response rate of 75%. The overall crude prevalence of overweight ($25.0–29.9\,kg\,m^{-2}$) and obesity ($\geq 30\,kg\,m^{-2}$) was 23.4 and 14.1%, respectively.

Table 1 gives the means (and 95% confidence intervals) of selected variables and the age-standardised prevalences (and 95% confidence intervals) of BMI categories by

Table 1 Mean value (95% confidence interval) of selected variables and age-standardised* prevalence (95% confidence interval) of underweight, overweight and obesity in males and females

Variable	Males ($n=185$)	Females ($n=2874$)	*P*-value	Total ($n=4731$)
Age (years)	44.9 (44.2–45.6)	44.0 (43.4–44.5)	<0.05	44.3 (43.9–44.8)
Height (m)	1.71 (1.70–1.71)	1.60 (1.59–1.60)	<0.001	1.64 (1.63–1.64)
Weight (kg)	65.8 (65.3–66.4)	64.9 (64.3–65.4)	<0.05	65.2 (64.8–65.7)
BMI ($kg\,m^{-2}$)	22.6 (22.4–22.8)	25.6 (25.4–25.8)	<0.001	24.4 (24.3–24.6)
Underweight (BMI $<18.5\,kg\,m^{-2}$) (%)	9.3 (8.9–9.6)	6.6 (6.3–6.9)		7.7 (7.4–8.0)
Overweight (BMI $=25–29.9\,kg\,m^{-2}$) (%)	17.1 (16.6–17.5)	26.9 (26.4–27.5)		23.1 (22.6–23.7)
Obese (BMI $\geq 30\,kg\,m^{-2}$) (%)	4.6 (4.3–4.9)	20.2 (19.7–20.7)		14.0 (13.6–14.5)

BMI – body mass index.
* Prevalence estimates of overweight and obesity were age-standardised to the new standard world population[18] by the direct method[19].

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gender. The rate of underweight was higher in males than females. In contrast, overweight and obesity were higher in females than males.

Table 2 presents the gender- and age-specific means (with standard deviations) of BMI and the distribution of BMI categories. The highest prevalence of overweight and obesity in males occurred in the 45–54 and 55–64 year age groups, respectively. In females, the 35–44 and 55–64 year age categories had the highest rates of overweight and obesity, respectively. Table 3 shows the mean BMI (and 95% confidence interval) and the distribution of BMI categories by urban–rural residence and by gender. Underweight was higher in rural than in urban dwellers. Overweight and obesity were both higher in urban than in rural residents.

Demographic characteristics by BMI category are given in Table 4. Underweight was least prevalent among the Akan ethnic group. Overweight and obesity were highest among the Akans and Gas. Subjects with tertiary education had higher rates of overweight and obesity than did those without tertiary education. Overweight and obesity were high among housewives, professionals, managers and entrepreneurs and low in unskilled workers, farmers, fishermen and students. A relatively high proportion of farmers, fishermen, unskilled workers, shop assistants and pensioners were underweight. Regarding job-related physical activity, subjects whose jobs involved heavy physical activity had the lowest rates of obesity. Those who participated in leisure-time physical activity less than once a week had more obesity compared with those who had more leisure-time physical activity per week. With respect to alcohol intake, those who had never drunk alcohol had the lowest levels of overweight plus obesity. Subjects who had four or more drinks per week had the lowest rate of obesity. More rural than urban dwellers were underweight. In contrast, more urban than rural subjects were overweight or obese. Urban subjects from the relatively affluent residential area had more overweight and obesity than did subjects from the less affluent area.

Among the tribes, Akans had the highest percentage of subjects with tertiary education (26%) compared with Ewes (17%) and Gas (5.4%). In contrast the Ewes had the highest proportion of manual workers (22%) compared with the Gas (17%) and Akans (7%). Among rural dwellers, only 12.5% had secondary or tertiary education as compared with 36.6% of urban subjects. Only 5.2% of

Table 2 Mean body mass index (BMI) (± standard deviation) and distribution of BMI categories by gender and age

Gender/age group (years)	Mean BMI ($kg\,m^{-2}$)	BMI distribution (% of subjects)			
		Underweight ($<18.5\,kg\,m^{-2}$)	Normal ($18.5–24.9\,kg\,m^{-2}$)	Overweight ($25.0–29.9\,kg\,m^{-2}$)	Obese ($\geq 30\,kg\,m^{-2}$)
Men					
25–34 ($n = 555$)	22.1 ± 3.0	5.4	83.8	8.8	2.0
35–44 ($n = 444$)	23.0 ± 3.8	5.0	69.9	20.7	4.7
45–54 ($n = 391$)	23.3 ± 4.2	9.0	59.9	25.8	6.1
55–64 ($n = 245$)	22.5 ± 4.5	15.9	60.0	16.3	7.8
≥ 65 ($n = 222$)	22.0 ± 4.3	22.1	54.1	19.4	4.5
All men ($n = 1857$)	22.6 ± 3.9	9.4	68.5	17.5	4.6
Women					
25–34 ($n = 900$)	23.9 ± 4.7	7.7	58.6	22.6	11.1
35–44 ($n = 764$)	26.2 ± 5.7	4.6	42.0	31.4	22.0
45–54 ($n = 561$)	26.7 ± 6.3	5.0	41.7	27.3	26.0
55–64 ($n = 319$)	27.2 ± 6.5	6.3	34.5	26.3	32.9
≥ 65 ($n = 331$)	25.3 ± 6.0	10.6	40.5	30.2	18.7
All women ($n = 2874$)	25.6 ± 5.8	6.5	46.1	27.1	20.2
Total ($n = 4731$)	24.4 ± 5.3	7.7	54.9	23.4	14.1

Table 3 Mean age and body mass index (BMI) (95% confidence interval) and distribution of BMI categories in urban and rural subjects by gender

Gender/residence	Mean age (years)	Mean BMI ($kg\,m^{-2}$)	BMI distribution (% of subjects)			
			Underweight ($<18.5\,kg\,m^{-2}$)	Normal ($18.5–24.9\,kg\,m^{-2}$)	Overweight ($25–29.9\,kg\,m^{-2}$)	Obese ($\geq 30\,kg\,m^{-2}$)
Men						
Urban ($n = 1219$)	43.8 (43.0–44.6)	23.3 (23.1–23.6)	5.3	65.9	22.9	5.9
Rural ($n = 639$)	46.9 (45.8–48.1)	21.2 (20.9–21.4)	17.2	73.6	7.2	2.0
Women						
Urban ($n = 1886$)	43.7 (43.1–44.4)	26.1 (25.9–26.4)	5.1	42.9	29.4	22.5
Rural ($n = 988$)	44.7 (43.5–45.4)	24.5 (24.2–24.9)	9.1	52.2	22.9	15.8

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Table 4 Distribution of body mass index (BMI) categories by demographic variables

Demographic variable	BMI distribution (% of subjects)			
	Underweight ($<18.5\,kg\,m^{-2}$)	Normal ($18.5–24.9\,kg\,m^{-2}$)	Overweight ($25–29.9\,kg\,m^{-2}$)	Obese ($\geq 30\,kg\,m^{-2}$)
Marital status				
Never married ($n = 542$)	7.6	67.2	18.3	7.0
Married ($n = 3135$)	7.6	53.7	24.6	14.0
Separated/divorced ($n = 591$)	8.3	52.8	22.8	16.1
Widowed ($n = 448$)	7.1	51.4	21.2	20.3
Ethnicity				
Akan ($n = 948$)	4.5	51.9	28.8	14.8
Ewe ($n = 618$)	9.2	55.5	23.1	12.1
Ga-Adangbe ($n = 2977$)	8.3	55.4	21.6	14.6
Other tribes ($n = 170$)	8.2	61.2	23.5	7.1
Highest level of education				
None ($n = 955$)	10.8	56.9	18.5	13.8
Primary–middle (≤ 10 years) ($n = 2411$)	8.0	57.5	21.3	13.2
Secondary (11–15 years) ($n = 785$)	5.4	53.2	27.8	13.6
Tertiary (>15 years) ($n = 549$)	4.2	42.4	34.6	18.8
Other (e.g. Islamic) ($n = 16$)	6.3	68.8	12.5	12.5
Occupation				
Student ($n = 74$)	12.2	73.0	12.2	2.7
Housewife ($n = 64$)	3.1	34.4	26.6	35.9
Unskilled worker ($n = 123$)	10.6	65.9	14.6	8.9
Farmer/fisherman ($n = 617$)	12.6	64.5	13.6	9.2
Trades person ($n = 652$)	6.3	59.8	23.9	10.0
Hawker/petty trader ($n = 1399$)	7.9	53.2	22.7	16.3
Clerical/office worker ($n = 82$)	3.7	62.2	25.6	8.5
Shop assistant ($n = 53$)	11.3	54.7	20.8	13.2
Paraprofessional ($n = 700$)	4.4	51.7	28.3	15.6
Entrepreneur ($n = 74$)	4.1	40.5	36.5	18.9
Professional/managerial ($n = 152$)	2.0	38.8	40.1	19.1
Pensioner ($n = 236$)	11.0	48.7	23.7	16.5
Unemployed ($n = 290$)	7.9	53.8	21.4	16.9
Others ($n = 200$)	6.5	50.5	32.0	11.0
Job-related physical activity				
Sedentary ($n = 963$)	7.4	52.0	25.6	15.0
Light activity ($n = 1012$)	6.5	52.3	24.8	16.4
Moderate activity ($n = 1933$)	6.8	54.6	24.5	14.0
Heavy activity ($n = 805$)	11.2	62.6	16.0	10.2
Leisure-time physical activity				
None ($n = 1106$)	7.9	52.8	24.1	15.3
Less than once per week ($n = 736$)	6.9	56.8	22.4	13.9
1–2 times per week ($n = 1321$)	7.9	54.7	23.6	13.9
3 or more times per week ($n = 1543$)	7.7	55.7	23.1	13.5
Alcohol intake				
Never drank alcohol ($n = 1329$)	8.5	56.8	21.7	12.9
No alcohol for last 6 months ($n = 755$)	6.1	53.5	24.0	16.4
One drink or less per week ($n = 1788$)	7.4	53.9	24.0	14.7
2–3 drinks per week ($n = 549$)	8.9	55.9	21.3	13.8
4 drinks or more per week ($n = 286$)	7.0	55.2	28.3	9.4
Smoking history				
Never smoked ($n = 4025$)	7.7	54.7	23.2	14.4
<100 cigarettes all his/her life ($n = 79$)	8.9	56.2	25.3	7.6
Not smoked for 6 months or more ($n = 289$)	6.2	53.3	25.3	15.2
<10 cigarettes per day ($n = 263$)	9.5	60.1	20.2	10.3
10–20 cigarettes per day ($n = 29$)	3.4	55.2	34.5	6.9
>20 cigarettes per day ($n = 10$)	–	70.0	20.0	10.0
Others ($n = 14$)	7.2	50.0	28.5	14.3
Urban–rural residence				
Urban ($n = 3104$)	5.2	51.9	26.8	16.0
Rural ($n = 1627$)	12.3	60.6	16.7	10.4
Housing				
High–middle class ($n = 1479$)	3.4	48.5	29.9	18.2
Lower class ($n = 1632$)	6.8	55.1	24.1	14.0

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urban dwellers were engaged in manual work as opposed to 35.6% of rural folk. Very few rural subjects were in managerial and professional occupations (1.1%) compared with 6.7% among urban subjects. With respect to urban dwellers, the high-class residential area had 11.9% of subjects in managerial occupations compared with 2% in such occupations in the low-class residential area. There were slightly more workers engaged in manual occupations in the low-class residential area than in the high-class residential area of the city (5.5 vs. 4.9%).

Discussion

In the present population-based cross-sectional study, data are presented on the age-standardised (new standard world population) prevalence of overweight and obesity in adult Ghanaians. A drawback of the study was that it was not based on a representative national sample. The study, nevertheless, provides useful data on the socio-demographic aspects of obesity in adult Ghanaians in the most urbanised area of the country. It is notable that overnutrition is on the increase and is now a major problem in the Accra Metropolitan area, with the prevalence of overweight and obesity being 23% and 14%, respectively. The prevalence of obesity in females was nearly four times that in males.

Social pressures may partly be responsible for the increasing rates of overweight and obesity in Ghanaians. Ghanaians generally associate fatness with beauty in women and success in both sexes. It is therefore not surprising that some women and indeed some men are now going out of their way to put on weight in order to appear beautiful or prosperous (personal observation). Ghanaian men are also known generally to prefer overweight and obese women to thin ones. This may conceivably contribute to the higher rates of overnutrition among females. It appears that Ghanaians are now eating more fried and fatty foods, sauces and soups than they did several decades before. With increasing affluence, they also appear to be taking larger food portions than before. Four or so decades ago, fried foods and fatty foods were not so common or so popular as today, and, for most people, soft drinks were consumed usually at Christmas. Along with urbanisation and Westernisation have come fast food chains and soft drinks bottling plants. Ghanaians also appear to be taking exercise less regularly. In the past, people walked long distances (sometimes miles) to work and to school. Nowadays, more and more Ghanaians are walking less frequently and are using a *tro tro* (cheap means of public transport in the city) or car at the slightest opportunity, sometimes for journeys of less than a quarter of a mile. In addition, many more families now own a car and so are more likely to drive than walk. Most homes now have television with at least three channels that offer 12 to 18 hours' viewing a day. Even individuals who do not have television in their homes will often congregate around television sets belonging to their neighbours. In the 1960s, television was very uncommon in most homes; homes with television had only one channel that was available at 18.00 in the evening to 22.00 at night. The stage is thus set for an obesity epidemic in Ghana.

In the present study, rural dwellers had lower rates of obesity than urban subjects. It is interesting to note that our rural subjects tended to be manual workers with relatively high levels of job-related physical activity. Our urban subjects from the high-class residential area had higher rates of obesity than did those from the low-class urban residential area. This is contrary to reports from the Western world, where subjects from affluent portions of society tend to have lower rates of obesity than do subjects from lower social strata. In our study, it is to be noted that a relatively higher proportion of residents from the higher-class residential area were in the more sedentary occupations with fewer opportunities to expend energy on their jobs. They were also more likely to be more affluent with a tendency to consume a more Western-type diet compared with urban residents from the low-class residential area (personal observation). Conceivably, despite their higher literacy rate, residents in the higher-class area may still hold a view of body image that favours being overweight and obese.

In about 10 years the rate of obesity in Ghanaians has increased several times, from less than 1% to 14%[13]. It has been observed that an increase in the prevalence of obesity within a population is often noted before a rise in the occurrence of chronic non-communicable diseases such as diabetes, hypertension, stroke, coronary artery disease and some forms of cancer[20]. With the increasing rate of obesity, the stage is thus set for non-communicable diseases to emerge and threaten the health of Ghanaians. Already we are seeing an increase in the prevalence of some of these diseases. In the late 1950s, the prevalence of diabetes was estimated at 0.2–0.4% in urban areas in Ghana[21,22]; in a recent study the prevalence of type 2 diabetes in adult Ghanaians from the city of Accra and its environs was 6.3%[16]. Ghana, a low-income country[15], can ill-afford to add the burden of non-communicable diseases to the existing burden of communicable diseases.

We need to respond to the challenge posed by the impending obesity epidemic. Population-based initiatives are needed to encourage physical activity and healthy eating, and to conduct research to identify effective educational, behavioural and environmental approaches to control and prevent obesity. At the present time, the environment is hardly conducive for health promotion. Very few roads in Ghana have pavements for pedestrians or are safe. There are many more vehicles and many more reckless drivers than a few decades ago. Ghana has now one of the worst figures for road traffic accidents in the world (Road Safety Campaign, Accra, Ghana, 2002). Thus not only is the environment non-conducive for walking as a pastime, it is also dangerous as one runs the risk of being

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run over by a vehicle. Also, there are very few walkways and parks in Ghanaian cities for joggers and for running. Most workplaces and communities do not have recreational and sporting facilities to encourage regular leisure-time physical activity.

There is an urgent need for a policy shift towards organised and co-ordinated health promotion to combat the increasing trend of overweight and obesity. City planners, local governments, employers, community and opinion leaders should be encouraged to include walkways, and other facilities that promote leisure-time physical activity, in housing and estate development projects. Facilities that encourage physical activity should also be provided in residential areas, communities and workplaces. In addition, negative social pressures such as 'fat is beautiful or prosperous' should be addressed through educational programmes. Individuals and communities must be made aware of the health risks associated with obesity and overweight. Awareness creation should be complemented by population-based health promotion programmes that emphasise the benefits of leisure-time physical activity such as brisk walking, jogging and running and healthy eating in preventing and controlling obesity.

The present study also reveals significant levels of underweight, particularly in men, pensioners and rural subjects, in the presence of rising obesity. Higher rates of underweight in adult males compared with females have also been reported in black South Africans[23]. The Accra area appears to be at the phase of the nutrition transition where undernutrition coexists with overnutrition. Although the cause of the undernutrition in the present study is uncertain, socio-economic factors may possibly play a role. Our subjects with no formal education and the relatively less affluent members of society (such as peasant farmers, fisherman, students and rural dwellers) tended to have higher levels of undernutrition. In Ghana, there is little irrigation farming. Food availability is therefore seasonal. Soon after the rainy season there is a plentiful supply of relatively cheap food. Without preservation and effective storage a lot of the food goes to waste. Furthermore, at harvest time, much of the food rots on farms due to the poorly developed road and transport infrastructure. With the onset of the dry season, food soon becomes scarce and expensive. The less affluent groups such as rural dwellers, fisherman and farmers are likely to fare less well during the period of food scarcity. It is to be noted that Ghanaian males tend to be involved in more physically active occupations than do females. Increased energy expenditure in the face of food scarcity may therefore be partly responsible for the relatively higher levels of undernutrition in males. Major policy shifts, with the introduction of irrigation farming, better food preservation and storage and improved road infrastructure, may ensure availability and equitable distribution of food throughout the year with a consequent reduction in the level of undernutrition. As food becomes plentiful and available throughout the year, health promotion, as advocated above, may avert further rises in the levels of overweight and obesity.

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