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SOCIOCULTURAL AND BEHAVIOURAL DETERMINANTS OF OBESITY AMONG INUIT IN THE CENTRAL CANADIAN ARCTIC

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Abstract—This paper reports on the sociocultural determinants of obesity among the Inuit people in the central Canadian Arctic, part of the Keewatin Health Assessment Study (KHAS), a comprehensive community health survey conducted during 1990/91 in eight Inuit communities in the Northwest Territories ($n = 434$ adults aged 18 yr +). On multivariate analysis, age is an independent predictor of obesity in both sexes. Among Inuit women, non-smoking status and a lower education is associated with various obesity indices. However, smoking is not a predictor in men, and the association with education is the reverse, i.e. the more highly educated are more likely to be obese. In addition, some obesity indices are associated with higher income, an admixed ethnic background, fluency in the Inuit language and less time spent on the land. In general Inuit men tend to show the pattern obeserved in developing societies, where obesity is more prevalent among those with higher SES status, whereas Inuit women are more characteristic of developed societies, where obesity is associated with a lower SES. The different sex roles in a rapidly modernizing population is most likely to be responsible for this phenomenon. Copyright © 1996 Elsevier Science Ltd.

Key words—obesity, central fat, body mass index, waist–hip ratio, Eskimo, Arctic, socioeconomic status

INTRODUCTION

Important social and cultural changes have occurred in the Canadian Arctic over the past several decades. The indigenous inhabitants—the Inuit—have been settled in towns and villages, resulting in a substantial reduction in traditional hunting activities and declining dependence on a diet based on land and marine mammals. As a consequence of such changes, the pattern of health and disease has undergone a transition [1], an important indicator of which is the increasing prevalence of obesity, associated with a decline in physical fitness and muscle strength [2].

In their review of 144 published papers dealing with socioeconomic status (SES) and obesity, Sobal and Stunkard found that in developed societies there was an inverse relationship between SES and obesity among women, i.e. the poor were more likely to be obese. The relationship, however, was inconsistent among men and children of both sexes. A different situation was observed in developing societies (which included data from three Native American populations—Apache, Kiowa/Comanche and Navajo), where the relationship was direct, i.e. the wealthy were more likely to be obese. This applied to men, women and children [3]. The effect of SES on obesity probably operates through differential food intake and energy expenditure. Cultural values which favour a fat body shape, assigning it social prestige and sexual attractiveness, promote greater food intake among the well-off, who possess the necessary means.

A useful framework for understanding the mechanisms linking social, economic and cultural factors with obesity has been proposed by Sobal. Such factors lead to variation in behaviour which influences energy intake, expenditure and intermediate metabolism, resulting in obesity. Operating in the other direction, the social perception of obesity can be interpreted through prejudicial beliefs with subsequent stigmatization and discrimination, with the result that access to higher SES roles becomes limited [4].

In this paper, we present data relating to the sociocultural and behavioural determinants of obesity among the Inuit, using data obtained from the Keewatin Health Assessment Study (KHAS), a comprehensive community health survey conducted during 1990/91 in eight Inuit communities in the Keewatin Region of the Northwest Territories (NWT), Canada. A previous paper investigated the definition, prevalence and metabolic correlates of obesity in this population [5].

STUDY POPULATION

The inhabitants of the Keewatin Region—the Central Inuit—are descendants of the people of the Thule culture who moved into the central Arctic around the twelfth century AD. Sustained contact with Europeans began in the eighteenth century, but despite the introduction of items of European

material culture, such as firearms, metal utensils and implements, the Inuit traditional way of life remained largely intact well into the twentieth century. Until the 1950s, they lived much the same way as that described by anthropologists such as Franz Boas towards the end of the ninteenth century [6], and the Fifth Thule Expedition of the 1920s [7]. Traditionally, the main subsistence activity has been the hunting of the barren ground caribou in the inland areas. Fish (e.g. arctic char) is an important secondary food source, and birds such as ducks, geese, ptarmigan and gulls, as well as their eggs, are also eaten. Except for some berries and roots available in the short summer, the source of plant food is mainly the stomach contents of herbivores and birds. Sea mammals such as seals, walruses and whales are hunted along the coast in the spring, both at the floe edge and in open water from kayaks [8].

Since the 1950s, the pace of change has intensified. New townsites were developed, and the Canadian government actively encouraged sedentary settlement where health, education and welfare services could be conveniently administered and provided. The beginning of mining activities in the region further consolidated the local population as well as introduced migrant workers from the south. Elsewhere in the Arctic, the Cold War (against the Soviet Union, not the climate) hastened the modernization of the northern frontiers with the construction of radar stations and airstrips.

The present Keewatin Region is located in the central part of the Northwest Territories, between 60° and 69° N and 80° and 102° W. It comprises seven predominantly Inuit communities on the west coast of Hudson Bay. In addition, the community of Sanikiluaq, situated on the Belcher Islands near the eastern shore of Hudson Bay, receives its health services from the Keewatin Regional Health Board, although administratively it is part of the Baffin Region. It has therefore been included in the Keewatin Health Assessment Study.

SURVEY METHODS

Details of the study design and survey methods have been published elsewhere [5, 9]. In the Keewatin Region, a complete census conducted for the study revealed a total population of 2975 individuals aged 18–74, 20% of whom were randomly selected (n = 599) and invited to participate in the survey. Of those invited, 72.5% participated, yielding a final sample of 434 individuals (199 M, 235 F). In this paper, 47 individuals who did not report full or part Inuit ancestry were excluded from analysis, resulting in a final sample of 387.

The survey consisted of three components: (1) an interviewer-administered questionnaire, (2) clinical examination and (3) laboratory tests. The questionnaire provides sociodemographic information as well as data on personal health and lifestyle habits. It was adapted from existing health survey protocols such as the WHO–MONICA study of cardiovascular risk factors [10], and the Canada Heart Health Survey [11]. Standardized procedures were used in performing clinical and laboratory measurements. Field staff were trained by instructors from the Canada Heart Health Survey. Anthropometry consisted of subscapular and triceps skinfolds, waist and hip girths, and height and weight. Lange callipers (Cambridge Scientific Industries, Cambridge, MD) were used for the skinfold measurements. Waist and hip girths were measured with a tape measure. Height and weight were recorded with the subjects wearing only underclothes and a hospital gown.

An extensive process of consultation, translation, pre-testing and back translation was undertaken to ensure that questionnaire items investigating health behaviour, knowledge and attitudes were culturally meaningful to the target population. All questionnaires were printed in both English and Inuktitut, the language of the Inuit.

The field work began early in 1990 and covered three communities during the spring; after a summer break the remaining five communities were covered between September and December 1991. The field work was preceded by an initial promotional tour of the targeted communities. Extensive use was made of community meetings, radio phone-in shows, posters and pamphlets.

The survey protocol was approved by the Committee on the Use of Human Subjects in Research of the Faculty of Medicine, University of Manitoba. Informed consent was obtained from each individual participating in the survey. A research license (No. 10016) was issued by the Science Institute of the Northwest Territories, upon receipt of signed authorizations by the Hamlet Councils of each of the communities participating in the study.

CONSTRUCTION OF VARIABLES

Sociodemographic variables

Variables such as *marital status*, *ethnic admixture*, *education*, *employment status*, *income* and *proficiency in Inuktitut* were based on responses to single questions (Table 1). Some categories of response were collapsed because of small cell size. For *marital status*, *single*, *separated*, *divorced* and *widowed* were combined into a *not married* category. In the analysis it would be understood that *not married* among the young generally meant *single*. *Married* also includes cohabitation or common-law marriage. For education, individual years of completed formal schooling were combined into two categories: 0–6 years as *primary education only*, and 7 or more years as *some secondary education*. The responses to the question "Are you employed during the past 12 months?" were combined into two categories: *not employed* and

Table 1. Frequency distribution of selected sociocultural and behavioural variables among Inuit

Variable	Category	Number	%
Sex	male	167	43.2
	female	220	56.9
Age group	18–34	210	54.3
	35–54	114	29.5
	55 +	63	16.3
Admixture	Inuit only	276	71.3
	admixed	111	28.7
Marital status	not married	168	43.4
	married	219	56.6
Education	primary only	215	55.6
	some secondary	172	44.4
Employment	not employed	223	57.6
	employed:	164	42.4
	seasonal/part-time	*61*	*15.8*
	full-time	*103*	*26.6*
Personal income	< $10,000:	302	78.0
	< $10,000	*163*	*42.1*
	missing	*139*	*35.9*
	$10,000 +	85	22.0
Inuktitut proficiency	not fluent	109	28.2
	fluent	278	71.8
Cigarette smoking	current smoker:	256	71.7
	regular smoker	*224*	*62.8*
	occasional smoker	*32*	*9.0*
	non-current smoker:	101	28.3
	past smoker	*65*	*18.2*
	never smoker	*36*	*10.1*

employed, which comprised both *part-time or seasonal* and *full-time*. It should be noted that among the *not employed* were housewives and the retired.

The *income* variable was dichotomized into *< $10,000* and *$10,000 + per year*. However, a large number of people (36%) did not respond to this question. In terms of the distribution of demographic, anthropometric and metabolic variables, it was evident that individuals with missing values were similar to the lower income group. They were therefore combined with the lower income group.

There were four responses for proficiency in spoken Inuktitut, which served as one measure of adherence to a traditional lifestyle, or degree of acculturation. As the great majority of respondents spoke it very well, the categories of *fairly well*, *very little* and *none at all* were combined into one category of *not fluent*.

Smoking

The survey identified *never smokers*, *past smokers* and *current smokers* of cigarettes. Among current smokers, *regular smokers* were defined as those who smoked at least one cigarette daily and *occasional smokers* those who smoked less often than daily. Only a handful of Inuit smoked cigars or pipes, and 30 individuals (8%) chewed tobacco. Among the latter, 18 were also current cigarette smokers. In the analysis, only cigarette smoking was considered. Never smokers and past smokers were combined into a single category of *non-current smokers*.

Physical activity

Two questions dealt with the frequency and intensity of physical activity:

How would you rate the level of physical exertion in your daily activities, would you say: (a) hard (b) medium (c) low?

How often do you engage in sporting activities? By sports, I mean vigorous activities such as: [... a list is read]. How many times per week do you do these kinds of activities: (a) daily (b) 4–6 times per week (c) 1–3 times per week (d) less than once per week?

The first question required a self-rating of overall daily activity level, including both at work and so-called "leisure-time" activity. The second covered the following strenuous sports: hockey, jogging, square dancing, fast walking, bicycling, swimming, curling, skating, softball, soccer, paddling, basketball, volleyball, aerobics, skiing, weight lifting, Inuit games such as high kick.

When these two variables were cross-tabulated, it was evident that the two did not coincide, as many individuals who rated their daily activities as involving "hard" physical exertion did not engage in active sports. For example, of 56 people in the "hard" category, 34 (61%) said they "never" took part in any active sports. A new composite variable was created by combining responses to these two questions, as indicated in Table 2.

Three categories were created in the new variable on *total physical activity*:

(1) *very active*: those who answered "hard" to the question on degree of physical exertion in their daily activities OR "daily" or "4–6 times/week" to the question on sports (figures shown in bold type in Table 2, 102 (30.8%) of 331 respondents);

Table 2. Cross of two variables measuring physical activity

	Frequency of vigorous sports						
Self-rated daily activity	daily	4–6/wk	1–3/wk	< 1/wk	never	no response	Total
Hard	**2**	**2**	**10**	7	**34**	**1**	56
Medium	**15**	**19**	39	37	76	6	192
Low	**4**	**4**	14	7	*38*	*2*	69
No response	**4**	**0**	4	2	*4*	56	70
Total	25	25	67	53	152	65	387

Notes: (1) *Very active*: those who answered "hard" to the question on degree of physical exertion in their daily activities OR "daily" or "4–6 times/week" to the question on sports (figures in bold type);
(2) *Moderately active*: an intermediate category to cover individuals who did not fall into categories (1) or (3)
(3) *Inactive*: those who answered "low" to the question on daily physical exertion AND "never" to the question on sports (figures in italic type).

Table 3. Cross-tabulation of time spent on the land during spring/summer and autumn/winter

	Autumn/winter on the land							
Spring/summer	> 1/wk	1/wk	2–3/mo	1/mo	< 1/mo	never	no response	Total
> 1/wk	**34**	**2**	**2**	**1**	**0**	**2**	**1**	42
1/wk	**25**	**8**	**6**	**2**	**0**	**1**	**0**	42
2–3/mo	**17**	**15**	24	1	2	2	0	61
1/mo	**11**	**4**	8	1	1	0	0	25
< 1/mo	**10**	**4**	11	7	*10*	*3*	*0*	45
Never	**46**	**16**	14	13	*13*	*31*	*1*	134
No response	**0**	**0**	1	0	*0*	*1*	36	38
Total	143	49	66	25	26	40	38	387

Notes: (1) *Frequently*: those individuals who spent > 1/wk or 1/wk EITHER during spring/summer OR autumn/winter (figures in bold type);
(2) *Sometimes*: an intermediate category which included individuals belonging to neither (1) nor (3);
(3) *Rarely*: those individuals who spent < 1/month or "never" during BOTH spring/summer AND autumn/winter (figures in italic type).

(2) *moderately active*: an intermediate category to cover individuals who did not fall into categories (1) or (3) (185 (55.9%) of 331 respondents);

(3) *inactive*: those who answered "low" to the question on daily physical exertion AND "never" to the question on sports figures shown in italic type in Table 2, 44 (13.3%) of 331 respondents).

Moderately active and *inactive* were further combined into a *non-active* category. It should be recognized that this variable provided only a qualitative or ordinal level measure, based on self-reports. The degree of detail in the questionnaire was not sufficient for conversion to quantitative measures of activity expressed in units of energy expenditure. It should also be emphasized that physical *activity* should not be equated with physical *fitness*, which is a physiologically distinct entity.

Traditional Inuit pursuits

There were two identical questions on time spent "on the land" in different seasons: autumn/winter and spring/summer:

In the past year, how often did you go on the land? Specifically, in [name of season] would you say: (a) more than once a week (b) once a week (c) 2–3 times a month (d) once a month (e) less than once a month (f) never.

Certain individuals spent a considerable amount of time "on the land" in both seasons. To create an overall, year-round measure of time spent on the land, the two variables were cross-tabulated (Table 3). This could be used as a measure of adherence to a "traditional" Inuit lifestyle to supplement the question on the ability to speak the Inuktitut language.

Three categories were recognized in the new composite variable *total time spent on the land* year round:

(1) *frequently*: those individuals who spent > 1/wk or 1/wk EITHER during spring/summer OR autumn/winter (figures shown in bold type in Table 3, 207 (59.0%) of 351 respondents);

(2) *sometimes*: an intermediate category which included individuals belonging to neither (1) nor (3) (85 (24.2%) of 351 respondents);

(3) *rarely*: those individuals who spent < 1/month or "never" during BOTH spring/summer AND autumn/winter (figures shown in italic type in Table 3, 59 (16.8%) of 351 respondents).

Sometimes and *rarely* were further combined to produce a category of *infrequently*.

Personal and family health history

Survey participants were questioned regarding any past history of heart disease, diabetes and hypertension and the type of treatment received. No attempt was made to check the medical records to corroborate the respondents' recall.

Participants were asked if anyone in the family was known to have suffered from heart disease, stroke, diabetes or hypertension. No attempt was made to validate the accuracy of the diagnosis. A composite variable of family history involving any one of the four conditions was created. In the sample, 21% of participants who reported at least one first-degree relative with one or more of the four conditions were categorized as *positive*, while the remaining 79% were considered *negative*.

Anthropometric indices

Various indices were constructed from the raw data on measured heights, weights, triceps and subscapular skinfold thicknesses, and waist and hip circumferences. These included body mass index (BMI), defined as weight in kg divided by height in meters squared, sum of skinfolds in mm (SUM), ratio of subscapular to triceps skinfolds (STR), and ratio of waist to hip circumference (WHR). BMI and SUM are used as measures of "overall" obesity, while WHR and STR are regarded as measures of "centrality" [12]

Results

The age-adjusted and sex-specific mean BMI and SUM values for different categories of sociocultural and behavioural variables were obtained using the SAS procedure GLM (general linear models). An example would be: *independent variable*: marital status (0 = not married, 1 = married); *covariate*: age

Table 4. Comparison of sex-specific and age-adjusted mean body mass index (BMI) amd sum of skinfolds (SUM) by selected sociocultural and demographic variables

		BMI				SUM			
		Male		Female		Male		Female	
Variable	Category	Mean	*P*	Mean	*P*	Mean	*P*	Mean	*P*
Marital status	not married	25.1	0.091	26.0	0.082	28.7	0.238	43.9	0.107
	married	26.2		27.3		31.8		48.8	
Ethnic admixture	Inuit only	25.6	0.747	26.8	0.900	28.8	0.037	47.4	0.675
	mixed	25.8		26.7		35.4		46.2	
Education	primary only	24.9	0.081	27.3	0.076	28.1	0.220	48.9	0.153
	some secondary	26.3		25.9		32.0		44.1	
Income	< $10,000/yr	25.3	0.137	26.7	0.543	28.2	0.013	46.9	0.934
	≥ $10,000/yr	26.4		27.3		35.0		47.3	
Employment	not employed	25.0	0.051	26.7	0.632	27.5	0.038	46.7	0.815
	full-/part-time	26.3		27.0		32.8		47.4	
Inuit language	not fluent	25.4	0.639	25.4	0.014	25.9	0.026	42.3	0.058
	fluent	25.7		27.3		32.1		48.6	
Time on land	infrequent	24.6	0.068	26.7	0.682	31.0	0.715	47.3	0.958
	frequent	25.9		27.0		30.0		47.5	
Current smoking	non-smoker	26.0	0.416	29.4	0.000	33.2	0.290	57.0	0.001
	smoker	25.4		25.9		29.9		43.5	
Physical activity	inactive	24.2	0.291	27.8	0.123	25.3	0.292	52.4	0.068
	active	25.6		26.5		31.3		45.5	
Family history	negative	25.7	0.470	27.0	0.479	31.7	0.259	48.5	0.237
	positive	25.1		26.4		27.4		42.2	

(in years); *dependent variable*: **BMI**. All independent variables are dichotomized. An interaction term with age is included in all models initially. If insignificant, this term is then dropped and the procedure repeated to generate the least-square means and associated *P* values based on *t*-tests. A $P < 0.05$ means that the null hypothesis of equality between the age-adjusted BMI, etc., of the two levels of the independent variable can be rejected.

Table 4 indicates that these obesity indicators differ significantly between different categories of ethnic admixture, income group, employment, language and current smoking status, after adjustment for age. The sexes, however, do differ: for example, female non-smokers are more obese (in terms of both BMI and SUM) than smokers, while no significant differences can be detected among males.

A series of stepwise multiple regression analyses were performed, with the independent variable list including all the variables listed in Table 4 as well as age as a continuous variable. Each of the obesity indices serves in turn as the dependent variable. Since the distribution of these variables deviate from "normality", their logarithm-transformed values were used in the regressions (Table 5). To facilitate comparison on the impact of the predictors, the standardized regression coefficients are also included.

Table 5 shows that age, education and smoking status are consistently identified as predictors of most measures of obesity among women. Women with only primary education have higher waist and hip

Table 5. Significant independent predictors of anthropometric indices established by stepwise multiple regression analyses

Dependent variable (log transformed)	Independent predictors [standardized regression coefficients]	Model R^2
(1) Male		
Body mass index	Age [0.398], Education [0.255]	0.108
Waist	Age [0.408]	0.166
Hips	Age [0.304]	0.092
Waist/hip ratio	Age [0.417]	0.174
Triceps skinfold	Admixture [0.196], Language [0.228], Time on land [− 0.206]	0.131
Subscapular skinfold	Income [0.212]	0.045
Sum of skinfolds	Income [0.214]	0.046
Subscapular/triceps ratio	Age [0.310], Language [− 0.312], Time on land [0.239], Education [0.199]	0.189
(2) Female		
Body mass index	Age [0.320], Smoking [− 0.239]	0.192
Waist	Age [0.355], Education [− 0.191], Smoking [− 0.233]	0.322
Hips	Age [0.215], Education [− 0.160], Smoking [− 0.298]	0.224
Waist/hip ratio	Age [0.424], Education [− 0.161]	0.272
Triceps skinfold	Education [− 0.178], Smoking [− 0.288]	0.122
Subscapular skinfold	Age [− 0.186], Smoking [− 0.177]	0.080
Sum of skinfolds	Smoking [− 0.260], Education [− 0.194]	0.113
Subscapular/triceps ratio	nil significant	

Note: The independent variables in all models included: age (in years); admixture (0 = Inuit only, 1 = mixed); marital status (0 = not married, 1 = married); education (0 = primary only, 1 = some secondary); income (0 = < $10,000, 1 = > $10,000 per year); employment (0 = not employed, 1 = employed full-/part-time); language (0 = not fluent, 1 = fluent in Inuktitut); time on land (0 = infrequent, 1 = frequent); current smoking (0 = non-smoker, 1 = smoker); physical activity (0 = inactive, 1 = active); family history (0 = negative, 1 = positive).

circumference, waist–hip ratio and triceps skinfolds. Among men, apart from age, various predictors such as education, non-Inuit admixture, income, language and time spent on the land are associated with some measures of obesity. It should be noted that education has opposite effects in the two sexes. Among men, those with some secondary education are more obese than those with primary education only, whereas among women, the opposite is observed. Current smokers have lower measures of obesity than non-smokers, but among women only. For measures of "acculturation" the data are somewhat conflicting: men who are fluent in the Inuit language (hence "less acculturated") and those who spend less time on the land (hence "more acculturated") are more likely to have higher triceps skinfolds. These variables are not important in predicting subscapular skinfolds. Those with mixed Inuit/non-Inuit heritage, to the extent known to and reported by the respondents, have higher triceps skinfold than unadmixed Inuit. Note that "ethnocultural" variables such as admixture, language and time on the land are associated only with triceps skinfold among men.

DISCUSSION

The availability of the Keewatin Survey data can further our understanding of the development of obesity among modern Inuit. By asking "within this population, who are more likely to be obese?" one can identify various sociocultural and behavioural determinants of obesity, a prerequisite to the design and planning of health promotion programs.

In this paper, various anthropometric indices were used to indicate obesity and central fat patterning. The issue of whether such measures are applicable to the Inuit is the subject of another paper [5]. High body mass index, skinfolds and waist–hip ratio among the Inuit are associated with some metabolic consequences (i.e. an unfavourable profile of blood pressure and plasma lipids, though not in terms of plasma glucose and insulin levels), although the pattern differs in magnitude from that observed among white Canadians.

On multivariate analysis, age is an independent predictor of obesity in both sexes. Among Inuit women, non-smoking status and a lower education is associated with various obesity indices. However, smoking is not a predictor in men, and the association with education is the reverse, i.e. the more highly educated are more likely to be obese. In addition, some obesity indices are associated with higher income, an admixed ethnic background, fluency in the Inuit language and less time spent on the land. The opposite direction of the two measures of "acculturation" can perhaps be explained by the fact that a person fluent in the Inuit language is highly sought after as an interpreter, such that he/she is more likely to be more "acculturated" rather than "traditional".

It appears that Inuit men, on the whole, show the pattern obeserved in developing societies, where obesity is more prevalent among those with higher SES status [3]. Inuit women, on the other hand, are more characteristic of developed societies, where obesity is associated with a lower SES.

The sexual difference with regards to the effect of SES cannot be readily explained on the basis of the survey data. Note that in the multiple regression models, income, employment status and physical activity have already been controlled for. One may perhaps seek an explanation in the different sex roles and their associated stress levels in a rapidly acculturating and modernizing society. Such data are more fruitfully to be obtained from qualitative, ethnographic research than quantitative data derived from relatively "blunt" survey instruments. Nevertheless, these results do indicate that obesity is not evenly distributed among the population, but depends on the presence or absence of various behavioural and lifestyle attributes.

The positive association of obesity with increasing age and non-smoking status, are well-known and frequently found in many population surveys, for example, among the predominantly Caucasian residents of the province of Manitoba [13].

Different cultures view obesity differently, and not all would regard it as a "health problem". Concepts of obesity are intertwined with concepts of self-worth, sexuality, ideal body type and female beauty. In fact, many pre-industrial societies probably have no ethnomedical definition of obesity [14]. Little data can be found in the ethnographic literature on what the Inuit thought about obesity. Ritenbaugh [15] went further and called obesity a *culture-bound syndrome*, at least in modern western society. Culture shapes the definition, diagnosis and treatment of the "disease" and defines its aetiology. Whereas biological data on height and weight are *etic*, biomedical categories such as disease and obesity are culture-specific (i.e. *emic*). Western biomedicine is but one specific conceptual framework for interpreting biological data. In support of her arguments, Ritenbaugh documented a downward shift in the standards since 1940s of what American biomedicine considered "obesity". It is, however, also probable that this reflects changing scientific knowledge.

As a "disease", obesity carries with it unfavourable social stigmas, a situation which likely gives rise to the increasing prevalence of so-called eating disorders, particularly among young females in Western society. Subtle discrimination against the obese as physically "deviant" also exists. Some of these attitudes may conceivably be transmitted from the dominant society to indigenous populations in North America because of modern communications and the influence of mass media. To what extent have such attitudes been accepted by Inuit and other Native

American populations is not known and would be a worthwhile subject for further ethnographic research.

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