Body proportions in healthy adult Inuit in East Greenland in 1963

Stig Andersen1,2, Gert Mulvad3, Henning Sloth Pedersen3, Peter Laurberg2

1 Department of Medicine, Queen Ingrids Hospital, Nuuk, Greenland
2 Department of Endocrinology and Medicine, Aalborg Hospital, Aarhus University Hospital, Denmark
3 Primary Health Care Clinic, Nuuk, Greenland.

ABSTRACT

Objectives. It is important to know the starting point when describing changes in Inuit in transition.

Study design. The original charts of 1,852 individuals from the epidemiological investigation in East Greenland around 1963 performed by Littauer and colleagues were recovered recently. They included height, weight and a physical investigation.

Methods and results. The focus of this paper was adult Inuit body proportions in 1963 by ten-year age groups excluding participants with disabilities affecting body build. Relatively stable values were seen in both genders with age. Median values in men/women aged 20 years and above were: height 164/153.5 cm, weight 64/54 kg and BMI 23.7/23.1. Men aged 50 years and above had a little lower height and weight than young men. Women aged 40-49 years had a higher weight and BMI, but this evened out in the older age groups. Median BMI was relatively high compared to WHO definition. Conclusions. The data from 1963 gives a starting point for evaluating changes in Inuit body build and the prevalence of overweight. Furthermore, they indicate a need for Inuit-specific normal BMI delineation.

Key words: Inuit, Indigenous, Greenland, Historic, BMI, Body build

INTRODUCTION

Transition of the Greenlandic society has had profound effects on living conditions for the Inuit particularly over the past three to four decades (1). A number of studies suggest an association between morbidity and obesity among the Inuit (2-5), making development trends in body proportions an important determinant of disease among Inuit as well.

Monitoring of BMI is important for the identification of individuals and groups at risk and for evaluating interventions (6). Also, the need for monitoring the Inuit is emphasised by the genetic susceptibility to obesity demonstrated in Canadian Inuit (7, 8). However, it is most important to have a basis for this, a starting point: what were the body proportions of the Inuit before the modernisation of Arctic societies.

In 1963 Littauer et al. performed epidemiological studies in Greenland Inuit (9, 10). The original data sheets from the investigation in East Greenland were recovered in 1998. This gives an opportunity to describe Inuit body build in a pure Inuit population before transition of the Inuit society, i.e. before a more sedentary life style, but after introduction of food supplies to compensate for periods of shortage of food, and after development of a modern health care system. Data on height and weight with focus on children and adolescents have been described in detail previously (10), and the focus of this paper is adult Inuit body proportions in 1963.

METHODS

Uffe Sagild, Jørgen Littauer, Carsten Sand Jespersen and Steen Andersen conducted epidemiological studies in Greenland in 1962 through 1964. Prevalence of diabetes and charts of height and weight for children have been published previously (9, 10) including a description of met-
hods. In brief, they investigated 14% of the 1963 Inuit population of Greenland with a participation rate of 96.9%. 2.1% of the remaining population were under the age of three. Three areas were included, but only data sheets from one area became available, the Ammassalik area in East Greenland. This included the main town and ten settlements. The main occupation was seal hunting with some fishing. The participants were exclusively pureblooded Inuit.

The original data charts from the investigation in Ammassalik in 1963 were donated in 1998 by the descendents of the late Jørgen Littauer. The boxes received contained 1,852 charts. They were all intact and readable. The charts contained a hand-written report on each individual. This included height in centimetres, weight in kilograms, year of birth, gender, and a physical investigation. Abnormalities in body build and overweight by clinical evaluation were recorded, as were pregnancy and diseases. Two persons were recorded as being dwarfs. Eight women were described as obese, and 24 women aged 20 and above were pregnant. We computerised the data with 10% double entered and no mistakes identified.

Nonparametric tests were used to test for difference between two (Mann-Whitney) and more (Kruskal-Wallis test) groups.

RESULTS
Figure 1 depicts the age distribution of the population included. This was identical to the overall age distribution of the population of Greenland in 1963 and to the age distribution of all participants in the 1962-1964 investigations.

Median height, weight and BMI in East Greenland in 1963 was 164 cm, 64 kg, and 23.7 in adult men, and 153.5 cm, 54 kg and 23.0 in women, respectively. Values by 10-year age groups are shown in Table 1 with 5, 25, 75 and 95 percentiles. Men showed a slightly, but significantly lower height after the age of 50 years, while height was identical in the age groups below 50 years. The lower height was accompanied by a lower weight after the age of 50 years, causing nearly similar BMI with age. Women were of similar height in all age groups with a slightly increased weight in the ten-year age group following the childbearing peak-age, with a similar increase in BMI.

DISCUSSION
The data from 1963 were conveniently collected in the time slot where optimal conditions for developing normal body proportions were present, thus giving the opportunity to describe the body build of a lean Inuit population.

Overall, relatively stable body proportions were seen with age. The reduction in height and weight in men with relative old age could be caused by several factors. At old age, men may have less hunting skills, making them less valuable to a hunting society. Thus they may loose their priority in access to a restricted food supply. Another cause could be disease. However, signs of disease were recorded and if present, participants were excluded from calculations. Another mechanism is the natural loss of muscle mass with age despite physical training.

The old age group grew up around the turn of the century. In this period a trading station was only present in Tasiilaq, and supplies of imported food may not have been stable. Thus, a cohort effect could contribute to the smaller bodies of old-
er men. On the other hand, no decrease was seen in either height or weight in older women. Hence, a cohort effect is less likely.

In women a slightly higher weight and BMI was seen in the age group 40-49. This occurs just after peak childbearing age and a relation is possible, either because some women were pregnant without this being registered, or because of a higher BMI in the post-partum years.

Height and weight were unaltered in women aged above 50 years. This differs from the pattern in men. One contributing reason may be that older women were still important to the hunting society with plenty of household duties. As they could contribute to cooking they may have had easier access to food.

The pattern found is in keeping with the body build anticipated in a physically active population with no overfeeding. Interestingly, median Inuit BMI in both men and women was high within the normal range as defined by the WHO. Applying the WHO criteria for overweight, 29 % of adult men and 23 % of adult women were overweight. These numbers are in contrast with the living conditions of a hunter population, because obesity was not feasible among male hunters and unlikely among females in East Greenland in 1963. It is thus likely that the high obesity rates were due to high muscle mass rather than to excess body fat. Another contributor may be the difference between Inuit and Caucasian body build described by others (12, 13).

The WHO criteria for overweight and obesity were developed based on risk of disease (6). The overweight criteria may not cohere with the Inuit body build. Hence, it is suggested that an Inuit specific delineation of normal BMI be developed for the evaluation of overweight among the Inuit.

In conclusion, the data from 1963 gives a starting point for evaluating changes in Inuit body build and prevalence of overweight. Furthermore, they indicate a need for Inuit-specific normal BMI delineation.

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Table 1. Height, weight and BMI among healthy Inuit men and women in East Greenland in 1963 by agegroups.

| Agegroup | Height (cm) | Weight (kg) | BMI (kg/m2) | n |
|----------|-------------|-------------|-------------|---|
| MEN +    | Median (5-25-75-95%) | Median (5-25-75-95%) | Median (5-25-75-95%) | |
| 20-29    | 164 (155-161-168-174) | 65 (55-62-69-77) | 23.8 (21.0-22.8-25.5-27.7) | 163 |
| 30-39    | 164 (153-160-168-174) | 65 (53-60-70-76) | 24.0 (21.1-22.4-25.5-28.0) | 89 |
| 40-49    | 163 (149-158-168-172) | 64 (51-58-67-81) | 23.6 (20.4-22.4-25.2-29.0) | 52 |
| 50-59    | 163* (152-158-166-171) | 62** (54-59-65-75) | 23.4 (20.7-22.3-24.7-28.7) | 35 |
| 60-69    | 159** (150-156-164-169) | 59** (36-52-66-73) | 22.2* (16.0-20.8-24.8-27.1) | 15 |
| WOMEN +  | Median (5-25-75-95%) | Median (5-25-75-95%) | Median (5-25-75-95%) | |
| 20-29    | 153 (145-150-157-163) | 52 (44-49-57-64) | 22.3 (19.0-21.0-24.6-27.2) | 115 |
| 30-39    | 155 (145-150-158-164) | 56 (42-48-60-70) | 23.2 (18.0-20.6-24.4-28.1) | 88 |
| 40-49    | 153 (149-158-168-172) | 56** (41-51-65-75) | 24.0* (18.6-21.4-27.1-31.8) | 53 |
| 50-59    | 153 (143-150-156-162) | 53 (41-48-60-76) | 23.1 (17.6-21.4-24.6-33.9) | 36 |
| 60-69    | 152 (139-146-157-168) | 53 (35-49-63-72) | 23.4 (17.7-20.9-26.5-31.9) | 21 |

Mann-Whitney p: *< 0.05, **<0.01 vs agegroup 20-29
Kruskal-Wallis p: +<0.05, ++<0.01
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Stig Andersen
Department of Endocrinology and Medicine
Aalborg Hospital, Aarhus University Hospital
Box 561, DK-9100 Aalborg
Denmark
E-mail address: stiga@dadlnet.dk
Fundings: Greenland Homerule.