

# Nutrition and Health: High degree of BMI misclassification of malnutrition among Swedish elderly population: Age-adjusted height estimation using knee height and demispan- NN Gavriilidou- Lund University

NN Gavriilidou

Lund University, Sweden

## Abstract

There is a strong association between malnutrition and cardiovascular injury and death. Malnutrition is often associated with sarcopenia and is observed as an independent risk factor of cardiomyopathies (atrophy and hypertrophy). Reduced the cardiac contractility and atherosclerosis has also been reported among malnourished geriatric patients. Its increases the risk of cardiac failure in end-stage renal disease patients and mortality among cardiac failure patients. In addition to sarcopenia, aging is related with fat redistribution with regional or central adiposity and loss of appendicular fat. This is seen as a risk factor for myocardial stroke, infarction, diabetes, hyperlipidemia, heart disease and the hypertension among the elderly. Obesity cardiomyopathy has been reported to the affect cardiac function. BMI is an integral part of anthropometric assessments, a widely used indicator to assess nutritional status 9, 10 stature and body weight are important parameters to assess BMI is a ratio among the weight (in kg) and height (in m<sup>2</sup>). Inaccurate height measurements lead to BMI misclassification.

**Materials and Methods:** This study includes a heterogeneous sample of men and women from five municipalities of Scania. The Country wide Population Registry was used to randomly invite the participants by letter. Predefined target populations were invited for the age with an over sample of the youngest and the oldest cohorts.

The sample included two groups. The first group (group 1) consisted of 2839 elderly members (aged 60–93 years) 58% of the randomly invited general population in residents. And the second group (group 2) included 2871 members aged 60–99 years, 1573 from baseline and 1298 new participants who took part in the follow up examination of GAS conducted in 2007–2010 (participation rate: 80%) and had a valid demispan dimension.

**Data Collection:** They an informed approval was obtained. The close ended survey investigated sociodemographics, physical, mental health and social factors. These data were obtained from the survey. The marital status denoted whether the members were single, married, divorced or living with a partner. Education was stratified as primary, secondary, or university level. Smoking status specified whether the participants are regular or irregular smokers or had quit smoking.

Height, weight, KH and demispan measured based on validated protocols. The height was measured by using a measuring tape with the individual standing straight with shoulder blades, buttocks and heels against the wall and straight fixed gaze. Arms were along the sides, shoulders relaxed, legs straight, knees touching each other, feet flat and heels together. Readings was made in cm with onethe decimal value. Bed ridden patients and those using a wheel chair were excluded from our study.

**Statistical Analysis:** Test for normality was performed for a each flexible and the analysis of the remaining error term raised no concern and simple linear regression analysis was performed by included by men and women age was 60–64 years as a reference population because the minimal age linked height change is expected. KH- and DS-based equations specific for men and women were formulated with measured height as the dependent variable and DS or KH as the independent variable, individually.

**Discussion:** We investigated the degree of misclassification of obesity and under nutrition owing to the in accurate height approximations are used in BMI calculations among the elderly in Southern Sweden countries. Studies have shown the direct method of underestimates body height measurement among geriatric populations and demispan are used to surrogate measures. The prevalence of the underweight (BMI <20 kg/m<sup>2</sup>) was significantly lower by 9.4% when the using to measured height to the calculate BMI in those aged 80+ years. The clinical significance of BMI misclassification calls for attention to the use of not only age-, sex- country specific but also ethnicity specific population data for such equations.

we used 60–64 years of age as position to formulate the equations. We found that the direct method of underestimated the height compared with those forecast by KH and demispan.

Under nutrition well defined by BMI  $\leq 20$  kg/m<sup>2</sup> is evidently underestimated by BMI demispan among both the youngest (60–64 years) and the oldest (85+ years) age groups. This prediction method better captures under nutrition, especially among the most elderly one, 1,42,43 when height changes they are the most severe because of functional impairments.

Obesity (BMI  $\geq 30$  kg/m<sup>2</sup>)<sup>5</sup> is overvalued by standard measurements. We found that BMI-calculated obesity occurrence is twice as high as KH- and demispan based among men aged 80+ years and women aged 70+ years old, and it doubles with every decade thereafter. As discussed above, this is attributed to the loss of height owing to degenerative conditions. Our demispan observations were concordant with those from the study by Hirani and Aresu<sup>19</sup> among the non-institutionalized elderly and with those from the study by Frid et al.<sup>9</sup> among hospitalized elderly. However, statistical challenging for agreement was done in these and other similar studies was that compared to the use of demispan or KH instead of measured height.

**Results:** Under nutrition prevalence's in men and women were 3.9 and 8.6% by KH, associated with 2.4 and 5.4% by standard BMI, and more pronounced for all females aged 85+ years (21% vs 11.3%). The corresponding value in the women aged 85+ years by demispan was 16.5% vs 10% by standard BMI. Obesity occurrences in men and women were 17.5 and 14.6% by KH, compared with 19.0 and 20.03% by standardized BMI.

**Conclusion:** The main strength of our study is the huge population and sample that is country wide representative owing to a random age and the gender-stratified selection and presence of both urban and rural areas. Considerable anthropometric differences between rural and urban populations exist and the former being heavier and having more muscle mass. The equations developed are the major among the Swedish population. A significant limitation is due to the cohort effect, namely the difference in height between the youngest and the oldest age groups owing to an increasing generation height. There is an age related misclassification of under nutrition and obesity among the old. It is credited to the caveats of inexact height estimation among the elderly. We have proposed the use of sex specific and age adjusted estimate equations of body height based on the knee height and demispan to address this issue.

**Note:** This work is partly presented 9<sup>th</sup> International Congress on Nutrition & Health Berlin, Germany