might be developed for public health practitioners as the basis for a course. These could be built around some of the following issues:

- Is there an ethical conflict inherent in the cost-benefit analysis as a prime determinant of health funding?
- How do the concepts of equal value of all human life become violated when decisions must be made to fund either a well-baby center or a geriatric day center?
- What should be the criteria for determining not only who is selected for renal dialysis, but whether or not renal dialysis *itself* as a health care measure should be approved by the Health Commissioner for funding by the state?
- How can self-determination (i.e., the right to smoke) co-exist with government financed medical care for terminally ill victims of bronchogenic carcinoma (i.e., self-provoked illness)?
- How does hospital and health center administration interfere with the covenant between physician and patient in the pursuit of bureaucratic order?
- What are the ethical considerations in the compulsory Pap smear?; the 10 p.m. curfew for residents of long-term care facilities?
- How may the police functions of the Health Department be viewed in light of moral considerations?

These are but a handful of the issues directly applicable to public health practice. Many more such problems should be uncovered and dissected. In undertaking a formal analysis of the ethical basis of public health programs we do more than merely study how the needs of the individual and the needs of society become regulated and integrated into daily function. We perform a more comprehensive and significant audit upon ourselves than we might ever have thought possible. We also prepare ourselves for decisions and tasks the ivory towered academicians can only ponder in splendid isolation.

SELECTED READINGS IN MEDICAL ETHICS

1. Publications of the Hastings Institute, 360 Broadway, Hastings on Hudson, New York, N.Y. 10706
   a. Hastings Center Studies, Vol. 1, Number 2, 1973. Especially recommended are articles by Robert M. Veatch, Roy Branson. $3.00
   b. Hastings Center Studies, Vol. 2, Number 1, 1974. Ivan Illich, *The Political Uses of Natural Death*, pp. 3–20. $3.00
   c. Bibliography of the institute of Society, Ethics and the Life Sciences. 1975. $3.00
2. Readings on Ethical and Social Issues in Biomedicine, Richard M. Wertz, Editor, Prentice-Hall, 1973. Especially recommended are essays by Henry K. Beecher, James F. Childress, and Leon R. Kass. $7.50

Association between Juvenile Onset Obesity And Severe Adult Obesity in 73,532 Women

ILONNA J. RIMM AND ALFRED A. RIMM, PHD

The purpose of this report is to explore the role of juvenile obesity as a risk factor in adult female obesity through a cross-sectional study of 73,532 women. Since severe adult obesity in women is a recognized health hazard,[1,2] an association between juvenile obesity and severe adult obesity would provide the rationale for juvenile weight control programs.

Methods

The women in this study were all members of the TOPS Club (Take Off Pounds Sensibly). The details concerning the population of women in this study are given elsewhere.[1,3,4]

Relative obesity was determined by use of the obesity index (Weight/Height). This was determined to be a good measure of the degree of obesity because of its high correlation with weight and low correlation with height.[5] The obesity index scale was divided into 10 intervals so that approximately 10 per cent of the women were included in each interval. Basic descriptive data are shown in Table 1.

Criterion for Juvenile Obesity

In this study the existence of juvenile obesity was ascertained by the question, "Were you considered a fat child?" Mullins,[6] in his retrospective study of childhood obesity, used a similar type of question to determine childhood weight status, finding it "to be the single most practical criterion." Although the answers to this question could be subject to biases, we feel that it gives a good estimate of the presence of juvenile obesity for the following three reasons: (1) The women involved in this study are members of TOPS (a weight reduction club); thus all are likely to be conscious of their weight problem and its history. (2) Fat children are known to have more difficulty with interpersonal relationships and are discriminated against by their peers.[7,8] A woman is likely to remember adverse experiences. (3) The per-

Address reprint to Dr. Alfred A. Rimm, Associate Professor of Preventive Medicine, Medical College of Wisconsin, 1725 West Wisconsin Avenue, Milwaukee, WI 53233. Ms. Rimm is a Research Assistant and pre-medical student at the University of Wisconsin.

TABLE 1—Descriptive Statistics For Each Obesity Level

Obesity Level	I	II	III	IV	V	VI	VII	VIII	IX	X
Minimum Value +	1.10	2.10	2.22	2.34	2.45	2.57	2.70	2.86	3.07	3.41
Maximum Value +	2.09	2.21	2.33	2.44	2.56	2.69	2.85	3.06	3.40	7.60
Weight										
Mean	126.4	138.3	145.9	154.0	161.1	169.5	178.8	190.6	208.1	247.7
S.D.	8.3	5.6	6.0	6.1	6.7	6.8	7.7	8.2	10.3	28.1
N	7461	6823	7934	7143	7478	7260	7291	7276	7447	7419
Per cent Above Ideal* Weight (for mean height and weight)	5.3	15.2	21.6	28.3	34.2	41.2	49.0	58.8	69.2	101.4

+ Calculated: $\frac{\text{Present Weight}}{\text{Present Height}}$

*Based on desirable weights from Metropolitan Life Insurance Company, Statistical Bulletin, 40, November-December, 1959.

manence of body image was studied by Stunkard and Mendelson.[9] They report that juvenile onset obesity is often a precursor of adult body image disturbances. Even thin adults who had been obese children had body image disturbances and a "morbid preoccupation with their physical appearance." If body image is relatively permanent, we can presume that adults have a reasonable image of childhood body size.

Nevertheless, the reported data could be subject to error for the following reasons: (1) women could differ in what age range they consider "childhood"; (2) women could differ in their interpretation of what is considered to be a fat child; (3) women could forget their childhood image. However, if these errors are random in nature, as seems probable, they would only tend to obscure rather than emphasize the relationships found.

Results

Figure 1 shows the per cent of women for three different age groups at each obesity level who indicated that they were considered a fat child. Note that for each increase in severity of obesity level a corresponding increase in the percentage of women who were fat children is evident.

The ratios of the per cent who were fat children in the highest obesity level (level X, Table 1) to the corresponding per cent in the lowest obesity level (level I, Table 1) are uniform for the three age groups. The mean ratio is 2.4. This finding suggests that the most severely obese women were 2–3 times more likely to have been fat children than the least obese.

Although the trends in Figure 1 are parallel there is a displacement between each age group. There are at least two explanations for this displacement:

1. Obesity at age 20 is likely to be a sequel to childhood obesity, whereas obesity at age 40 could be caused by other factors (pregnancy, emotional crisis, etc.) resulting in adult onset obesity. Consequently, the sample of women who belong to TOPS and are in the 40–49 years age group may contain women with both adult onset and juvenile onset obesity. In the 20–29 years age group, adult onset obesity is less likely to be present.
2. Comparison of girls' height and weight tables prepared in 1900[10] and 1960[11] show that weight has increased about 9 pounds while height has increased about 3 inches. This could indicate that girls actually have become slightly heavier although it is unlikely that this could account for the entire difference between age groups.

There was no effect of parity on the relationships observed in Figure 1, implying that permanent weight gains associated with pregnancy had no association with the correlation between juvenile and adult abesity.

The 13,527 women 20–29 years of age were divided into two groups, those who reported themselves as fat children (5,997) and those who did not so report themselves (7,530). Thirty-seven per cent of the former group (2,336) are now severely obese (>55 per cent overweight) as compared to 21 per cent (1,562) of the latter group. Thus, in this population, the proportion of self-reported fat children now severely obese is 1.7 times the proportion of self-reported non-fat children now severely obese.

Discussion

The overall results presented in Figure 1 lead to the conclusion that severe adult obesity is definitely related to childhood obesity in that about 2.4 times more severely obese women than normal weight women were fat children.

Although our conclusion is different from that which could be obtained from a prospective study, we feel that it offers important insight into the relationship between juvenile onset obesity and severe adult obesity.

These findings are similar to those of Abraham and Nordiesk[12] who reported a prospective study of 100 girls in Hagerstown, Maryland. They followed 50 juvenile obese girls and found that 80 per cent were obese as adults; of 50 normal

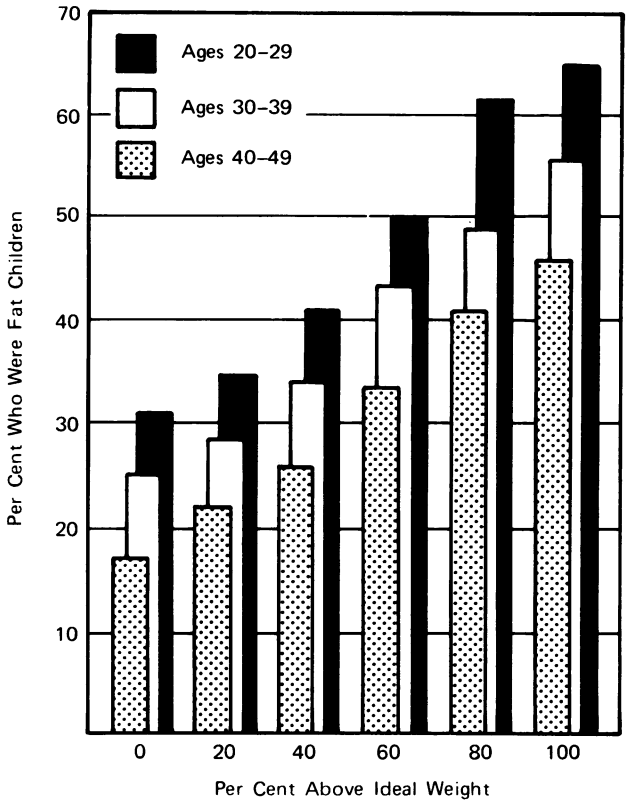

FIGURE 1—Per Cent of Women Who Were Fat Children for Each Obesity Level — 3 Age Groups

weight girls followed, 18 per cent were obese as adults. Juvenile obese girls were 4.4 times as likely to become obese adults as normal weight girls.

Because our sample is a biased one and our parameters differ, this ratio cannot be compared directly with our findings. But the implications of both studies are similar. Since severe adult obesity is associated with substantial adult morbidity, efforts should be directed toward children to discourage development of juvenile obesity and its possible successor, severe adult obesity.

Summary

The association between juvenile obesity and severe adult obesity was examined using a questionnaire completed by 73,532 weight conscious women. Relative obesity as an adult was determined by the ratio Weight/Height. The question, "Were you considered a fat child?" determined childhood weight status. Analysis of the data revealed that severely obese women (regardless of age) were 2.4 times more likely than normal weight women to have been fat children. This association was noted for all parity groups. The data also suggests that the risk of a fat child developing severe obesity is substantially greater than that for a non-fat child. Since adult obesity is associated with a number of adult diseases, this study emphasizes the importance of weight control in childhood.

ACKNOWLEDGMENTS

This work is supported by TOPS Club, Inc., Obesity and Metabolic Research Program, Medical College of Wisconsin, Milwaukee, Wisconsin

REFERENCES

1. Rimm, A., Werner, L. H., Van Yserloo, B., Bernstein, R. A. Relationship of obesity and disease in 73,532 weight-conscious women. Pub. Health Rep., 90:1, 44–52, 1975.
2. Chiang, B. N., Perlman, L. V. and Epstein, F. H. Overweight and hypertension: A review. Circulation 39:403–421, 1969.
3. Bernstein, R. A., Werner, L. H. and Rimm, A. A. Relationship of gallbladder disease to parity, obesity, and age. A study of 62,739 weight-conscious women. Health Services Reports 88:925–936, 1973.
4. Rimm, I. J. and Rimm, A. A. Association between socioeconomic status and obesity in 59,556 women. Preventive Medicine 3:543–572, 1974.
5. Florey, C. The use and interpretation of ponderal index and other weight-height ratios in epidemiological studies. J. Chron. Dis. 323:93, 1970.
6. Mullins, A. O. The prognosis in juvenile obesity. Arch. Dis. Child. 33:307, 1938.
7. Alessi, D. F. and Anthony, W. A. The uniformity of children's attitudes toward physical disabilities. Except. Chil. 35:(7)543–545, 1969.
8. Matthews, V. and Westie, C. A preferred method for obtaining rankings: Reactions to physical handicaps. Am. Sociol. Rev. 31: 851, 1966.
9. Stunkard, A. and Mendelson, M. Obesity and the body image: I. Characteristics of disturbances in the body image of some obese persons. Am. J. Psychiat. 123:(10)1296–1300, 1967.
10. Keating, *Cyclopedia* of Diseases of Children, 1900.
11. Stuart, S. Textbook of Pediatrics, seventh ed., p. 50, Philadelphia, 1959.
12. Abraham, S. and Nordsieck, M. Relationship of excess weight in children and adults. Pub. Health Rep. 75:263, 1960.