Appropriate Classification of Obesity in Mentally Retarded Adults

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Triceps skinfold thickness and body weight measures were obtained for 44 female and 40 male mentally retarded adults participating in a sheltered workshop setting. Subjects' relative weights and skinfold thicknesses were found to correlate reasonably well for females and males, $rs = .88$ and .59, respectively. Use of only height and weight tables for determining the presence of obesity, however, resulted in 22.5 percent of the males and 13.7 percent of the females being misclassified as nonobese. The distinction between overweight and obesity was discussed. Clinical/research implications of the findings were delineated.

Research has shown that obesity is a prevalent condition among mentally retarded individuals (Fox & Rotatori, 1982). Measurement is a crucial aspect of obesity research in terms of appropriate classification and subsequent treatment of this condition. Yet some confusion remains concerning how obesity is to be defined and measured. For example, the terms overweight and obesity have been used interchangeably in most clinical settings, although they are not identical (Bray, 1979). Obesity refers to surplus body fat whereas overweight indicates an excess in body weight relative to established height standards. Also, separate measures of excess body weight (such as the Metropolitan Life Insurance, 1977, desirable weight for height tables) and surplus body fat (e.g., skinfold thickness at various body sites) have been developed. Further complicating the situation, a review of the literature reveals a marked tendency for investigators and clinicians to use measures of overweight to describe a condition of obesity. Implicit in this practice is the assumption that measures of overweight correlate strongly with obesity measures.

The purpose of the present study was to test this assumption with a sample of re-
tarded adults. Failure to find a strong rela-
tionship between obesity and measures of
overweight would suggest that some individ-
uals may be misclassified and thus not
receive treatment for obesity. In a related
study with nonretarded subjects, Johnson
and Stalonas (1977) found that body weight
correlated minimally with triceps skinfold
measures, \( r = .34 \). In the present study we
were interested in determining the relation-
ship between relative body weight (or per-
centage of desirable weight) with an esti-
mate of body fat (as measured by triceps
skinfold thickness). Subjects were 40 males
and 44 females drawn from two sheltered
workshops for mentally retarded adults.
The mean age of both males and females
was 31 years (standard deviation \( SD =
10 \)). Half of the subjects (\( n = 42 \)) were
chosen by the staff of one workshop to partici-
pate in a separate study. These subjects
represented two extremes of the weight
continuum (obese and thin). The remaining
42 subjects were randomly selected from a
second workshop.

Each subject was weighed (accurate to \( \frac{1}{2}
\) pound) and measured (accurate to \( \frac{1}{4} \) inch)
on a standard medical scale. Desirable
weights for subject heights were deter-
mined from the Fogarty Center Table
(Bray, 1979), which was adapted from the
Metropolitan Life Insurance Table. The
advantage of the Fogarty Table is that it
does not require estimates of body frame
size to determine desirable weights for
heights. For females between the ages of 18
and 25, one pound was subtracted from the
table’s desirable weight value for each year
under 25. Regression equations were used
to establish desirable weights for subjects’
heights not included on the Fogarty Table.
The relative weight for each subject was
calculated as follows:

\[
\text{Relative Weight} = \frac{\text{Present Weight} - \text{Desirable Weight}}{\text{Desirable Weight}} \times 100
\]

In addition to height and weight data,
triceps skinfold thickness was obtained for
each subject. In order to facilitate reliable
measurement, we used a tape measure to
locate and mark the midpoint between the
top of each subject’s acromion process (at
the shoulder) and olecranon process (at the
elbow) on the left arm. Using this midpoint,
two experimenters independently measured
and recorded each subject’s triceps skinfold
thickness in mm with a Lange skinfold
caliper. The caliper was checked for accu-
racy, using a standard sized metal block,
before each measurement session. Analysis
of the skinfold data revealed a significant
correlation between the measurements by
the two experimenters, \( r (82) = .99, p <
.001 \); the experimenters never deviated
from each other’s measure by more than 4
mm, mean deviation = 1.4 mm, mode = 1.5
mm.

Relative weight and skinfold data for the
subjects by sex is shown in Table 1. The
relative weight values and triceps skinfold
thicknesses for males correlated \( r (38) =
.59, p < .001 \); for females, the correlation
between these measures was \( r (42) = .88, p
< .001 \). A correlation of \( r (82) = .76, p < .01,\)
was found for the entire sample.

Based on established cutoff values for
defining obesity (i.e., relative weight value
of 20 or more [Robinson, 1972]; skinfold
thickness of 18 mm for males and 25 mm for
females [Frisancho, 1974]), 16 males and 18
females in the present study would be
classified as obese by their relative weight;
22 males and 23 females would be diag-
nosed as obese based on skinfold measures.
Discrepancies found between the relative

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Relative weight</th>
<th>Triceps skinfold thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Males</td>
<td>17.3</td>
<td>29.5</td>
</tr>
<tr>
<td>Females</td>
<td>25.2</td>
<td>34.9</td>
</tr>
</tbody>
</table>

Note. Relative weight = present weight minus desirable weight divided by desirable weight times 100.

a 40 males, 44 females.
weight and skinfold measure resulted from 1 female and 3 males being classified as obese by relative weight and not by skinfold scores; 6 females and 9 males were classified as obese by skinfold and not by relative weight scores. Percentages of subjects classified as obese by each measure alone and the combined measures (i.e., classified as obese by relative weight or skinfold thickness) is shown in Table 2. Based on the percentages of subjects classified as obese using the combined measures, the data in Table 2 indicates that 22.5 percent of the males and 13.7 percent of the females in the sample would be misclassified as nonobese using the relative weight formula alone; 7.5 percent of the males and 2.3 percent of the females would be misclassified as nonobese by the triceps skinfold measure used alone.

TABLE 2
Subjects Classified as Obese by Various Measures (in Percentages)

<table>
<thead>
<tr>
<th>Subjectsa</th>
<th>Relative weight alone</th>
<th>Skinfold thickness alone</th>
<th>Relative weight or skinfold thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>40.0</td>
<td>55.0</td>
<td>62.5</td>
</tr>
<tr>
<td>Females</td>
<td>40.9</td>
<td>52.3</td>
<td>54.6</td>
</tr>
<tr>
<td>Total sample</td>
<td>40.5</td>
<td>53.6</td>
<td>58.3</td>
</tr>
</tbody>
</table>

a 40 males, 44 females.

Although relative weight and skinfold thickness data were found to correlate reasonably well for our sample, greater errors in classification for a given individual were likely to occur when only the height–weight tables were used for measurement. Errors of misclassification of an obese condition were reduced through the combined use of skinfold thickness and relative weight measures.

It is important to remember that heaviness and corpulence are different concepts; therefore, it is possible for a person to be overweight and underfat or overfat and not at all heavy (Seltzer & Mayer, 1965). Successfully defining overweight (obese) individuals requires using both heaviness and fatness estimates (Le Bow, 1981). In fact, Durnin and Rahaman (1967) recommended several measures be used including multiple skinfold measures at various body sites (e.g., biceps, subscapular) and anthropometric measures (e.g., waist, thigh circumference). Using at least triceps skinfold thickness and relative weight measures in obesity related work should help to ensure that a given individual desiring or in need of treatment for obesity is served. This is potentially important in light of the increased health implications associated with obesity, including cardiovascular disease, respiratory problems, and diabetes (Van Itallie, 1979).

Future investigators should address the reasons for discrepant classification outcomes based on height–weight and skinfold thickness data. For the present, particular syndromes commonly associated with mental retardation (e.g., Down syndrome) did not account for the discrepant findings in the present sample. It is likely that several factors, such as site of skinfold thickness measurement, subject age and sex, and measurement method and errors, contribute to diagnostic discrepancies. These factors require identification in order for professionals to arrive at a valid and reliable classification system for obesity.

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References