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Obesity of Mentally Retarded Individuals: Prevalence, Characteristics, and Intervention

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Research on the prevalence, characteristics, and treatment of obesity of mentally retarded individuals within the context of research findings with the obese nonretarded population was selectively reviewed. According to the available literature, obesity is a prevalent problem in the retarded population, and there is a greater incidence among females than males. The literature also suggests that obese retarded subjects as a group can be distinguished from their nonobese peers by their physical condition, but not by their eating style or personality characteristics. Behavioral self-control strategies have been found to be effective in producing weight loss in obese retarded children and adults. Further research is needed to reduce the high interindividual variability observed in treatment outcome studies and to address problems of long-term maintenance of weight loss.

Over 29 million adults in the United States between the ages of 20 and 74 years are obese (Abraham, 1983). Although obesity has existed for ages, we are less accepting of an obese condition today than we were historically (Ayers, 1958). Short- and long-term health risks associated with obesity have contributed to its growing unacceptance. Many research studies have shown associations between obesity and hypertension, hyperlipidemia, diabetes mellitus, carbohydrate intolerance, pulmonary and renal problems, surgical risk, and complications during pregnancy (Bray, 1976; Dawber, 1980; Kannel & Gorden, 1979; Van Itallie, 1979). In addition to health risks, obese mentally retarded individuals are likely to be the object of increased social prejudice and nonacceptance due to the social stigma associated with being both retarded and obese (Rotatori, Switzky, & Fox, 1983). Despite the wealth of accumulating research and intervention literature on obesity, this work has been extended to the retarded population only fairly recently and in a very limited way (Staugaitis, 1978). Our purpose in this paper was to review the available literature on obesity among retarded individuals within the context of the research findings with the obese nonretarded population.

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Definition and Measurement

A recent Task Force on Obesity (Bray, 1979) recognized the persistent need to define obesity precisely in order to understand etiologies associated with this condition, to develop accurate classification systems for obesity subgroups, and, ultimately, to offer differential treatment programs. Measurement is a crucial area in the obesity field, yet confusion remains concerning how obesity is to be defined and measured (Garn & Clark, 1975). For example, the terms *overweight* and *obesity* have been used interchangeably in most clinical settings, although they are not identical. Overweight refers to an excess in body weight relative to standards for height (Bray, 1979), whereas obesity is defined as an excess of subcutaneous, nonessential fat (Craig, 1969). Further complicating the

situation is a marked tendency for researchers and clinicians to use overweight measures to describe an obese condition, the assumption being that these measures are strongly correlated. Separate measures of relative body weight (e.g., computed from the Metropolitan Life Insurance Company's desirable weight for height tables) and surplus body fat (e.g., skinfold thickness at various body sites) have been developed and used interchangeably as diagnostic tools. Gross weight, however, is an inexact measure of body fat because body mass includes skeletal, musculature, and body fluid weights as well as corpulence. Therefore, such factors as temporary fluctuation in body fluids and muscular development can result in misclassification of an obese or overweight condition when using only height–weight tables (Wallen & Roszkowski, 1980).

In addition to being a more direct measure of obesity, skinfold thickness has been found to be significantly associated with myocardial infarction, whereas relative weight (from Metropolitan Weight Tables) was not (Hubert, Feinleib, McNamara, & Castelli, 1983). This imperfect association between body fat and body weight warrants particular attention when interpreting results from studies on overweight or obesity. For example, using nonretarded subjects, Johnson and Stalonas (1977) found that body weight correlated poorly with tricep skinfold thickness, $r = .34$. In a sample of 84 moderately retarded adults (40 males, 44 females) chosen from a sheltered workshop setting, Fox, Burkhart, and Rotatori (1983a) found that tricep skinfolds correlated moderately well with percent overweight values, $r = .76$, $p < .001$, and that better correlations were found for females than males, $rs = .88$ and .59, respectively. Garn and Clark (1975) also reported that there was a reasonable relationship between these measures for nonretarded adolescents and adults. Fox et al. (1983a), however, indicated that when height–weight tables were used alone, 22.5% of the obese males and 13.7% of the obese females would be misclassified as nonobese, whereas errors of misclassification were reduced when skinfold thickness and relative weight measures were used in combination. The limitations of using height–weight tables to assess an obese condition have been reported by several authors (LeBow, 1977; Seltzer, 1965; Wallen & Roszkowski, 1980). These limitations include poor reliability of weight classification based on body frame, arbitrary selection of weight values due to the use of weight ranges rather than actual values, and poor standardization of ideal weight measures. These drawbacks and the results from Fox et al. (1983a) lend support to the observations by LeBow (1981) that successfully defining obesity requires the use of both heaviness (e.g., weight per height) and fatness estimates. (For a more comprehensive review of assessment issues, see Fox, Rotatori, and Burkhart, 1983).

Incidence of Obesity

An important component to the study of obesity is determining the extent of the problem. Estimates of the incidence of obesity among American adults range from 15% to 50% (Bray, 1976; Van Itallie, 1979). According to Abraham (1983), 28% of women and 29% of men between 20 and 74 years of age are obese. The prevalence is even greater in certain ethnic groups, increases with age, and is negatively correlated with higher socioeconomic status (Stunkard, 1975). Although there are currently no comprehensive epidemiological data on obesity among retarded individuals (Jackson & Thorbecke, 1982), preliminary evidence suggests that obesity is a prevalent problem in this population. Also, the causes of obesity in this population are, with few exceptions, not different from those within a nonretarded population (Rotatori & Fox, 1981).

In an assessment of the incidence of overweight among a sample of 1,152 retarded subjects drawn from four midwestern settings (i.e., institutions and community residences), Fox and Rotatori (1982) found differences according to gender and the degree of mental deficiency. For this sample, obesity was defined as 20% or more above desirable weight for height (Robinson, 1972). Results indicated that for

subjects functioning in the severe to profound ranges of mental retardation (376 males, 272 females), 6.9% of the males and 13.6% of the females were obese; in the mild to moderate retardation categories (258 males, 228 females), 27.9% of the males and 38.2% of the females were obese. Significant relationships were found between mental retardation level (profound/severe, moderate/mild) and weight category (nonoverweight, overweight, obese) for males and females, and between sex and weight, with obese females more prevalent (25.1%) than obese males (15.6%). A significant relationship was also found between weight category and age group for males and females, with an increasing incidence of obesity in older subjects. In sum, the findings based on a sample of retarded individuals, indicated (a) a higher proportion of women than men were obese, (b) a higher proportion of moderate/mild retarded persons were obese than were those in the severe/profound range, and (c) incidence of obesity generally increased with age but not in a direct linear fashion.

The first two findings are consistent with results from a study by Wallen and Roszkowski (1980), who used a sample of 149 institutionalized retarded adults. Based on a comparison of actual and ideal weights, they found a disproportionately larger number of excessive weight individuals among those who were mildly and moderately retarded. A greater proportion of overweight females was also found, with comparatively more underweight males than would be expected based on their representation in the total sample. To account for their results, Wallen and Roszkowski suggested that the interaction between sex and degree of retardation may be associated with syndromes in which weight is a clinical feature, such as Prader-Willi, Down, Carpenter, Lawrence-Moon-Biedl, and Cohen syndromes. Except for Down syndrome, however, these conditions are rare. Although overweight has been observed among children with Down syndrome (Chumlea & Cronk, 1981), Wallen and Roszkowski (1980) found that only 1 of the 8 adults with Down syndrome in their sample was overweight, suggesting that this clinical condition contributed little to the variance in overweight found in their sample.

In the Fox and Rotatori (1982) study, specific syndromes associated with mental retardation (e.g., Down syndrome) did not account for the differences found by sex, age, and mental retardation level. More studies that assess the relationship between overweight and clinical conditions are needed. Of particular importance is the use of appropriate measures for classification of overweight and obesity for such individuals because differences may occur in physical make-up and growth rate. For example, individuals with Trisomy 21 often have less than normal weights and length at birth and a smaller stature throughout early development (up to two standard deviations below the normative mean at 2 years of age) but eventually catch up to norm levels of growth during late adolescence (Chumlea & Cronk, 1981). Consequently, height–weight tables would appear to be of limited value as a classification tool for overweight with these individuals, who have been found to differ significantly from the normal population in stature, weight, and corresponding height–weight values.

Eating, Physical, and Personality Characteristics of Obese Individuals

Jackson and Thorbecke (1982) suggested that retarded individuals are more likely to develop obesity than are nonretarded persons. To support this observation, a number of factors that are generally characteristic of this population have been cited as possibly contributing to weight problems, including a sedentary lifestyle, lack of nutritional awareness, poor eating behavior, and personality factors such as external locus of control (Jackson & Thorbecke, 1982). Numerous studies attempting to find differences between obese and nonobese individuals have been conducted with the nonretarded population; however, extension of similar research efforts to the retarded population has been limited. Studies conducted in laboratory and naturalistic settings to assess the eating style that may be characteristic of obese individuals have

generally produced equivocal results (Rodin, 1981; Stunkard & Kaplan, 1977). From their own research and a review of the literature, Stunkard, Coll, Lindquist, and Meyers (1980) concluded that the small and inconsistent differences that have been found between eating styles of obese and nonobese individuals are of "doubtful relevance in determining the cause and control of obesity" (p. 1129).

Other studies using nonretarded subjects and employing various assessment techniques (e.g., family reports, self-reports, psychoanalytic interviews, naturalistic observations) have suggested a negative correlation between physical activity and obesity (Curtis & Bradfield, 1971; Dean & Garabedian, 1979; Meyers, Stunkard, Coll, & Cooke, 1980). There is also evidence to suggest that increased activity level facilitates loss of body fat (Epstein et al., 1982; Horton, 1976). Research comparing energy expenditures of obese and nonobese individuals, however, has also produced inconsistent findings (Thompson, Jarvie, Lahey, & Cureton, 1982).

Finally, an increasing number of articles have been published over the past several years on the association of obesity and certain behavior and personality characteristics of nonretarded subjects. These studies have generally resulted in conflicting findings. For example, studies by Johnson (1974) and Ross (1974) revealed a heightened sensitivity of obese individuals to visually prominent food cues, lending support to the position that obese individuals are more sensitive to and influenced by external variables in their environment (e.g., sight and smell of food) than by cues emanating from their internal state (e.g., hunger pangs). More recent research has challenged this externality assumption about obese persons (see review by Rodin, 1981).

Eating Style

In order to extend these investigations to the retarded population, Fox, Burkhart, and Rotatori (1983b) assessed the eating behavior of 28 moderately retarded adults identified by a sheltered workshop staff as being either thin (n = 14) or overweight (n = 14). The subjects were classified as obese using skinfold and relative weight measures. The nonobese group included thin and normal weight subjects. Eating data were collected individually for each subject by two observers during a normal lunch period in the workshop cafeteria. Results revealed no significant differences in eating behavior between obese and nonobese groups based on total calories consumed, total meal time, and percentage active eating time (i.e., time spent chewing, biting, swallowing, drinking). Also, 92% of the males completed their meals in less than 15 minutes as compared to 44% of the females, even though total meal time did not differ significantly for the groups. The major importance of this research endeavor was the failure to find a significant difference in eating style between obese and nonobese retarded subjects, a result that is consistent with studies employing nonretarded subjects (Stunkard & Kaplan, 1977). The wide individual variability in eating behavior found for the obese and nonobese retarded subjects (e.g., the number of bites/drinks taken during the first 5 minutes of the meal ranged from 10 to 54 for obese and 9 to 42 for nonobese subjects), however, suggests that although an "obese eating style" may not be a valid construct, eating patterns may be one of several important variables contributing to an obese condition (at least for some individuals). Other variables (e.g., snacking patterns, daily or weekly caloric intake, physical activity levels) need to be researched further to delineate their potential relationship to the development and maintenance of an obese condition.

Physical Characteristics

Using a group of 42 retarded individuals (18 males, 24 females) also from a sheltered workshop setting, Fox, Burkhart, and Rotatori (1984) investigated general physical condition as an indirect measure of physical activity. The hypothesis underlying this investigation was that sedentary people would be more likely to be in poorer physical condition than would active individuals, a further assumption being that

there would also be a greater prevalence of obese individuals falling within this category. Subjects were classified as obese (10 females, 12 males) and nonobese (14 females, 6 males) based on triceps skinfold and relative weight measures. A submaximal cardiovascular test of endurance developed at the Ohio State University (Mathews, 1978) was chosen to assess the physical condition of the subjects. Basically the test required subjects to step up and down on a wooden platform to a prescribed cadence. The performance measure was the number of innings (i.e., 30-second work periods) the subject successfully completed. Sixty-two percent of the sample (14 obese, 12 nonobese) completed the test. Results showed a significant difference between the obese and nonobese groups in mean number of innings completed, $F(1, 22) = 9.59$, $p < .005$, with the obese group completing fewer innings overall (mean = 4.86, range = 1 to 10) than did the nonobese group (mean = 7.5, range = 2 to 15). A significant sex difference was also found, with females completing fewer innings than did males. Consequently, our hypothesis was supported in that physical condition did discriminate between obese and nonobese groups of retarded subjects, with obese subjects performing more poorly.

The implications of these findings relative to understanding the causal nature between activity level and obesity remain speculative because it is unclear how these variables contribute to and interact with each other, either alone or in combination with other factors (i.e., physiological, metabolic). For instance, reduced activity level may be the cause or result of an obese condition, or it may be a manifestation of obesity caused by other factors. In addition, it seems likely that the interrelationship between these variables occurs over time in a cumulative fashion; i.e., an individual may become overweight and reduce his or her energy expenditure, which in turn may lead to deterioration in physical fitness, which then contributes to decreased energy expenditure and further weight gain. Another possibility might involve reduction in activity level without a consistent decrease in caloric intake, which in turn may lead to an overweight condition, further deterioration in physical fitness, and weight gain. Current research evidence suggests that activity by obese individuals requires greater energy cost than does similar activity by nonobese individuals (Brownell & Stunkard, 1980) and that obese persons are not highly motivated for physical activities, although they benefit in terms of weight loss from exercise more than do nonobese individuals (Buskirk, 1969). From a treatment standpoint, the implications of our findings lend support to including a physical exercise component to remediation programs. In fact, many investigators consider exercise to be a crucial component of treatment programs (Craddock, 1973; Stuart & Davis, 1972).

Of additional interest is the implication that may be drawn from our study and results of previous research (Garfield, 1963), which suggested that, in general, males tend to be more active than are females. This factor may be an important aspect to understanding the greater prevalence of obesity among females (Fox & Rotatori, 1982) in conjunction with a greater prevalence of underweight in males within the retarded (Wallen & Roszkowski, 1980) and nonretarded (Bray, 1979) populations. For instance, Wallen and Roszkowski suggested that increased activity level in combination with the poor intake and utilization of nutrients characteristic of severely–profoundly retarded individuals may contribute to the greater prominence of underweight males than females found within the population, even though each condition alone may not be sufficient to cause underweight.

Personality Characteristics

In conjunction with the investigation of variables associated with energy expenditure, Fox, Burkart, and Rotatori (1984) studied two personality dimensions (anxiety and self-concept) of the sample of 42 retarded adults in an effort to assess psychological factors that might be associated with an obese condition. Although psychological problems are reportedly more prevalent among obese than among

nonobese individuals (Bruch, 1973), this personality area had not been addressed with retarded persons.

The personality measures employed and administered verbally to each subject in our study were the Children's Manifest Anxiety Scale (Castenada, McCandless, & Palermo, 1956) and a two-component self-concept measure consisting of a 12-item questionnaire and 16-adjective checklist (adapted from Zigler, Balla, & Watson, 1972). Thirty-eight subjects in our sample successfully responded to the self-concept measure, whereas 37 subjects (18 obese, 19 nonobese) successfully completed the Anxiety Scale. Results for both measures revealed no significant group, sex, or interaction differences. Both obese and nonobese retarded persons scored very positively on the self-concept measures, with little interindividual variability. Our subjects showed more anxiety than did the normative sample of fourth- through sixth-grade children for the Anxiety Scale. Given the relatively poor validity scale scores of our sample (mean = 6.89, range = 3 to 9) in comparison to the normative data (mean range = 1.81 to 3.07), these results must be interpreted cautiously.

Treatment

Since the development of behavioral treatment procedures for obesity, well over 100 related research studies and clinical reports have appeared in the literature (Abramson, 1977). Despite these extensive efforts, there has been comparatively little treatment research with retarded individuals; however, a review of the available literature reveals that the behavioral approach to weight control for retarded persons represents an effective strategy (Fox, Switzky, Rotatori, & Vitkus, 1982).

Although a comprehensive description of the behavioral treatment programs for obese retarded individuals is not detailed here, the essential components generally consist of self-monitoring (Joachim, 1977), external reinforcement (Foxx, 1972), stimulus control (Foreyt & Parks, 1975), and control of eating behavior (Rotatori, 1978). Energy expenditure (Altman, Bondy, & Hirsch, 1978; Buford, 1975; Gumaer & Simon, 1979; Heiman, 1978), nutritional education (Rotatori & Fox, 1980), and cognitive restructuring (Rotatori, Fox, & Switzky, 1980), although not specific behavioral techniques, are also important elements that have been applied in treating obesity with both the nonretarded (see review by Stunkard, 1982) and retarded populations. Approaches have ranged from single modality treatments (Foxx, 1972; Joachim, 1977; Joachim & Korboot, 1975) to multicomponent treatments (Foreyt & Parks, 1975; Rotatori & Fox, 1980; Rotatori, Fox, & Switzky, 1979, 1980), with the most successful programs in terms of reduction and maintenance generally involving multicomponent treatment packages (Jackson & Thorbecke, 1982).

Rotatori and his colleagues have developed a comprehensive weight loss program specifically for retarded individuals that has proved successful with retarded children (Rotatori, Parrish, & Freagon, 1979), adolescents (Rotatori & Switzky, 1979; Rotatori, Fox, & Switzky, 1979), and adults (Rotatori, 1978; Rotatori, Switzky, & Fox, 1981). This treatment package is comprised of 14 weeks of active treatment where subjects meet three times weekly and are introduced to self-monitoring (of daily weight and food intake), cognitive restructuring (e.g., emotional responses to discourage urges to overeat), control of eating behavior (e.g., eating one average helping of food per meal, reducing eating rate and snacking), and stimulus control (performing food cue elimination) techniques. Additionally, two weekly meetings are conducted for 5 weeks of maintenance.

A streamlined version of this approach consisting of two meetings per week during the 10-week treatment phase and five weekly meetings during the maintenance period was recently applied to two groups (N = 16) of eight moderately retarded adults (Fox, Haniotes, & Rotatori, 1984). Results indicated that although no significant difference was found between a buddy reinforcement system implemented in one group and the individual treatment approach used with the other group, the ab-

breviated version of the treatment package was successful in producing significant weight loss and maintenance up to one year for some subjects in both groups. An additional aspect of this study worth mentioning involves parental participation, which, although not systematically investigated, may have contributed in part to the successful results. For instance, in an exploratory study with 12 female retarded adolescents and adults using six weekly information-providing sessions directed toward treating subjects and their parents, Jackson and Thorbecke (1982) found that members of a treatment group lost significantly more weight than did members of a control group. Of particular interest was the additional finding of weight loss trend across the baseline period, which the authors attributed to parental control and expectations influenced by notification of their child's acceptance into the program. Mean weight losses of subjects in Jackson and Thorbecke's study were comparable to those in Fox, Haniotes, and Rotatori's (1984) study, and findings from both of these studies were consistent with results of Hall's (1972) study, in which nonretarded individuals had a significant weight loss (.22 to .45 kg per week) as a result of using behavioral weight reduction strategies.

In further support of the importance of parent involvement in weight loss programs with retarded subjects, the streamlined weight loss package consisting of weekly meetings was recently used with two groups of moderately retarded obese adults (Fox et al., 1985). In one group (N = 8, mean age = 27 years), parents of the participants were actively involved in the treatment program; in the second group (N = 7, mean age = 29), parents were minimally involved in the treatment process. At the end of treatment, subjects in the parent-involved group lost significantly more weight (mean = 3.3 kg) with less intragroup variability (SD = 1.0 kg) than did the second group (mean = 1.08 kg; SD = 2.18 kg). A strong correlation was found between degree of subject involvement in treatment (as measured by number of daily homework forms completed) and weight loss.

Conclusions

Our knowledge about obesity among mentally retarded individuals has expanded since the first review of this area appeared less than 10 years ago (Staugaitis, 1978). As is the case with nonretarded persons, obesity represents a prevalent and potentially serious health problem for retarded individuals. The treatment literature directed at reducing obesity in the retarded population is promising. At present, including strategies to change eating and activity patterns, enhance self-control, and encourage the development of a support system seems to be an essential component of a comprehensive treatment package. Including more traditional nutritional information may even further enrich treatment efforts with obese retarded persons (Rotatori, Fox, Litton, & Wade, 1985). The high interindividual variability observed in weight loss studies and the problems of long-term maintenance continue to plague this research area for both retarded and nonretarded populations. Investigators must address these issues in future treatment studies.

Continued study is also needed at the basic research level. Carefully defining and measuring an obese condition is prerequisite for making comparisons between studies. At present, use of both relative weight and tricep skinfold measures should be considered minimal requirements for assessing an obese condition. Further investigation is necessary to identify factors contributing to the development and maintenance of obesity, including eating and activity patterns, caloric input, and metabolic factors. It is unlikely that further studies of personality factors related to obesity in the retarded population using available measures would be fruitful. Certainly, specific clinical populations frequently associated with obesity and mental retardation (e.g., Down syndrome) need further study. Nardella, Sulzbacher, and Worthington-Roberts' (1983) study of activity levels in persons with Prader–Willi syndrome is an example of such needed research.

Finally, most current work on the topic of obesity with retarded individuals has centered on adults and to a lesser extent on

older adolescents. Current research efforts need to be extended to younger persons. The schools would serve as a prime location for developing programs to teach young retarded (and nonretarded) children about nutrition and appropriate eating and activity patterns in an attempt to reduce the occurrence of obesity as the children mature. Literature is already available with obese nonretarded children to guide such preventative efforts with obese retarded children (Epstein, Masek, & Marshall, 1978).

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