Self-Reported Versus Measured Weight and Height in an Older Adult Meal Program Population

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Background. Self-reported weight and height are used to compute ponderal indices in studies where it is impractical to obtain objectively measured data. Little is known about the associations between self-reported and measured weight and height in older adults.

Methods. Participants in congregate and home-delivered meal programs in a rural Wisconsin county recorded their height and weight on a questionnaire as part of a study on nutritional risk and quality of life. Objective measurements of height and weight were made on the same day. Data for 131 subjects, ranging in age from 62–92 years, were analyzed to evaluate associations between self-reported and measured weights and heights.

Results. Correlation coefficients between self-reported and measured values suggested that self-reported weight was somewhat more valid than self-reported height in this population. However, self-reported weight was misreported by 10 pounds or more in 20% of the sample.

Conclusions. More data are needed to evaluate the utility of self-reported data for weight and height in groups of older people. Judging from this study, self-reported height and weight data, if used at all for older adults, should only be used as a continuous variable rather than for classifying subjects into relative weight categories.

Measures of weight adjusted for height, such as the body mass index (BMI = weight [kg]/height [m²]) are frequently used. Height and weight measures are sometimes obtained by self-report for practical reasons (1,2). Although self-report may be considered accurate for purposes of studying large groups in the general population (1,2), the degree to which self-reported and measured weights and heights agree varies among certain subgroups, particularly those delineated by gender, overweight status, and age (1–3). Error in underreporting weight is known to increase as measured weight increases, a trend more apparent for women than men (1,3). An age effect, more notable in women, was documented in a Danish study, in which those age 40 and older underestimated their weight to a greater degree than did younger subjects (2).

Overweight status was a predictor of error in reported height in a large sample of adults age 20–74 years participating in the second Health and Nutrition Examination Survey of 1976–1980 (3). Self-reported height was particularly unreliable in overweight females. Errors in self-reported height were also age-associated, with bias and unreliability increasing directly with age after 45 years.

Terminal digit preference is another source of error in self-reported weight. Stewart reported distinct preferences for weight in pounds ending in 0 or 5 in a sample aged 14–61 years, with 23 and 20% of the sample erroneously reporting weights ending in 0 and 5, respectively (1).

Little is known regarding associations between self-reported and measured height and weight data in older population groups. Issues of interest include whether young-old differ from old-old in accuracy of self-report, whether overweight status or gender have any bearing on self-report, and whether a terminal digit preference exists in self-reported weight. This article examines these questions in a population of adults age 60 and older.

Methods

All individuals 60 years of age and older participating in the Title III-C meal programs in a rural Wisconsin county were asked to complete a questionnaire in a study of associations between risk factors for malnutrition and quality of life (4). The instrument, designed to be self-administered, included questions to elicit self-reported height and weight as follows: “How tall are you? . . . feet . . . inches.” and “How much do you weigh? . . . pounds.” Height and weight measurements were made by trained personnel after the questionnaire was completed and on the same day. Because logistical limitations precluded transporting a beam balance scale, a portable scale (Model 160, Health-O-Meter, Bedford Heights, IL) was used, with an error tolerance of 1 pound, according to the manufacturer. Height measurements were obtained in congregate sites (n = 86) by affixing a non-stretch tape measure to a wall and using a right-angled block to determine height measurement to the nearest quarter-inch. For home-bound respondents (n = 45), a sticker was affixed to the wall at the level where the bottom of the wood block rested on top of the head, and the distance from the floor to the bottom of the sticker was measured with a metal tape measure. The response rate for the questionnaire was 86%, with 155 subjects participating. Of these, 131 had complete data for both self-reported and measured heights and weights.
Proportions of the total sample and male and female subgroups who overreported, underreported, and accurately reported height and weight were computed. Chi-square analysis was used to determine whether there were gender differences in the overreporting of height or underreporting of weight. Data comparing self-reported and measured heights and weights were generated by gender, BMI ≤27 or >27, and by age group (>80 and ≤80 years of age). Mean errors in self-reported height and weight were computed; independent samples t test was used to evaluate differences in means for subgroups. Criterion validity was measured as the Pearson product-moment correlation coefficient between the self-reported value and the measured (criterion) value. The proportions of men and women who overreported their height by more than two inches were computed, and an examination of end-digit preference in reporting weight was conducted using the method of Stewart (1).

Statistical significance was evaluated at the α = 0.05 level. Statistical analyses were conducted using the SAS System (Version 6.11, 1996, SAS Institute, Cary, NC).

RESULTS

Ages for women ranged from 62–92 years and for men 62–96 years, with means (±SD) of 79.9 ± 7.3 years and 77.6 ± 8.5 years, respectively. Of the total, 45% underreported weight by one pound or more and 32% overreported it. Fifteen subjects (12%) underreported weight by 10 pounds or more, whereas 11 (8%) overreported weight by 10 pounds or more. Fifty-six percent overreported and 15% underreported height by at least one-half inch. Height was overreported by more than two inches by 3 males and 14 females (together, 13% of the sample.) There were no gender differences in terms of likelihood of underreporting weight or overreporting height. Approximately one fourth of the subjects accurately reported weight or height. There were no significant differences in mean error in reporting weight when evaluated by gender, overweight status (BMI > 27), and age group (≤80 and >80 years) (Table 1), although the differences in mean error for reported weight between the two BMI groups approached statistical significance (p < 0.05). The correlation coefficients between self-reported and measured weights suggest self-reported height values were not nearly as valid as self-reported weights in this population. In all subgroups, the mean error for height was positive, indicating overestimation of height. Differences in mean error for self-reported height for men and women and for older and younger groups were not significant. However, the mean error in reporting height was significantly different between the overweight and nonoverweight group.

To evaluate the tendency toward end-digit preference for 0 or 5, the proportion who reported weights ending in 0 or 5 were computed for the sample. Assuming that 10% might be expected to have body weights ending in each of the digits from 0 to 9, the proportion of the sample above 10% reporting weights ending in a particular digit could be considered to exhibit an end-digit bias for that digit (1). According to this logic, 30% of the sample erroneously reported a weight ending in 0. A digit preference for 5 existed, but it was substantially less than that for 0 at 14% of the sample.

CONCLUSIONS

The correlation (validity) coefficients between self-reported and measured weights are in line with those reported for other population groups (1,2). However, that nearly 20% erred in reporting weight by 10 or more pounds raises questions about the reasons for such large discrepancies. The overweight group displayed a trend toward a larger error in self-reported weight when compared to the nonoverweight group. The validity coefficients between measured and self-reported heights were less substantive than those for weights, suggesting that self-reported height was less valid than self-reported weight in this population, and it would be an important source of error in computation of a weight/height index from self-reported data. It has been conjectured that older people may report heights as they remember them from an earlier age before the effects of osteoporosis occur (3). Thirteen percent of the subjects, mostly women, overestimated height by more than two inches, potentiating misclassification of overweight category using self-reported height. For example, using a BMI of 27 as the cutoff, a person weighing 180 pounds with a measured height of 68 inches would be classified as being overweight, with a BMI of 28.3. In a study using self-reported measures, if that subject were to report weight

Table 1. Means for Self-Reported and Measured Weights and Heights by Gender, Overweight Status, and Age Group

<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-Reported weight (lbs.)</td>
<td>Measured weight (lbs.)</td>
</tr>
<tr>
<td>Total sample</td>
<td>131</td>
<td>158.1</td>
</tr>
<tr>
<td>Males</td>
<td>35</td>
<td>183.0</td>
</tr>
<tr>
<td>Females</td>
<td>96</td>
<td>147.3</td>
</tr>
<tr>
<td>BMI&gt;27</td>
<td>70</td>
<td>176.0</td>
</tr>
<tr>
<td>BMI27</td>
<td>61</td>
<td>135.0</td>
</tr>
<tr>
<td>≤80 years old</td>
<td>63</td>
<td>166.9</td>
</tr>
<tr>
<td>&gt;80 years old</td>
<td>68</td>
<td>147.6</td>
</tr>
</tbody>
</table>

*Self-reported minus measured.
†Pearson product-moment correlation between measured and self-reported weights.
‡Pearson product-moment correlation between measured and self-reported heights.
§Means significantly different between the two BMI categories (p < .05).
accurately as 180 pounds but height as 70 inches, the resulting BMI of 26.7 would place that individual in the nonoverweight group. Our findings support the recommendation of Rowland (3) that if self-report is the source of data on height and weight, these data should be treated as continuous rather than categorical variables because of the potential for misclassification.

These subjects were not informed in advance that they were to be weighed and measured, but it is likely word of this reached some subjects, particularly in the congregate meal environment. It may be that advance knowledge of being weighed generates more accurate responses, perhaps due to greater candor or more careful consideration of weight history. Measures to ensure uniform treatment in this regard would improve data quality. In this study, weight measurements were made to the nearest half-pound and height to the nearest quarter-inch, yet subjects were not specifically asked to report height and weight in such detail. Also, as Stewart has pointed out, being specific about asking for weight to the nearest pound might help reduce tendency toward end-digit bias (1). Finally, as participants in congregate and home-delivered meal programs, these subjects may have been exposed to health messages or may have been otherwise influenced to be more body conscious than people who do not participate in such programs.

There are few data on older adults with which to compare these results. It is expected that other studies of older adults will collectively enable recommendations to be made about appropriate use of self-reported weight and height in older population groups.

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REFERENCES


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