The Prevalence of Overweight and Obesity in Britain, Canada, and United States

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Abstract: Three nations carried out large surveys of their non-institutionalized populations during the period 1976–81, with essentially similar techniques for measuring height and weight. Using criteria previously published for the British survey, we analyzed the Canadian and United States data and compared the prevalence of excessive weight for ages 20–64 in the three countries. Overweight was defined as a Quetelet index value of 25.1–30, and obesity as a value exceeding 30.

Compared to their Canadian and British counterparts, American men are more likely to be overweight or obese, especially at the lower age levels. The proportion of excessively heavy men reaches a plateau around age 50 in all three countries, possibly indicative of a survivor phenomenon. Among women, the US has the highest proportion of excessively heavy individuals at all ages except 20–24; this difference is especially marked at ages 45–54. Unlike men, there is no evidence that the proportion of overweight or obese women reaches a plateau by age 64. (*Am J Public Health* 1987; 77:38–41.)

Introduction

Obesity, defined as excessive storage of energy in the form of fat, has been identified as a risk for a wide range of diseases, including adult onset diabetes, hypertension, coronary heart disease, certain cancers, gout, gall bladder disease, and certain arthritic conditions.[1,2] Assessing the prevalence of obesity in populations is thus an important requirement for health planning. There are differences in the operational and statistical definitions of the concepts of overweight and obese. Some studies have employed relative weight indexes that compare the weight of each individual to the median or mean weight of all persons in the same age, sex, or height category.[3] An alternate approach has been to assess the general population against the weight-for-height norm for a particular group in the population, e.g., those aged 20–29.[4] Benn developed formulae for obtaining a unique exponent value for the body mass index.[5] Nevertheless, the fact remains that all such relative weight scales may refer to a standard which is overweight or underweight from a clinical perspective.

The variety of methods used to estimate overweight and obesity has also made it difficult or impossible to compare populations as they change over time, or as they vary from one society to another. However, the consistency of the techniques used in population surveys in Britain, Canada, and the United States during the period 1976–81 invites comparative analysis of the prevalence of overweight and obesity in these three countries. In addition to being interesting in their own right, such comparisons may suggest avenues for research into the health implications of obesity.

Methods

The British estimates are drawn from a survey carried out for the Department of Health and Social Security in 1980;[6] Canadian prevalence data are based on the 1981 Canada Fitness Survey,[7] and the American estimates are obtained from the second National Health and Nutrition Examination Survey (NHANES II), conducted between 1976–80.[8] Each of these was based on a probability sample of the national non-institutionalized population.

Since the ages covered by the surveys varied, comparisons in this paper are restricted to the common age range of 20–64 years. The British survey sample was comprised of 4,013 men and 4,421 women in this age range. The Canadian survey sampled 4,831 men and 5,448 women, and the American survey covered 3,838 men and 4,173 women. Post-stratification procedures were used in each case to calculate sample weights for estimating prevalence values. More detailed descriptions of the sample designs may be found in published reports.[4,6,7] All data presented in this paper are appropriately weighted; the US data are for Whites only. Controlling the analyses for race and presenting age- and sex-specific data remove the major factors which could confound these comparisons of national populations.

The anthropometric techniques used to measure weight and height were similar in the three surveys, and the differences which did exist are unlikely to bias estimates of relative weight or affect the comparisons between populations. Weight was measured with beam balances in Canada and the US and with a spring balance in Britain; all were regularly calibrated. Weighing was always done in light clothing, and the British data have been corrected for this weight. All three surveys ensured subjects were standing in stocking feet for height measurement, with the head in the Frankfort plane. The British survey had subjects stretch to their fullest height; the Canadian and US surveys had the anthropometrist apply gentle traction to achieve this stretch.

Obesity and overweight are not identical concepts. Obesity is typically defined as an excess of body fat and overweight is an excess of body weight relative to a specified standard for height. However, this paper adopts the practice of the recent British report and uses the Quetelet or body mass index to assess both overweight and obesity. The Quetelet index is defined as W/H^2 (kilograms/metres^2). Underweight is defined as ≤ 20, normal as 20.1–25, overweight as 25.1–30 and obese as >30. The same weight classification values were used for both men and women and for all age groups, and are those employed in the British report.

Results

Table 1 presents the distribution of body mass index values for men in the three countries. The age-related patterns are similar for all three—a pronounced increase from ages 20–24 in both the overweight and obese categories until ages 45–54, when a plateau appears to be achieved. This

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TABLE 1—Distribution of Men by Body Weight Classification and Age, Britain, Canada, and the United States

Age Groups (years) by Country	Sample Size	% Underweight (BMI ≤ 20)	% Normal (BMI > 20–25)	% Overweight (BMI > 25–30)	% Obese (BMI > 30)
20–24					
Britain	516	14	64	19	3
Canada	819	11	64	21	—
United States*	581	10	58	25	7
25–34					
Britain	1,057	8	57	29	6
Canada	1,576	6	55	33	6
United States*	901	6	46	38	10
35–44					
Britain	886	5	49	38	8
Canada	1,129	3	43	43	11
United States*	653	—	39	46	12
45–54					
Britain	811	4	43	45	8
Canada	761	—	35	50	12
United States*	617	—	38	43	16
55–64					
Britain	743	7	41	43	9
Canada	546	—	36	46	14
United States*	1,086	3	36	47	14
Total 20–64					
Britain	4,013	7	50	35	8
Canada	4,831	5	48	38	9
United States*	3,838	5	43	40	12

*Whites only.
—Sample size too small for precise estimate.

leveling off occurs when a majority in each population are either overweight or obese.

For each age group of men, Britain has the largest proportion in the normal weight category. Canada is second to Britain in the younger years (through age 44), after which the United States is second. The proportions are generally small, but the largest proportion of these in each group is consistently the British.

The findings for the overweight and obese categories are very similar; thus these observations refer to the two groups combined ("excessive weight"). Britain has the smallest proportion in this classification for all age groups, followed by Canada up to ages 35–44. Only for the age group 45–54 does the United States not have the highest prevalence of excessive weight. There is a substantial gap between Britain and the two North American nations in the older age group (Figure 1).

In many respects, the data for women (Table 2) are different from those for men, although the same increase in overweight and obesity associated with age is evident. No plateau is observed in the excessive weight classification. Britain and Canada have similar proportions in the normal weight category, while the United States has substantially fewer in this classification after age 24.

The prevalence of obesity among US women exceeds that of Britain and Canada in every age group, by a factor of 1.5–2 after ages 20–24. In contrast, the proportion of women classified as overweight is relatively similar for all three countries. The exception is ages 45–54, where there are noticeably more US women (Figure 2).

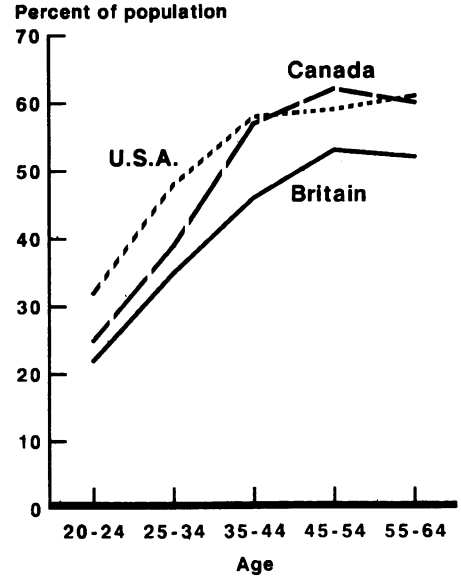

FIGURE 1—Prevalence of Excessive Body Weight (BMI > 25), Males, Ages 20–64, Britain (1980), Canada (1981), United States (1976–80)

Discussion

The definitions of overweight and obese are, of necessity, those used in the British report and differ from those sometimes used in the study of this topic. For example, the National Center for Health Statistics (NCHS) has used as a benchmark the weight-for-height of 20–29 year-olds,[4] while the US Office of Disease Prevention and Health Promotion has used 120 per cent of ideal weight as its cut-off in setting national objectives.[9] Similarly, Bray has suggested different Quetelet index values for men and women in the definitions of overweight and obese,[10] and NCHS[4] has used different power values for the sexes in the index weight/(height)p. These variations account for the discrepancies between this report and others in the prevalence of excessive weight, yet

TABLE 2—Distribution of Women by Body Weight Classification and Age, Britain, Canada, and the United States

Age Groups (years) by Country	Sample Size	% Underweight (BMI ≤ 20)	% Normal (BMI > 20–25)	% Overweight (BMI > 25–30)	% Obese (BMI > 30)
20–24					
Britain	547	23	56	16	5
Canada	873	34	57	7	—
United States*	624	25	56	12	7
25–34					
Britain	1,115	17	59	18	6
Canada	1,757	23	58	15	4
United States*	1,000	22	48	19	12
35–44					
Britain	973	9	59	24	8
Canada	1,223	14	57	21	8
United States*	726	13	51	21	16
45–54					
Britain	904	8	51	29	12
Canada	903	6	51	29	14
United States*	647	9	45	48	18
55–64					
Britain	882	7	44	35	14
Canada	692	—	46	37	13
United States*	1,176	8	41	30	21
Total 20–64					
Britain	4,421	12	54	25	9
Canada	5,448	17	54	21	8
United States*	4,173	15	48	22	15

*Whites only.
—Sample size too small for precise estimate.

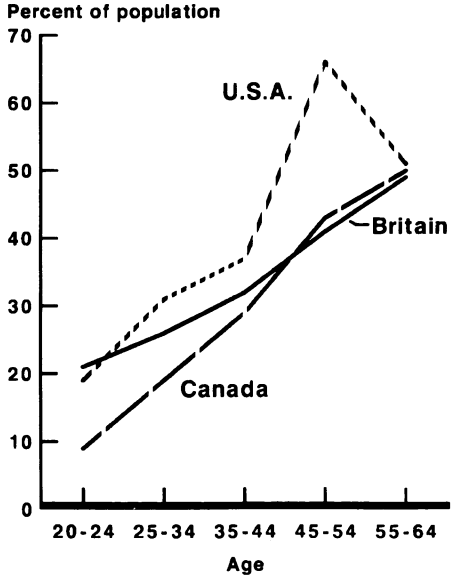

FIGURE 2—Prevalence of Excessive Body Weight (BMI > 25), Females, Ages 20–64, Britain (1980), Canada (1981), United States (1976–80)

it is essential for these international comparisons that the same criterion be used for assessing the data of each country.

It is also clear that the reference-group approach could not be used in this comparison: if American 20-year old males were used as a standard, for example, this would be an automatic advantage for the two other countries, and if each country's youngest adults were taken as the reference group, the international comparison of adults would be meaningless. Thus comparison against a "clinical" value is the only workable method. The comparisons presented here illustrate another difficulty with the reference group approach, even for within-country interpretation of data: the high prevalence of underweight women age 20–24 in Canada, for example, tends to exaggerate the proportions of overweight among older groups if these proportions are calculated with reference to the youngest group rather than an absolute standard.

Regardless of the criterion for overweight or obesity, it is apparent from the results that there is a similar age-related increase in excessive weight in all three populations. Since this increase corresponds to the increased prevalence of those chronic diseases for which obesity is a risk, the plateau evident for men in Figure 1 may indicate a "survivor" phenomenon. The lack of such a plateau for women indicates either that it occurs at a later age or that it does not occur at all. The patterning of body fat—in particular, waist/hip ratio which appears to be related to cardiovascular disease[11]—may account for the postponement or absence of a plateau among women.

The reasons for the increasing prevalence of overweight with age presumably are due to an increasing imbalance of caloric intake with expenditure, although there are no population data to substantiate this view directly. However, leisure-time physical activity declines with age in both the United States and Canada,[12] and population studies in Britain would likely reveal similar patterns. The average daily expenditure on leisure-time physical activity in Canada, where the prevalence of activity is slightly higher than the United States,[12] has been estimated at only 2.3 kcal/kg body weight for men and 1.8 kcal/kg for women.[13] Compared to a resting value of 1 kcal/kg, this is evidently not sufficient to burn off the calories consumed each day, even though these also decline with age in Canada[14] and in the United States.[15]

While these circumstantial data on caloric intake and expenditure may suggest some explanation of the association between age and excessive weight, it is not possible to explain the international differences in overweight and obe-

sity with these data. It is perhaps more than coincidental, however, that the ranking of the three countries on overall prevalence of excessive weight corresponds to their relative levels of affluence. The important public health question is whether the increased prosperity which every country seeks will lead to still greater levels of excessive weight among their populations.

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ECFMG Urges Expanded Program for Foreign Medical Graduates

The Educational Commission for Foreign Medical Graduates (ECFMG) has issued a new position paper and proposal for a cooperative effort by the United States Government, universities, and the medical profession that will provide increased educational opportunities for exchange visitor physicians who are committed to returning to their home countries with new medical knowledge and skills that will serve their patients.

ECFMG is the principal organization authorized by the United States Information Agency (USIA) to sponsor exchange visitor physicians for clinical training. The number of exchange visitor physicians sponsored annually by ECFMG has decreased substantially during the last decade, the Commission notes, from 7,540 in 1976 to 1,915 in 1985.

The new ECFMG position paper, entitled "The Graduate Medical Education of Exchange Visitor Physicians: The Need to Enhance and Expand the Current Program," issued October 1986, is a companion document to "Graduate Medical Education of Foreign Medical School Graduates in the United States," issued in June 1986. For further information, contact: Educational Commission for Foreign Medical Graduates, 3624 Market Street, Philadelphia, PA 19104-2685, USA. Telephone 215/386-5900.