

MATERNAL PERCEPTIONS AND TREATMENT MEASURES RELATED
TO PREPUBESCENT WEIGHT REGULATION

by

Carol Brigham Hill, B.S.N.

A Thesis

Presented to
The Oregon Health Sciences University
School of Nursing
in partial fulfillment
of the requirements for the degree of
Master of Nursing

June 8, 1984

APPROVED:

[REDACTED]

Doris Julian, RN, MN, Associate Professor, Thesis Advisor

[REDACTED]

Barbara J. Stewart, PhD, Associate Professor, First Reader

[REDACTED]

Elaine W. Lis, PhD, Professor, Crippled Children's Division,
Department of Public Health and Preventive Medicine, Second Reader

[REDACTED]

Carol A. Lindeman, RN, PhD, Dean, School of Nursing

This study was supported by traineeships from the United States Public Health Service Grant Numbers 2 ALL NU00250-06 and 2 ALL NU00250-07.

ACKNOWLEDGEMENTS

I sincerely thank my thesis committee, Doris Julian, Barbara Stewart, and Elaine Lis, for their patience, understanding, support and guidance during the past two years.

Wilma Peterson, my graduate program advisor, assisted with the initial preparation of the proposal and served as moderator of the thesis defense.

Steven Schuman, Director of Research, Vancouver Public Schools, provided assistance with procurement of district permission to conduct the study, as well as guidance during the data collection phase.

Marie Beaudet taught me how to write a coding layout, how to enter the data into the Harris computer, wrote the computer program, and conducted the statistical runs for data analysis.

Julia Brown's wit, sparkle, and lively test questions aided my journey into the realm of research. She also assisted with the development of the initial proposal.

I thank Mary Ann Thimmes, Veda DeColon, and the Clark College Nursing Department for allowing my flexibility with work scheduling at various points during my graduate study.

My family has borne the brunt of my preoccupation with this thesis. I thank my parents for the electric typewriter and summer vacation, my husband for the delicious dinners, and now relinquish the kitchen table for my children's evening educational preparation!

TABLE OF CONTENTS

CHAPTER	PAGE
I.	INTRODUCTION. 1
	Review of the Literature. 2
	The Definition of Obesity. 2
	Health Risks Associated with Obesity in Adults . . . 5
	Incidence of Childhood Obesity 6
	Implications of Childhood Obesity. 6
	Etiology of Childhood Obesity. 11
	Treatment of Exogenous Childhood Obesity 17
	Summary. 20
	Conceptual Framework. 21
	Statement of the Problem. 22
	Research Questions. 24
	Infant Feeding Practices 24
	Research Question 1 24
	Research Question 2 24
	Portion Control. 24
	Research Question 3 24
	Physical Activity. 24
	Research Question 4 24
	Perception of Daughter's Weight Status and Need for Regulation. 25
	Research Question 5 25
	Research Question 6 25
	Research Question 7 25
	Interest Question Regarding Special Programs . . . 25
	Research Question 8 25
	Hypotheses. 25
	Hypothesis 1 25
	Hypothesis 2 26
	Implications for Nursing. 26

TABLE OF CONTENTS (cont.)

CHAPTER		PAGE
II.	METHODS.	27
	Setting and Subjects	27
	Questionnaire Response Rates.	29
	Demographic Characteristics of Respondents.	30
	Age of Daughters	30
	Mother's Educational Level	30
	Income of Families	30
	Family Size.	31
	Materials Provided to School Personnel.	31
	Instruments.	31
	NCHS Growth Charts.	32
	Childhood Weight Regulation Questionnaire	32
	Procedure.	33
	Measurement of the Independent Variable.	34
	Hypothesis 1.	34
	Hypothesis 2.	34
	Measurement of the Dependent Variable.	35
	Hypothesis 1 and 2.	35
	Measurement of Other Variables of Interest	36
	Infant Feeding Practices.	36
	Question 1	36
	Question 2	36
	Question 3	37
	Question 4	37
	Portion Control	37
	Question 5	37
	Question 6	37
	Question 7	37
	Question 8	37
	Question 9	37
	Physical Activity	38
	Question 10.	38
	Question 11.	38
	Question 12.	38

TABLE OF CONTENTS (cont.)

CHAPTER	PAGE	
II.	METHODS (cont.)	
	Perception of Daughter's Weight Status and Need for Regulation.	39
	Question 13	39
	Question 14	39
	Question 15	39
	Question 16	39
	Question 17	39
	Question 18	39
	Question 19	39
	Question 20	39
	Question 21	40
	Question 22	40
	Demographic Variables.	40
	Question 23	40
	Question 24	40
	Question 25	40
	Question 26	40
	Mother's Perception of Her Own Weight and Special Program Interest Question	40
	Question 27	40
	Question 28	41
	Data Analysis	41
	Hypothesis 1	41
	Hypothesis 2	41
	Research Questions for Other Variables of Interest. . .	41
	Infant Feeding Practices	41
	Portion Control.	41
	Physical Activity.	42
	Perceptions of Need for Weight Reduction	42
	Demographic Variables and Interest Question. . . .	42
III.	RESULTS	43
	Hypothesis 1.	43
	Hypothesis 2.	44
	Results Pertaining to the Research Questions.	45

TABLE OF CONTENTS (cont.)

CHAPTER	PAGE
III.	RESULTS (cont.)
	Results Pertaining to the Research Question (cont.)
	Infant Feeding Practices. 45
	Research Question 1. 45
	Research Question 2. 45
	Portion Control 46
	Research Question 3. 46
	Physical Activity 46
	Research Question 4. 46
	Perception of Daughter's Weight Status and Need for Regulation 48
	Research Question 5. 48
	Research Question 6. 50
	Research Question 7. 53
	Research Question 8. 53
	Additional Descriptive Data Obtained from the Study. . 53
	Infant Feeding. 53
	Portion Control 54
	Length of Attempt at Daughter's Weight Management 54
	Additional Findings Obtained from the Study. 54
IV.	DISCUSSION 56
	Consideration of the Hypotheses. 56
	Sample Variability from NCHS Growth Charts 57
	Discussion of Pertinent Relationships Obtained from Data Analysis 57
	Infant Feeding Practices. 57
	Portion Control 57
	Physical Activity 58
	Perceptions of Weight Status and Need for Management. 58
	Nursing Roles in Childhood Weight Management 59

TABLE OF CONTENTS (cont.)

CHAPTER	PAGE
V. SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS.	60
Summary	
Conclusions	62
Limitations	64
Recommendations for Further Research.	64
REFERENCES	66
APPENDICES	
Appendix A: Explanation Letter Sent to Parents of All Second and Third Grade Females.	70
Appendix B: National Center for Health Statistics Growth Charts	71
Appendix C: Cover Letter	72
Appendix D: Childhood Weight Regulation Questionnaire.	73
Appendix E: Response Sheet for Parents Desiring a Summary of Results.	85
Appendix F: Question-Answer Sheet for Principals and Teachers.	86
Appendix G: Postcard	89
Appendix H: District Format Abstract	90
Appendix I: Codebook	92
Appendix J: Parent Letter.	99
ABSTRACT	100

LIST OF TABLES

TABLE		PAGE
1	Diseases Producing Obesity.	11
2	School Selection by Geographical and SES Representation	28
3	Questionnaire Response Rates by Group	30
4	Comparison of REDUC Scale Means Using a <u>t</u> -test.	44
5	ANOVA Comparing the Four Groups on Breastfeeding Scores.	45
6	Mothers' Knowledge of Where to Obtain Weight Control Advice for Daughter	48
7	Mother's Perception of Daughter's Cooperation with Weight Regulation	50
8	Maternal Perception of Daughter's Weight Status	51
9	Percentage of Mothers Attempting Various Weight Regulation Methods for Daughters.	52
10	Inter-Item Correlations Between Weight Regulation Treatment.	52
11	Percentage of Daughters Preparing Their Own Meals	54
12	Self-Reported Maternal Height	55

LIST OF FIGURES

FIGURE		PAGE
1	Conceptual Framework Derived from Literature Review. .	21
2	Hypothesized Model for the Prediction and Explanation of Mother's Compliance Behaviors. . .	23
3	Mean of Selected Influences Upon Maternal Decisions Regarding Infant Feeding . . .	47
4	Mean of Selected Influences Upon Maternal Decisions Regarding Childhood Weight Regulation . .	49

CHAPTER I

INTRODUCTION

Obesity, a form of malnourishment, with its social, psychological, and health-hazard implications, has been studied extensively. Although reminders of the desirability of maintaining normal weight are constantly before Americans in the media, and concern with the undesirability of being overweight is evidenced by the success of weight-control retail establishments and support groups, obesity remains a stubborn health problem.

Childhood obesity is of interest because it is particularly difficult to treat, and because the obese child is at high risk of becoming an obese adult (Coates & Thoreson, 1978; Lloyd, 1977; Myres & Yeung, 1979, Stark, Atkins, Wolff & Douglas, 1981; Weil, 1977).

Many research studies focus on the incidence, etiology, and treatment of childhood obesity. Many also focus on the relationship of parental obesity to childhood obesity, indicating the possibility of genetic, environmental, social, and psychological influences. Fewer studies have examined the reactions of parents to obesity in their children, their perceptions of the obesity as constituting a "problem," or noted the circumstances or conditions under which parents do or do not undertake corrective and preventive measures.

It is the purpose of this study to add to current knowledge in these last areas, by exploring maternal perceptions and interpretations of childhood obesity, and tendencies to take preventive and treatment

actions. Specifically, maternal perceptions of prepubescent females' weight regulation problems and parent-initiated treatment measures will be investigated.

Review of the Literature

Research studies and opinions of nutritionists, physicians, nurses, and others who work with the obese will be reviewed. Topics will include the definition of obesity, the health risks associated with adult and childhood obesity, and its incidence, implications, etiology, and treatment.

The Definition of Obesity

Obesity is defined as the excessive growth of the adipose organ due either to an enlargement of fat cell size (hypertrophic) or number (hyperplastic), or the combination of both factors (Häger, 1977). Although it has been believed that children usually exhibit hyperplastic obesity, and that the years 0 through 5 and 9 through 13 are probably the most vulnerable periods, Häger's (1977) research on 8-year-old females revealed that fat cell numbers were not related to age at onset of obesity, and that the girls had a combined type of obesity.

It is important to distinguish an overweight condition from true obesity, for adult mortality rates and other risks are related to obesity, not the presence of an overweight state. Directly biopsied fat measurements, of course, are limited to research studies and other specialized situations. Nutrition experts and physicians who have

studied obesity often recommend triceps skin fold measurement with calipers to establish fat thickness (Brook, 1977; Mayer, 1975, Myres & Yeung, 1979; Quay, 1972; Selzer & Mayer, 1967; Stuart & Davis, 1972; Weil, 1977). There are, however, limitations to the use of skinfold calipers for determination of children's fat thickness. Triceps skinfold measurements may not necessarily reflect true fat distributions, especially with respect to sexual differences and individuals in athletic training (Lowe, Coursin & Heald, 1966).

While skinfold thickness measurements have been correlated with body density in adults, Lowe et al. (1966) indicated that uncontrolled variables such as skin compressibility and flux in subcutaneous fat thickness present in growing children reduce the precision of such correlations.

Additional problems with usage of calipers in children are the variability found between successive measurements (Rowe, 1980) and the lack of reference data for American children of all ages (Hamill & Moore, 1976). Caliper readings are best suited to monitor fat thickness in children over a period of time in conjunction with growth charts (Rowe, 1980).

The 1976 National Center for Health Statistics (NCHS) growth charts were developed using computerized data on contemporary American children of all income levels and ethnic backgrounds, and are best utilized for prepubescent children. Hamill and Moore (1976), who developed these tools, recommend that children who fall below the 10th or above the

90th percentiles, or who change more than 25 percentile points on the weight for length chart between measurements should be checked for accuracy of measurement. They indicate that weight for length or height above the 95th percentile suggests obesity. Garn and Clark (1975) also recommend use of the percentiles rather than standard deviations, due to skewed fatness values.

DuRant and Linder (1981) reviewed and researched various indices used for assessment of children's body weight and concluded that skin-fold measurements lacked internal validity with respect to measurements of direct fat thickness. They stated that obese children do not lose triceps skinfold fat when they lose weight. One difficulty they indicated with respect to the NCHS growth charts is that very obese children will exceed the highest percentiles on these charts. Once a state of obesity is reached (i.e., on or above the 95th percentile of weight for height) it becomes impossible to indicate relative body weight. Their research showed the weight-for-length index to be most useful for measurement of relative body weight.

The definition of obesity as a specific cutoff point in percentiles remains equivocal and nonstandard, since weight for length or height is a continuum. The Ten State Nutritional Study did elicit valuable information about the upper 15% of the percentiles. Children from the 85th to the 95th percentiles were taller, more developed physically, had a higher fat-free weight and larger skeletal mass, and shared higher income levels than those children falling in lower percentile

categories. The highest 5%, while exhibiting the same growth patterns, tended to be from lower income levels (Garn & Clark, 1975). Differential fatness gain in low-income children was also observed by Garn, Hopkins and Ryan (1981) in a longitudinal study, which revealed especially large gains of adipose tissue in adolescence.

Health Risks Associated with Obesity in Adults

Obesity is a health problem of considerable magnitude in the United States. Some 20% of all adults are obese when compared to traditional adult standards delineating obesity: they exceed "ideal" weight for height by 120% (DeLameter, 1981).

Why is obesity undesirable? Data gathered by the Metropolitan Life Insurance Company have shown that obese persons have, on the average, a 50% higher risk of death before the age of 65 than non-obese persons. Mortality of obese persons is more likely to be the result of diabetes, cirrhosis, biliary calculi, and cardiovascular-renal disease than mortality of non-obese persons. The obese are five times more likely to be hypertensive than the non-obese (Osancova, 1975). Because obese persons are less physically active than those of normal weight, they are also at higher risk for development of coronary and cerebral arteriosclerosis (Stuart & Davis, 1972). Obesity also increases surgical anesthetic risks and hazards of abnormal pregnancy (Osancova, 1975). The increased mechanics of carrying extra weight is believed to be the cause of the osteoarthritis more common in adult obese patients than non-obese (Merritt, 1982).

Incidence of Childhood Obesity

Stark et al. (1981), whose longitudinal study followed the heights and weights of 5,362 British children for 26 years, found that the incidence of children who exceeded standard weight for height by 20% or more increased for each age group over six years of age. Prevalence of obesity in females increased from 2.9% of 6-year-olds to that of 9.6% of 11-year-olds. Fewer males were obese at all childhood ages. Humphrey (1979), who conducted a study of height-weight disproportion in 1,953 elementary school-aged American children, found a similar trend, though the percentages of children above the 90th percentile on NCHS growth charts ranged from 10.6% of 5-year-olds to 15.6% of 11-year-olds. Humphrey's population was less diversified in nature than that of the British study.

Implications of Childhood Obesity

Do obese infants become obese children and obese adults? Experts are not in agreement on this matter, for it has been shown that there is no critical time period for the development of fat cell numbers or size (Merritt, 1982), but they caution that fatness persisting into prepubescence poses significant threats to a child's adult weight status.

Weil (1977), after consideration of data from nine separate studies, concluded that, although most adult obesity does not originate in childhood, there is a significant tendency for obese children to become obese as adults when compared to children who are not obese. Coates and Thoreson (1978), who reviewed the Haggerstown prospective study and

Stunkard and Burt's (1967) research on overweight adolescents, indicated that the overweight child had twice or more the risk of being overweight as an adult than a child of average weight. Lloyd's (1977) review indicated that 20% of infantile obesity would persist into adulthood. Myres and Yeung (1979) reviewed a number of studies and concluded that children who do not outgrow infantile obesity by the age of five had a high risk of its persistence. Stark and associates (1981) conducted an extensive 26-year longitudinal cohort study of over 5,000 British children. Data collected during this survey indicated that the risk of persistent fatness was related to the degree of fatness in childhood, and that 40% of overweight 7-year-olds became overweight adults. Merritt (1982) notes that while most infants demonstrating rapid weight gain return to normal weight during the preschool years, additional risk factors such as parental obesity interact with infantile obesity to increase the likelihood of childhood obesity. He states that approximately one-third of adult obesity originates in childhood and adolescence.

The results of many studies, then, suggest that there is no optimal age during childhood to predict overweight status as an adult, but overweight children are more likely to be so as adults than children of normal weight.

Children who are obese not only have an increased risk of remaining so throughout their lives, but also have increased risks to their physical and psychological health. Depressed growth hormone release, hyperinsulinemia and carbohydrate intolerance have been associated with

childhood obesity (Coates & Thoreson, 1978). Obesity has been shown to be one of several factors relating to essential hypertension in childhood (McLain, 1976). Shick (1981) documents a variety of studies relating hypertension levels in children to relative weight, reporting an incidence of 27.3% hypertension in children at or above the 90th percentile on the NCHS growth charts.

Merritt (1982) identifies other health problems associated with childhood obesity, citing increased rates of respiratory infection observed in obese infants during their first year. He indicates that the increased incidence of slipped capital femoral epiphyses, Legg-Calve-Perthes disease and genu valgum seen in obese children versus those of normal weight are thought to be largely mechanical in nature. Orthopedic complaints and pains and dyspnea upon activity experienced by even moderately fat children may lead to secondary inactivity, further compounding the development of progressive obesity (Bruch, 1975).

Psychological trauma clouds the obese child's youth significantly. Obese children may experience increased peer and adult rejection, develop poorer self-concepts with greater body-image disturbances, and manifest greater incidence of disturbed personality characteristics than children of normal weight (Coates & Thoreson, 1978).

Obesity handicaps children with an "undignified" condition which is poorly accepted by other children and adults. Bruch (1975) indicated that from her observations of large numbers of obese children about two-thirds have associated inadequate personality development or

psychiatric illness. Although not uniform conditions in nature, in general those children whose families had been unable to cope with conflicts and tensions and had most rigorously enforced dieting or medicinal treatments for the developing obesity seemed to fare the worst in the long term, while those with congenial, stable family relationships fared better.

Furthermore, while research on age of onset of body image disturbances revealed that elementary school age children were subjected to much derogatory criticism by peers and parents, obese adolescent females suffered more severely from significant disturbances in body image, primarily due to the pressures and demands of integrating with the opposite sex (Stunkard & Burt, 1967). Wineman (1980) reported Nathan's work on childhood body image development which showed that obese children "failed to develop an organized, differentiated and inner sense of self and of integrity" (p. 232).

Recent research by Edelman (1982) has shown that even Kindergarten-aged children recognize childhood obesity as a negative state to be avoided. By the age of six, half of the children interviewed were able to relate obesity to particular types of food. However, the need for recognition of activity in body weight regulation maintenance was less often elicited from the children. Edelman (1982) noted that even the youngest children felt the obese person could and should be "in control" of weight regulation, and that obesity was a stigma upon character for that reason. Social ramifications, rather than health reasons, were

consistently given as the reason for desirability of a normal-weight status.

The concept of obesity as a stigma deserves attention, for obese children feel shamed by society for their bulk, although not all have disapproving families (Tobias & Gordon, 1980). They often feel that the people around them do not see past their weight to their favorable attributes. Many lack inner security to help them cope with the negative social attitudes around them. It may be difficult for them to understand that thin persons experience feelings of loneliness. Obese children often tend to turn to others with the same plight. Thus, opportunities for attainment of social interaction skills are narrowed. Tobias and Gordon (1980) recommend multidisciplinary evaluation including mental health assessment for obese persons prior to weight reduction. Bruch (1975) states that physicians should be aware of and sensitive to family stability, warmth, and satisfaction with one another, and that weight reduction may be better postponed when psychiatric intervention is indicated.

Adults and peers obviously contribute, then, to the social stigma felt by an obese child. But health professionals may also project negative social assessment to obese children. Research dealing with attitudes of professionals suggest that they perceive obese persons as society does, rather than from the basis of educational knowledge attained regarding obesity. Professionals who had themselves lost and maintained weight or whose families had experienced success in the

matter held more favorable, realistic attitudes toward the obese (Maiman, Wang, Becker, Finlay & Simonson, 1979).

The Etiology of Childhood Obesity

Less than 5% of obese children have underlying diseases contributing to or causing the obesity. These are reproduced in the following table from Merritt (1982, p. 28).

Table 1
Diseases Producing Obesity

Central nervous system damage (Fröhlich's syndrome)
Trauma
Tumor
Postinfectious
Endocrinopathies
Hypothyroidism
Insulinoma
Cushing's syndrome
Exogenous corticosteroids
Mauriac syndrome (diabetes with excess insulin administration, characterized by short stature and hepatomegaly)
Congenital syndromes
Prader-Willi (see text)
Laurence-Moon-Biedl (mental retardation, short stature, polydactyly, hypogonadism, retinitis pigmentosa, deafness)
Alstrom's (deafness, diabetes-mellitus, retinitis pigmentosa, short stature, hypogonadism)
Vasques (males with X-linked short stature, mental retardation, hypogonadism, gynecomastia)
X-chromosome disorders
Pseudohypoparathyroidism
Pseudopseudohypoparathyroidism

Children with hormone deficiencies or genetic syndromes are differentially diagnosed by their extremely short statures and delayed bone ages. In addition, those who have the genetic syndromes exhibit marked mental deficiency, as well as other physically observable features, such as polydactyly and hypogonadism found in the Laurence-Moon-Biedl syndrome or the hypotonia and hypogonadism of Prader-Willi's syndrome (Golden, 1979).

Most obese children of average or above average height, then, are classified as exogenously obese with no single cause. Brook (1977) indicates that studies on monozygotic twins show heritability of fatness has high genetic components. Exogenous obesity is not related simply to overeating, for, in fact, obese children have not been shown consistently to eat more than their non-obese peers (Golden, 1979; Lloyd, 1977; Merritt, 1982; Quay, 1972). Indeed, scientists remain at present unclear as to the processing of specific peripheral metabolic, hormonal, and central nervous system signals which produce feeding behaviors leading to obesity. A small chronic metabolic imbalance is all that is needed to produce obesity. Recent research centers upon theories of increased metabolic efficiency in the obese, enhanced adipose tissue triglyceride synthesis, and retarded adipocyte lipolysis, dramatically seen in triglyceride storage disease (Merritt, 1982).

The most striking relationship shown by the Ten State Nutritional survey and other studies is that a child's shared environment with an obese parent or parents, whether as a natural, adopted, or foster child

influences the development of obesity (Coates & Thoreson, 1978; Copeland, 1981; DeLameter, 1981; Myres & Yeung, 1979; Nutt, 1979; Weil, 1977).

Ethnic traditions and cultural patterns influence food habits and nutrition, as well as stability of family structure and interaction characteristics of the various family members (Hertzler & Vaughn, 1979). Schafer and Keith (1981) found that families with school-aged children settled into stable food and nutritional patterns and were less influenced by outside sources of information than families of preschool children. Food costs and personal concerns for health and weight were found to be the most important considerations affecting food habits and nutrition in their study. Jerome (1982), however, emphasizes that dietary patterning is a continuous process, changing with social, cultural, technological, and economic trends, with families adopting new foods and food uses, modifying traditional practices, and leaving still others unchanged.

Winckler (1978) points out that prosperity and the availability of a multiplicity of processed and precooked foods and powerful media advertising for such foods may make it difficult for many mothers to feed their children nutritious foods. In addition, she notes that it is easier for children involved in organized sports to get exercise.

Velocity of weight gain in infants' first four months is higher than at any other time in life. Researchers have examined infant feeding practices and found relationships to later weight status inconclusive. Clinicians need to remember that this rapid growth requires much energy

consumption and put it into the perspective of the magnitude of a normal infant's growth (Lasky & Eichelberger, 1982).

The use of bottle feeding and the early introduction of semi-solid foods in the infant diet are thought by some to contribute to infant overfeeding (Myres & Yeung, 1979; Nutt, 1979), although Weil (1977) does not believe current evidence supports this view. Himes (1979) reviewed a number of studies of infant feeding practices versus obesity and concluded that, although bottle-fed infants in societies such as America exhibit weights of 200-500 grams higher at the end of the first year of life, increases of that magnitude did not constitute obesity. He reviewed a number of infant weight gain studies and found the data "muddled by confounding factors" (p. 124) and without reasonable conclusions. Small sample sizes, vague definitions of "completely breast-fed" infants, and lack of correlation to socioeconomic differences were cited as problems with the studies.

Increased caloric density of formulas and semi-solid foods has been implicated by some authors, but Himes (1979) found that, indeed, commercially prepared milk-based formulas had lower caloric densities than breast milk, and that the only commercially prepared strained baby foods having higher densities than breast milk were desserts, meats, and egg yolks, which are not normally used in great amounts nor introduced until the latter half of the first year.

Bottle feeding can lead to increased solute loading of the infant. Increased solute loads can stimulate thirst, which may be quenched with

another bottle of formula instead of water. Himes (1979) indicated that more research needs to be done to establish any correlations existing between increased solute loads and infant weight gains.

Pediatric literature now advocates an iron-fortified formula for those infants not breast-fed for a full year, and addition of solids from 6-12 months of age. Crummette (1980) found that infant's mothers relied upon their past experiences with nutrition, their own mother's advice, and the advice of health professionals to help them make decisions about infant nutrition. She found that printed materials had some influence, but learning experiences in a formal setting and radio and television materials had limited or little applicability to the mother's decisions about infant nutrition.

There is widespread agreement that physical activity levels are diminished in obese infants, children, and adults, and that this is an important factor in maintaining the excess weight (DeLameter, 1981; Myres & Yeung, 1979; Weil, 1977).

The Copelands (1981) discuss psychological theories relating to the etiology of childhood obesity. These include maternal beliefs that "a fat baby is healthy," maternal overfeeding due to obsession about growth failure, passive maternal interaction with the child leading to less stimulation and more inactivity, and maternal preoccupation with personal problems leading to unrealistic gauging of the child's hunger. Morris et al. (1982) investigated maternal behaviors relating to misinterpreting of infants' cues for hunger and satiety. While they did

not find a relationship between the mothers who indicated difficulty in assessment of their infants' varying cues and subsequent thickness of body fat at nine months of age, they cautioned that mothers need instruction in understanding feeding behaviors.

Lasky and Eichelberger (1982) indicate that the preschool period is one of vulnerability for increased pressure from parents upon their child to increase eating portions. Decreased appetites common to the preschool child and the child's use of the eating of food as one more aspect of life he is able to control can lead to conflict. The parent can excessively reinforce eating behaviors and set up patterns that may affect the child's later life.

Influences of external stimuli upon the child to eat, rather than internal stimuli of hunger, and maternal use of food as a reward or punishment, speed of eating (Myres & Yeung, 1979), and use of food as a tension-reliever, a show of affection, or for getting attention (Weil, 1977) have been implicated in the etiology of childhood obesity. Still another view is the psychoanalytical one that the child may fail to progress from the oral to the anal stage of development and, using food as self-gratification, become a compulsive eater (Copeland, 1981).

Childhood obesity, then, is usually of multifactorial nature. Genetic and environmental factors have been implicated in its etiology. Little is positively certain except that the child with obese parents remains at the highest risk of developing persistent obesity.

Treatment of Exogenous Childhood Obesity

Authorities differ in their recommendations for the prevention and treatment of childhood obesity. At one extreme are Pisacano, Lichter, Ritter, and Siegal (1978), who advocate the Prudent Diet for infants beginning at age three months. In their opinion this diet does not deter normal growth and development. Their diet differs from traditional infant diets by the elimination of most animal fat. Other experts, however, caution against any type of dietary restriction before the end of the first year of life to avoid compromising linear growth (Filer, 1978; Weil, 1977). Hammar (1975) advocates attempts to slow a fat infant's rate of weight gain by offering water in between formula feedings to keep caloric intake at 110-120 cal./Kg. per day for the first six months, and by using 16 cal./oz. formulas the second six months, planned nutritional snack items for toddlers, and by discouraging playpen usage and encouraging family walks, hiking, swimming and other activities.

Smicklas-Wright and D'Augelli (1978) developed an interdisciplinary preschool obesity prevention plan which involved parents and children in the development of habits of nutritious food selection, "thin" eating styles, and encouragement of lifelong activities. "Thin" eating styles include slow chewing, moderate-sized portions, recognizing actual hunger versus eating because of expectations, and are part of behavior modification programs for the obese.

Drug therapy for treatment of obesity is contraindicated in children under 12 years of age (Grollman, 1975). It is encouraged only as a temporary adjunct to dietary management in adults.

Weight maintenance, or reduction, depending upon the severity of the adiposity, through increased physical activity coupled with moderate caloric restriction in a family therapy setting using behavior modification is the preferred method for treatment of childhood obesity (Copeland, 1981; Golden, 1979; Weil, 1977). Ravussin (1982) indicates that physical exercise is an important adjunct to caloric restriction to maintain lean body mass of obese individuals during weight reduction. Brownell and Stunkard (1978) reviewed six research studies dealing with behavioral treatment of childhood obesity and suggested that preliminary evidence pointed toward its success.

Behavior modification has as its basis the belief that behavioral disorders are learned coping responses occurring within a social and cognitive environment. Obese persons are taught to analyze their eating behaviors and the stimuli which cause them to eat, and then adapt eating patterns and reinforce them positively. Self-monitoring of eating patterns and stimuli has been introduced into behavior modification of obese children successfully (Brownell & Stunkard, 1978).

Stimulus control includes not keeping high-calorie snacks around the house and limiting accessibility to food that must be kept there. Spare change which could be used for impulse-buying of snacks is kept to a minimum. Eating is confined to certain places and scheduled times (Brownell & Stunkard, 1978).

Specific measures to slow down eating include setting down utensils between bites, slowing chewing, waiting in between swallowing and taking the next mouthful of food, and tasting and savoring each spoonful or bite (Brownell & Stunkard, 1978).

It is important for parents to institute frequent rewards for a child's efforts. These might include toys, allowances, extra TV privileges, or attendance at special events. Contracting with children for rewards has been successful, especially if done with a therapist (Brownell & Stunkard, 1978). Special attention to self-esteem development and the fostering of healthy peer relationships eases the psychological trauma these children experience (Copeland, 1981).

Jonides (1982) reported upon a successful 10-week, cost-effective behavior modification program for obese and overweight school-aged children using a group approach in a private practice setting. The percentage overweight of the group decreased over both the duration of the 10-week program and at the end of one year.

Weil (1977) indicated that children who most need treatment are those with family histories of cerebral vascular accident, diabetes mellitus, hyperlipidemia, and with one or more obese parents. He suggested that the vast proportion of time, effort, and money spent on weight reduction is used for those children least at risk, who are less than 20% overweight. Humphrey (1979) concluded from a study of incidence of obesity in children of elementary school age that few obese children were receiving treatment for their condition. Lloyd (1977) reported on Scott's findings that only 1 of 15 obese children aged 10 years had been referred to a physician, and only one-third had been given dietary advice.

A number of respected nutritionists and physicians who have studied childhood obesity advocate a school-based weight control program. Collipp's (1975) Long Island, New York program does use moderate caloric restriction in conjunction with vigorous physical exercise, as he found caloric restriction necessary to weight reduction of obese children. At that 1975 writing, his program had been functioning for four years in one school district, and for one to three years in other districts. Brownell (1982) instituted a similar, but shorter 10-week program in Florida for research purposes and found that a control group of obese children not involved in the program gained weight during the 10 weeks while 94% of the "program" group lost at least two pounds, and 79% lost five or more pounds.

A major limitation of any sensible weight-reduction program is loss of compliance due to the slow weight loss. It may take six months to two years for a child's weight to normalize under moderate dietary restriction (Merritt, 1982). Retrospective studies of adults who as children experienced successful weight reduction reveal that few are able to maintain desirable weights. Most successful are those adults who as children had relatively low total adipocyte numbers (Merritt, 1982).

Summary

The definition of, health risks, incidence, implications, etiology, and treatment of childhood obesity have been reviewed. A shared environment with obese person(s) has been most specifically implicated

in its etiology. Moderate caloric restriction, nutrition education, increased physical exercise, and behavioral modification are preferred treatments.

Conceptual Framework

From the review of the literature the following conceptual framework for this study emerges:

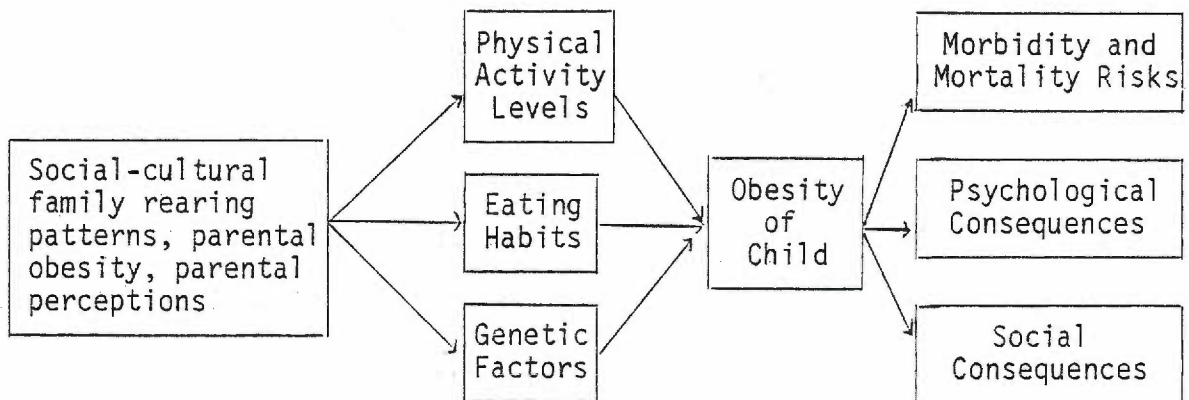


Figure 1: Conceptual framework derived from literature review.

This study examines the aspects of maternal perception of childhood weight regulation problems and maternal preventive and treatment behaviors. The child's possibility of a shared environment with one or more overweight or obese parents is viewed as leading to factors which contribute to his or her development of exogenous childhood obesity. Possible outcomes of that condition are increased morbidity and

mortality rates, especially if the obesity is a persistent condition, and psychological and social consequences related to poor self-image and peer and adult rejection.

Health behaviors can be explained theoretically by the health belief model (Becker, Maiman, Kirscht, Haefner & Drachman, 1977) which predicts a patient's behavior upon the basis of the "individual's valuation of an outcome and the expectation that a specific action will result in that outcome" (Becker et al., p. 349). Indeed, Becker's modified model includes maternal perceptions as part of readiness to undertake recommended compliance behaviors (Figure 2). His research on black lower class Eastern American families' compliance with a dietary regimen for juvenile obesity indicated that the health belief model could be used as a predictor to future weight loss based upon maternal answers to questions drawn from the model.

Statement of the Problem

While many studies have focused upon the incidence, etiology, and treatment of childhood obesity, few have examined the parental perceptions of developing childhood obesity, the types of treatments initiated by parents on their own volition, or whether or not they seek professional services and advice for the treatment of this condition. Mothers undeniably influence their children's eating habits and physical activity levels (Copeland, 1981). Litman (1974) determined following

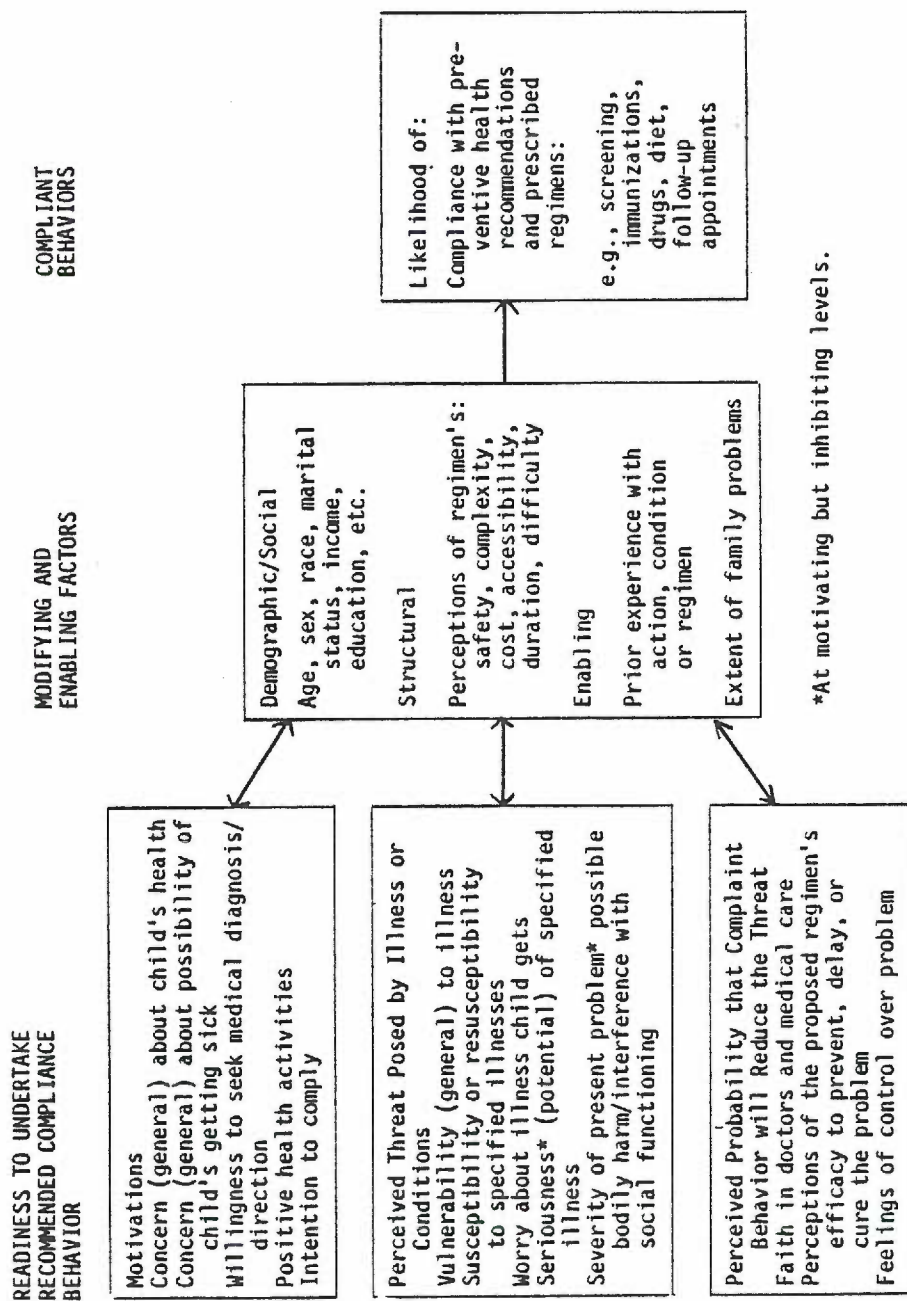


Figure 2: Hypothesized model for the prediction and explanation of mother's compliance behaviors (Becker et al., 1977, p. 350).

his research directed toward families' involvement in medical care that the mothers had the primary influence upon their children's food habits and attitudes. Maternal perceptions of a child's weight status influence the initiation of treatment measures (Nutt, 1979).

Research Questions

Infant Feeding Practices

Research Question 1. Are there relationships between infant feeding practices and the subsequent development of childhood obesity?

Research Question 2. Which factors influence mother's decisions about infant feeding? Are there relationships between those factors and a child's subsequent weight status?

Portion Control

Research Question 3. Do children of mothers who exercise control over portions, meals prepared by children, meals eaten away from home, and types of snacks consumed tend to be less overweight?

Physical Activity

Research Question 4. Do children who regularly engage in physical activity tend to be less overweight?

Perception of Daughter's Weight Status and Need for Regulation

Research Question 5. Which persons or things most influence parent's decisions regarding childhood weight regulation?

Research Question 6. Is there a relationship between a mother's perception of her child's weight status and her activities and behaviors toward childhood weight regulation?

Research Question 7. Is there a relationship between a mother's perception of her own weight status and her behaviors toward an obese condition in her child?

Interest Question Regarding Special Programs

Research Question 8. Would mothers be interested in special children's weight control programs if they were to be made available through the schools?

Hypotheses

The following hypotheses are derived from the literature review:

Hypothesis 1

Mothers of prepubescent females within the 51st to 90th percentiles of weight for height are more likely to have attempted their daughter's weight reduction using caloric restriction, increased physical activity, behavioral modification, or other special programs than are mothers of prepubescent females who exceed the 90th percentile in weight for height.

Hypothesis 2

Mothers of prepubescent females who exceed the 75th percentile of weight for height and perceive their weight as more than 30 pounds over desirable weight are less likely to have attempted their daughter's weight reduction using caloric restriction, increased physical activity, behavioral modification, or other special programs than are mothers of prepubescent females in that same percentile category whose self-perception is less than 30 pounds over desirable weight.

Implications for Nursing

Nurses come into contact with overweight and obese children in physician's offices, community health agencies, acute care settings, and schools. Effective family counseling regarding preventive and treatment behaviors can aid parents and children to make decisions about nutrition and lifestyle. Interventions at this pre-growth spurt age could be of great benefit to them, for wise nutritional planning and increased physical activity could aid them in weight maintenance through the growth spurt years preceding puberty and lead to reduction of relative obeseness by the early teenage years, when peer acceptance and self-image become more crucial to personality development.

CHAPTER II

METHODS

This study was designed for the purpose of an exploratory assessment of selected maternal perceptions and behaviors of the 234 mothers whose second and third grade daughters were of average or above-average weight. Information was collected regarding infant feeding practices, perceptions of need for weight control, perceptions of the daughters' behavior, and various weight regulation methods initiated by the mothers, either on their own volition, or acting upon the advice of others. This study was an ex post facto retrospective survey using a questionnaire (Appendix D). Threats to internal validity included those of selection and possibly history in some individual instances.

Setting and Subjects

The subjects of this study were 137 mothers of second and third grade females in varying weight categories. These 137 mothers were the 59% who returned completed questionnaires from a purposive sample of convenience consisting of 234 mothers of second and third grade females enrolled in Vancouver, Washington School District #37. They were selected following district Research Advisory Council and Superintendent approval with assistance of the district Director of Research. In order to obtain a sample representative of the district, eight elementary schools were selected from the three geographical divisions of the district. An effort to balance the sample socioeconomic status

was made by using two schools from each of four levels district-wide as measured by the percentage of subsidized lunches provided at each site (Table 2).

Table 2
School Selection by Geographical and SES Representation

Name of School	Geographical Area	% Subsidized Lunches	Females Available for Study
Felida	North	8	49
Salmon Creek	North	11	56
Hazel Dell	North	21	39
Minnehaha	Central	24	51
Ogden	East	40	35
King	East	43	24
Washington	Central	57	56
Hough	Central	60	40
			<u>350</u>

The racial composition of the Vancouver School District is 91.2% Caucasian and 8.8% minorities. Housing is predominantly single-family dwelling, although there are some apartment complexes and low-income housing units within the district boundaries. Therefore it was expected that the sample would be more homogeneous than non-homogeneous. The children are weighed and measured routinely in the fall and spring by school personnel and parent volunteers. Fall measurements were used for all children except those who had recently moved into the district.

Second and third grade females identified as available for the study were those: (a) from English speaking families; (b) with recorded heights and weights; and (c) whose parents had not denied access to the height and weight information. Handicapped children were also excluded. Weight for height percentile was identified, and those 126 females whose weight for height was below the 51st percentile were discarded from the study. The remaining 234 females were placed in the following four categories, based upon their weight for height in accordance with NCHS growth chart percentiles:

- Category A: 104 females within the 51st through 75th percentiles
- Category B: 68 females within the 76th through 90th percentiles
- Category C: 33 females within the 91st through 95th percentiles
- Category D: 29 females who exceeded the 95th percentile.

Questionnaire Response Rates

Response rates of the four groups are of interest to the researcher. While an overall response rate of 59% was achieved, when rates of the four groups are contrasted it is evident that Groups C and D varied considerably (Table 3). Three of the respondents chose not to complete the questionnaire, therefore, the final number of subjects decreased to 137.

Table 3
Questionnaire Response Rates by Group

Group	No. Questionnaires Mailed	No. Questionnaires Returned	% Returned
A	104	62	59.6
B	68	42	61.7
C	33	22	66.6
D	29	14	48.2
	<u>N = 234</u>	<u>N = 140</u>	<u>M = 59.8</u>

Demographic Characteristics of Respondents

Age of daughters. Group D daughters were oldest in the study ($M = 8.69$ years), however, all groups' mean ages for the other three groups were within the 8-year-old range ($M = 8.38, 8.17,$ and 8.04 years for groups A, B, and C, respectively).

Mother's educational level. Mothers in Group D indicated the lowest mean educational level of the four sets ($M = 12.23$ years), and Group B the highest ($M = 13.17$). There were no significant differences among the means of the four groups on educational level ($F(3, 131) = 1.75, p = .16$).

Income of families. Incomes were very homogeneous among groups, with the average income for all groups in the \$15,000 to \$19,000 range ($F(3, 127) = .15, p = .93$). Income reversal reported in the literature

for mothers of children exceeding the 95th percentile in weight for height (eg., Garn & Clark, 1975) was also the case in this study, as Group D mothers reported the lowest mean income ($M = 3.9$, coded within the \$10,000-\$14,000 range).

Family size. Family sizes reported ranged from 2 to 7 persons, but all four groups' mean family size was slightly over 4 persons ($M = 4.3, 4.21, 4.1, \text{ and } 4.23$ for Groups A, B, C, and D, respectively). There were no significant differences among the means of the four groups on family size ($F(3, 128) = .20, p = .90$).

Materials Provided to School Personnel

Although school personnel were not involved in the study, principals and teachers of the second and third grade females were given copies of the questionnaire (Appendix D) and a question and answer sheet (Appendix F) to assist them should students or parents contact them. Principals received additional materials from the district Director of Research immediately prior to the implementation of the study. These consisted of a letter explaining the validity of the researcher's permission to conduct the study and a district-format abstract of the study (Appendix H).

Instruments

Two instruments were used to obtain data for this study. They were the National Center for Health Statistics growth charts containing percentiles of prepubescent female physical growth (Appendix B) and the Childhood Weight Regulation Questionnaire (Appendix D).

NCHS Growth Charts

The development of these charts was discussed previously in the literature review. Since they have been developed using recent measurements of large numbers of American children, they have high validity. Threats to reliability include errors in measurement encountered when the children were weighed and measured.

Childhood Weight Regulation Questionnaire

This 28-item instrument (Appendix D) was developed by the researcher utilizing the literature review, faculty assistance, and Dillman's (1978) suggestions for order and appearance. Questions were derived from the literature review, research questions, and hypotheses. Questions 1 through 4 deal with infant feeding practices, 5 through 9 are concerned with portion control and snacking habits, 10 through 12 with physical activity status, 13 through 23 with perceptions of the child's weight status, need for regulation, and methods of weight regulation attempted by the mothers. Questions 24 through 26 are demographic in nature. Question 27 asks the mother to perceive her own weight status, and question 28 pertains to interest in school-based children's weight control programs. The questionnaire was piloted with 18 mothers to ascertain its clarity. The data from the questionnaires were coded and entered into a computer using the coding layout presented in Appendix I.

Procedure

A letter (Appendix A) explaining briefly the nature of the study was sent home with all English-speaking second and third grade girls on May 19, 1983. Parents who did not desire their daughter's height and weight card examined were given a week's time to respond via a detachable permission denial slip. Ten parents did return the slips denying such permission. On May 26 and 27 the researcher traveled to the eight schools and examined height and weight cards allowed. Each female available for the study was identified as to weight for height percentile using NCHS growth chart percentiles (Appendix B). The 126 females whose percentile categories were below the 51st percentile were eliminated from the study. The remaining 234 females were placed into Categories A through D as previously delineated.

A cover letter (Appendix C), a 28-question questionnaire (Appendix D), and stamped envelope addressed to the researcher were mailed to the mothers of the selected females using computer-generated labels provided at cost to the researcher by the school district. Each questionnaire was precoded as to weight status category and subject number, and its return implied consent to be included in the study. Participants desiring a synopsis of the results of the study were invited to submit their names and addresses on a separate piece of paper (Appendix E) and mail back with the questionnaire. Seventy-seven percent of the respondents desired a synopsis of the major study findings. Thus, a letter was mailed to those requestors (Appendix J).

One week past the initial mailing date a postcard (Appendix G) was mailed to all subjects in the study, in accordance with Dillman's (1978) recommendations. It thanked those who had responded and reminded those who had not responded of the importance of the return of all questionnaires.

Measurement of the Independent Variable

Hypothesis 1

The independent variable for hypothesis 1 was weight level of the daughter and was measured by the percentile categories into which the daughters belonged. These were previously defined as Categories A, B, C, and D under Setting and Subjects, page 29. These categories were determined by usage of the NCHS growth charts. Selected statistical computations were accomplished by grouping those 104 females in Categories A and B together (Group AB), and those 36 females in Categories C and D together (Group CD).

Hypothesis 2

The independent variable for hypothesis 2 was the mother's perception of her degree of overweight and was measured by the weight categories in which the mothers placed themselves (Appendix D, Question 27), defined as follows:

- Category 1: Perceives herself as underweight for height
- Category 2: Perceives herself as at desirable weight for height
- Category 3: Perceives herself as 1-15 pounds overweight for height
- Category 4: Perceives herself as 16-30 pounds overweight for height
- Category 5: Perceives herself as 31-45 pounds overweight for height
- Category 6: Perceives herself as 46 or more pounds overweight for height

The 106 women who placed themselves into Categories 1 through 4 were put into one large group (Group I) for the purpose of statistical calculations. The 29 women who placed themselves into Categories 5 and 6 composed the second large group (Group II).

Measurement of the Dependent Variable

Hypothesis 1 and 2

Hypothesis 1 and 2 used the same dependent variable, the mother's attempts to reduce her daughter's weight gain, and was measured by responses to four items regarding caloric restriction, increased physical activity, behavioral modification, or other special weight reduction or maintenance programs. These aspects of weight reduction attempts were ascertained in response to Question 19, Appendix D. The 30 mothers who responded to this question were assigned scores of 0(Never), 1(Rarely), 2(Sometimes), and 3(Often). The 10 mothers who responded to Question 17 ("Have you tried to reduce the amount of weight your daughter was gaining?") with a "no" answer were assumed to have scores of 0 for each of the weight reduction areas.

A scale, REDUC, was composed of the averages of the first 5 responses to Question 19 (Appendix D). For the REDUC scale, a score of 3 indicated the weight reduction methods were attempted often, a score of 2 indicated sometimes, 1 rarely, and a score of 0 for never. Cronbach's coefficient alpha indicated a reliability of .70 for this scale.

Measurement of Other Variables of Interest

Infant Feeding Practices

Question 1: Each month, through 6 months of age, was scored as follows: 0(milk other than formula, formula), 1(mostly formula, some breast), 2(mostly breast, some formula), or 3(breast entirely). The average of the monthly scores was computed to obtain an individual breastfeeding score for each subject's daughter.

An infant feeding scale, FEED, was computed by averaging responses to the seven items (Newborn, months 1 through 6) included in Question 1 (Appendix D). For the FEED scale, a score of 3 indicated that the mother breastfed her daughter entirely, 2 that the child was mostly breastfed, 1 that the child was mostly formula-fed but continued to breastfeed occasionally, and 0 that the child was entirely formula-fed. Cronbach's coefficient alpha indicated a reliability of .96 for the FEED scale.

Question 2. This question contains nominal data and was measured by reporting type of milk used for each individual.

Question 3. Each subject's daughter was given a "solids" score corresponding numerically with the month solids were begun, ie.: 1(1st month), 2(2nd month), etc., to a maximum score of 8(8th month or later).

Question 4. Each subject's daughter was assigned a score for each item regarding influences upon the mother's decisions about infant feeding as follows: 0(no influence), 1(a little), 2(moderate), or 3(great deal).

Portion Control

Question 5. This item was scored by assigning the following numbers to the responses: 0(fills own plate) or 1(plate filled by adult).

Question 6. Each subject's daughter was assigned scores reflecting amount of control over evening meals as follows: 0(four or more meals per week away from home), 1(two or three), or 2(1 or less).

Question 7. Subject's daughters were assigned a score for each of the three daily meals as follows: 0(never), 1(rarely), 2(sometimes), or 3(often).

Question 8. Each subject's daughter was given a score of 0(seconds of any food allowed), 1(seconds of some foods allowed), or 2(no seconds allowed).

Question 9. Each snack item was scored as follows: 0(never), 1(rarely), 2(sometimes), or 3(often). Each of the snack items was assigned to one of two general categories: wholesome vs. empty-calorie.

Wholesome and empty-calorie scores were computed for each subject's daughter.

Two snack subscales were devised. The first, SNK1, was composed of the average of responses to eight higher-calorie, lower-nutrition snacks (Question 9, Appendix D): cookies, soda pop, chips, cakes, candy, ice cream, pie, and popsicles. For the SNK1 scale, a score of 3 indicated that these items were eaten often, 2 sometimes, 1 rarely, and 0 never. The alpha reliability for this scale was .79.

The second snack subscale, SNK2, was composed of the average of responses to nine lower-calorie, higher-nutrition snacks (Question 9, Appendix D): fruit, cheese, crackers, vegetables, popcorn, yogurt, cereal, bread, and peanut butter. Scores for the SNK2 subscale were assigned to the same values and interpretations as those for SNK1. The alpha reliability of this scale was .74.

Physical Activity

Question 10. Each individual response was given a score of 1(item checked) or 0(item not checked).

Question 11. Each individual sport response was given a score of 1. A total sports score was computed for each subject's daughter.

Question 12. This item was scored as follows: 0(unable, does not have), 1(rides rarely), 2(moderate amount), or 3(frequently).

Perception of Daughter's Weight Status and Need for Regulation

Question 13. Responses to this question placed the daughters in perceived percentile categories. Each individual was scored as follows: 1(underweight), 2(at desirable weight), 3(1-9 pounds overweight), 4(10-19 pounds overweight), 5(20-24 pounds overweight), or 6(25 or more pounds overweight).

Question 14. The responses to this question consisted of nominal data and were scored as 0(no) or 1(yes).

Question 15. Responses were given scores of 1(slight problem), 2(moderate problem), or 3(serious problem).

Question 16. Responses were assigned scores on the following basis: 1(birth-11 months), 2(1-2 years), 3(3-4 years), 4(5-6 years), 5(7-8 years), or 6(9 years or older).

Question 17. Responses were nominal data format and were reported using scores of 0(no) or 1(yes).

Question 18. Each influence was scored as follows: 0(no influence), 1(a little), 2(moderate), or 3(great deal).

Question 19. This question's scoring was previously outlined under Measurement of the Dependent Variable, page 35.

Question 20. Responses were scored as follows: 0(even faster), 1(same rate), 2(slowed a little), 3(slowed moderately), 4(slowed considerably), or 5(lost a few pounds).

Question 21. Responses were scored corresponding to the number of years of weight control attempt, i.e., 1(past year), 2(2 years), etc.

Question 22. A discouragement score was computed by assigning numerical values to each response as follows: 1(strongly disagree), 2(disagree), 3(no opinion), 4(agree), or 5(strongly agree). A total discouragement score was computed for each individual.

Demographic Variables

Question 23. Numerical age of the daughter was the score for this demographic question.

Question 24. The subject's highest grade completed was the score.

Question 25. Responses to the income-range question were scored as follows: 1(under \$4,999), 2(\$5,000-\$9,999), 3(\$10,000-\$14,999), 4(\$15,000-\$19,999), 5(\$20,000-\$24,999) or 6(\$25,000 or more).

Question 26. Family size was reported assigning one number for each person listed, plus 2 for the mother and daughter.

Mother's Perception of Her Own Weight and Special Program Interest Question

Question 27. This question was discussed previously under Measurement of the Independent Variable, Hypothesis 2, page 34.

Question 28. This interest question was not scored numerically, as the data is nominal in nature, but was reported by either a 0(no) or 1(yes).

Data Analysis

Hypothesis 1

Student's t-test was performed to compare the means of the Group AB mothers with the Group CD mothers on the REDUC scale.

Hypothesis 2

Using only those mothers whose daughters exceeded the 76th percentile in weight for height, a t-test was performed to compare the mean REDUC scores of those mothers perceiving themselves as 30 pounds overweight with the mean scores of those mothers perceiving themselves as 31 pounds or more overweight.

Research Questions for Other Variables of Interest

Infant feeding practices. ANOVA's were computed to compare the means of Groups A, B, C, and D on scores obtained from Questions 1, 3, and 4. A Chi-square was performed to examine the relationship between the four groups and responses obtained from Question 2.

Portion control. ANOVA's were computed to compare the means of Groups A, B, C, and D on data from Questions 6, 7, and 9. Chi-squares were used to examine the relationship between the four groups and responses obtained from Questions 5 and 8.

Physical activity. ANOVA's were computed to compare the means of Groups A, B, C, and D on data obtained from Questions 11, 12, and 13. A Chi-square was performed to examine the relationship between the four groups and responses from Question 10.

Perceptions of need for weight reduction. ANOVA's were computed to compare the means of Groups A, B, C, and D on data obtained from Questions 15, 16, 18, 20, 21, and 22. Chi-squares were performed to examine the relationships between the four groups and responses from Questions 14 and 17.

Demographic variables and interest question. Data obtained from Questions 23, 24, 25, 26, and 27 were reported by mean scores of each of the four groups of daughters, A, B, C, and D.

For ANOVA's with significant F values, post-hoc comparisons of means were accomplished through the use of the Neuman-Keul's procedure.

CHAPTER III

RESULTS

This chapter presents tests of the two hypotheses, results pertaining to the research questions, other correlations obtained from statistical computations of the data, and descriptive data relating to the thesis. Significance levels of .05 or less are reported. However, since this was an exploratory study, selected findings with a significance level of $\leq .10$ are mentioned.

Hypothesis 1

Hypothesis 1 states that mothers of prepubescent females within the 51st through 90th percentiles of weight for height are more likely to have attempted their daughter's weight reduction using caloric restriction, increased physical activity, behavioral modification, or other special programs than are mothers of prepubescent females who exceed the 90th percentile in weight for height. It was predicted that mothers of Group CD females would have attempted fewer weight control measures than Group AB mothers. This hypothesis was tested by computing a t-test comparing the means of the two groups of mothers on the REDUC scale. Contrary to the hypothesis, there was not a significant difference between the weight reduction attempts of the two groups of mothers: $t(26) = -.01$, $p = .99$. Hypothesis 1, therefore, was not supported (Table 4).

Hypothesis 2

Hypothesis 2 states that mothers of prepubescent females who exceed the 75th percentile of weight for height and who perceive themselves as more than 30 pounds over desirable weight are less likely to have attempted their daughter's weight reduction using caloric restriction, increased physical activity, behavioral modification, or other special programs than are mothers of prepubescent females in the same percentile category, but who perceive themselves as less than 30 pounds over desirable weight. It was predicted that of mothers whose daughters fell in Groups B, C, and D, those who perceive themselves as 31 pounds over desirable weight for height would have attempted fewer weight reduction measures for their daughters than those mothers perceiving themselves as 31 pounds overweight. This hypothesis was tested using a t-test to compare means of the two groups of mothers on the REDUC scale: $t(23) = -.50$, $p = .86$. Hypothesis 2, then, was not supported (Table 4).

Table 4
Comparison of REDUC Scale Means Using a t-test

Measure	Group	Mean	Standard Deviation	<u>t</u> Value
Daughter's Weight Groups				
REDUC	AB	1.44	.64	-.01(26)
REDUC	CD	1.44	.62	
REDUC	I	1.38	.65	-.50(23)
REDUC	II	1.52	.67	

Results Pertaining to the Research Questions

Infant Feeding Practices

Research question 1. Are there relationships between infant feeding practices and the subsequent development of obesity? As shown in Table 5, the F test for the overall ANOVA was significant at $p = .02$. The Neuman-Keul's procedure indicated that Group C mean breastfeeding scores were significantly higher than those of the remaining groups.

Table 5
ANOVA Comparing the Four Groups on Breastfeeding Scores

Group	Mean	Standard Deviation
A	.90	1.17
B	.97	1.28
C	1.72	1.20
D	.56	.95

$F(3, 130) = 3.45, p = .02$

Note: For this scale (FEED), the scores ranged from 0(formula entirely) to 3(breastfeeding entirely).

ANOVA's performed upon mean scores for introduction of solid foods did not reveal any significant differences among the four groups.

Research question 2. Which factors influence mothers' decisions about infant feeding? A mother's own experiences, her physician's

instructions, and her education influence her decisions about infant feeding more than other relatives, friends, media, or nurses (Fig. 3).

Are there relationships between these factors and a child's subsequent weight status? None of the infant feeding variables appeared to be related to subsequent weight for height percentile category at ages 7-10.

Portion Control

Research question 3. Do children of mothers who exercise control over portions, meals eaten away from home, those meals prepared by their children, and types of snacks consumed tend to be less overweight? While there was no significant variation among groups concerning meals eaten away from home, those mothers who perceived their child as having a problem with weight control tended to restrict second helpings:

$r = .16$, $p = .03$, $N = 134$. Mothers who perceived their daughters as possessing a weight control problem reported that their daughters ate less of the more nutritious, lower calorie snacks (SNK2 scale):

$r = -.15$, $p = .04$, $N = 134$.

Physical Activity

Research question 4. Do children who regularly engage in physical activity tend to be less overweight? Group D mothers reported the lowest mean number of sports participation items during the past year, but it was not statistically significant ($p = .16$). Those mothers who perceived that their daughters had a weight control problem tended to report less sports participation ($r = -.13$, $p = .06$, $N = 134$).

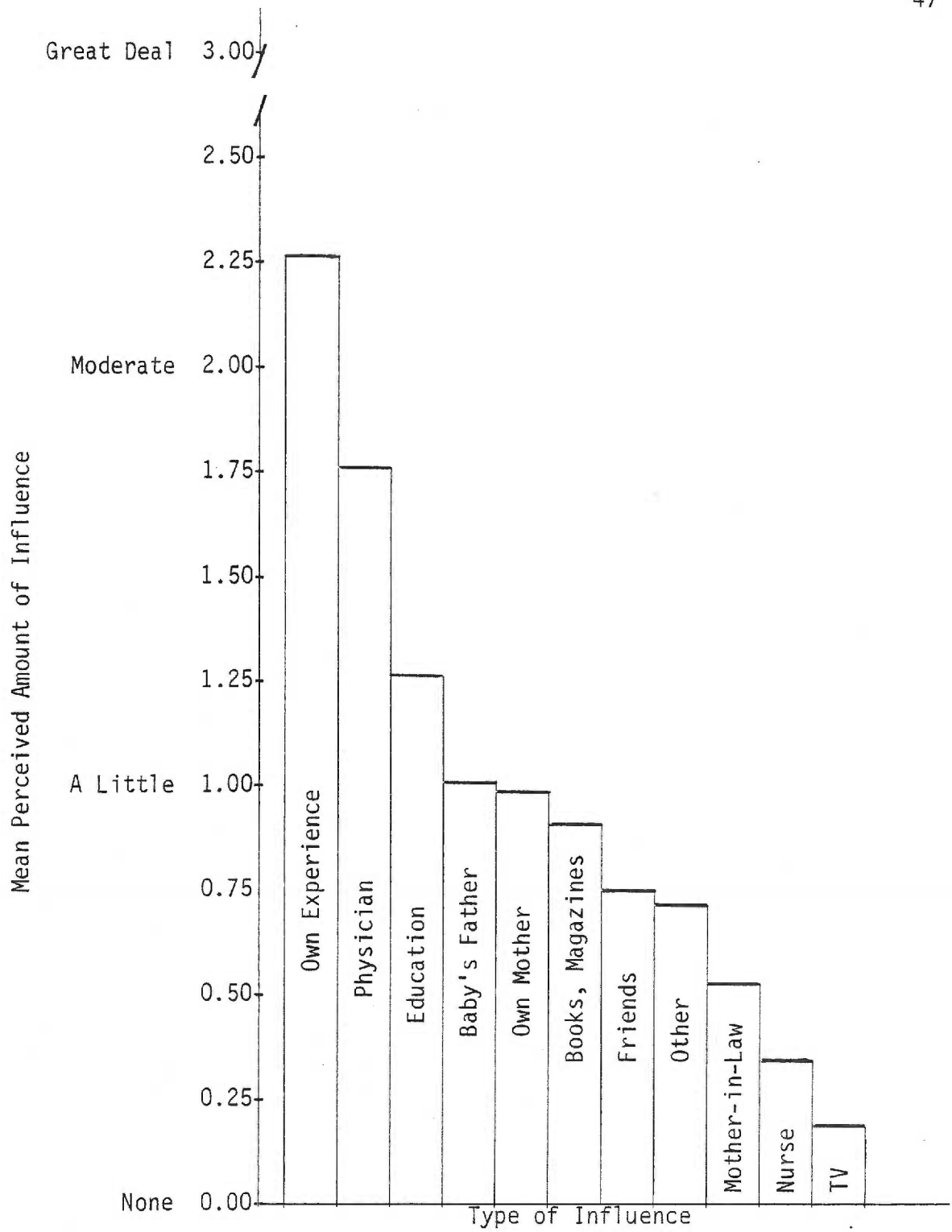


Figure 3: Mean of Selected Influence Upon Maternal Decisions Regarding Infant Feeding.

Perception of Daughter's Weight
Status and Need for Regulation

Research question 5. Which persons or things most influence parents' decisions regarding childhood weight regulation? Mothers report that their own experiences and their relatives most influence their decisions about childhood weight control (Figure 4). Neuman-Kuel's procedure indicated that Group D mothers reported they were more unsure of where to obtain advice about childhood weight control (Table 6) than mothers in the other groups.

Table 6

Mothers' Knowledge of Where to Obtain
Weight Control Advice for Daughter

Group	Mean	Standard Deviation
A	1.83	.89
B	2.24	1.04
C	2.25	1.16
D	3.15	1.14

$F(3, 129) = 6.45, p = .0004$

Note. For this variable, scores ranged from 1(strongly disagree) to 5(strongly agree). The question reads, "I wouldn't know where to get the advice I would need."

Group D mothers had the highest mean discouragement scores on the seven questions regarding their views about childhood weight regulation (Question 22, Appendix D), but the only variable approaching statistical significance was that of the daughter's cooperation (Table 7).

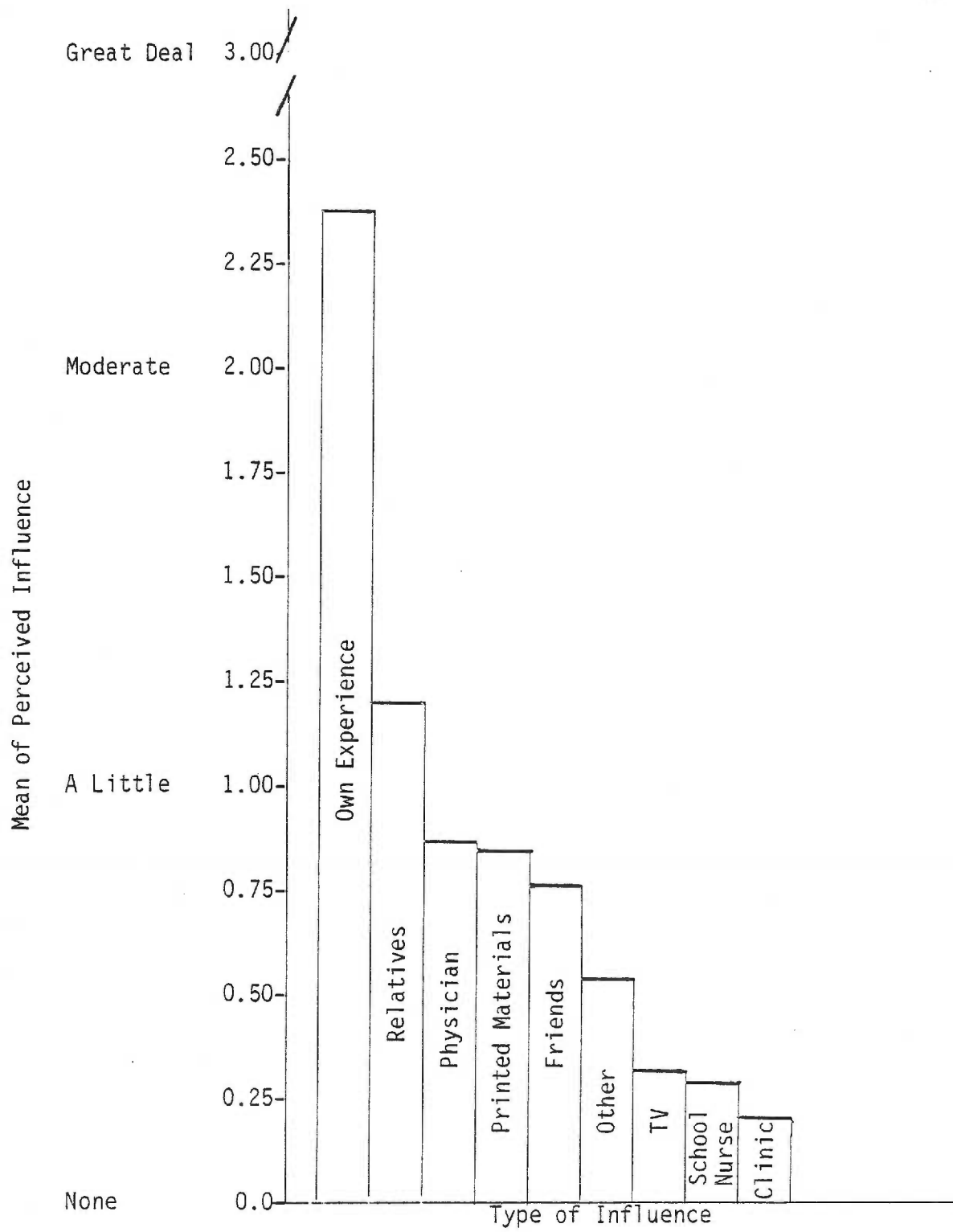


Figure 4: Mean of Selected Influences Upon Maternal Decisions Regarding Childhood Weight Regulation.

Table 7
 Mother's Perception of Daughter's Cooperation
 with Weight Regulation

Group	Mean	Standard Deviation
A	2.16	1.07
B	2.20	1.01
C	2.25	1.01
D	3.00	1.41

$F(3, 128) = 2.26, p = .08$

Note: For this variable scores ranged from 1 (strongly disagree) to 5 (strongly agree). The question was worded, "My daughter doesn't cooperate."

Research question 6. Is there a relationship between a mother's perception of her child's weight status and her activities and behaviors toward childhood weight regulation?

Mothers of the most overweight females (Group D) were able to identify their daughter's weight status as a problem, although most did not perceive the extent in pounds of the overweight condition accurately. An average female aged 8 years is 50 inches tall and weighs 55 pounds. A female of that same height who exceeds the 95th percentile weighs over 70 pounds, or 15 pounds more than average. The mean responses to Question 13 (Appendix D) indicate that most of the mothers perceived their daughters as slightly over desirable weight, and Group D mothers' mean perception was in the 1-9 pound overweight category (Table 8).

Table 8
Maternal Perception of Daughter's Weight Status

Group	Mean	Standard Deviation
A	2.12	.45
B	2.48	.63
C	2.55	.67
D	3.69	1.18

$F(3, 133) = 21.77, p = .0001$

Note: For this variable scores were as follows: 1(underweight), 2(at desirable weight), 3(1-9 pounds overweight), 4(10-19 pounds overweight), etc., to a maximum of 6(25 or more pounds overweight).

Thirty mothers who identified their daughters as having a weight problem reported using some types of attempts at weight management for their daughters. The types and frequencies of the methods they employed are summarized in Table 9. It is evident that mothers tend to restrict calories, encourage sports and activity participation, and exercises.

There were several methods of weight regulation with statistically significant inter-item Pearson correlations (Table 10). Mothers who used caloric restriction were more likely to also employ exercise and/or rewards. Usage of exercises and sports were highly related, as were special programs and rewards.

Table 9
 Percentage of Mothers Attempting Various Weight
 Regulation Methods for Daughters

Method	Percent Attempting the Method			
	Never	Rarely	Sometimes	Often
Caloric Restriction	6.7	10	66.7	16.7
Exercises	17.9	14.3	46.4	21.4
Sports, Activities	16.7	10	30	43.3
Rewards	57.7	26.9	7.7	7.7
Special Programs	84.2	5.3	5.3	5.3

Table 10
 Inter-Item Correlations Between Weight Regulation Techniques

	Caloric Restriction	Exercise	Sports	Rewards	Special Programs
Caloric Restriction	$\underline{r} = 1.00$	$\underline{r} = .31$ $\underline{p} = .05$	$\underline{r} = .09$ $\underline{p} = .32$	$\underline{r} = .39$ $\underline{p} = .03$	$\underline{r} = .37$ $\underline{p} = .06$
Exercises		$\underline{r} = 1.00$	$\underline{r} = .49$ $\underline{p} = .004$	$\underline{r} = .17$ $\underline{p} = .20$	$\underline{r} = .37$ $\underline{p} = .06$
Sports, Activities			$\underline{r} = 1.00$	$\underline{r} = -.05$ $\underline{p} = .40$	$\underline{r} = .12$ $\underline{p} = .31$
Rewards				$\underline{r} = 1.00$	$\underline{r} = .40$ $\underline{p} = .04$
Special Programs					$\underline{r} = 1.00$

Research question 7. Is there a relationship between a mother's perception of her own weight status and her behaviors toward an obese condition in her child? Mothers who reported themselves as more than 31 pounds overweight did not attempt greater numbers of weight control measures for their daughters. However, of those who had done so, more successful efforts were reported by those mothers who did attempt to reduce their daughter's weightgain ($r = .34$, $p = .03$, $N = 29$).

Research question 8. Would mothers be interested in special children's weight control programs if they were made available through the schools? Definite interest was expressed in such programs, with 51.9% of the mothers desiring one, even though only 25.5% of the mothers perceived a weight problem as existing for their daughter.

Additional Descriptive Data Obtained from the Study

Infant Feeding

Nearly half of the mothers began breastfeeding their daughters as newborns. By two months total breastfeeders dropped to one-third of the sample. By three months of age this number had dropped to one-fourth. Another 6% breastfed using occasional supplementation. One-fifth continued to breastfeed through 6 months of age.

Solids were begun at an average age of 3 months, 3 weeks, with over 60% of the mothers reporting feeding baby food to their daughters by the fourth month.

Portion Control

One-third of the sample reported controlling the portions of food their daughters eat. Nearly 17% of the girls eat out two to three times per week. It was of interest that 68% reported their daughters prepare their own breakfast "sometimes to often," 50% prepare their own lunches "sometimes to often," and 38% prepare their own dinners "occasionally to sometimes" (Table 11).

Table 11
Percentage of Daughters Preparing Their Own Meals

Meal	Frequency of Preparation in Percent			
	Never	Rarely	Sometimes	Often
Breakfast	13	20	34	34
Lunch	20	30	39	11
Dinner	62	29	9	None

Note: N = 133 females.

Length of Attempt at Daughter's Weight Management

Mean length of management attempts was 1.8 years. Mean age of perception of weight as a problem for their daughters was at 4 years.

Additional Findings Obtained from the Study

Group D mothers are statistically significantly shorter by self-reported height than the other mothers in the study according to Neuman-Keul's comparison of Groups A, B, C, with D (Table 12).

Table 12
Self-Reported Maternal Height

Group	Mean Height in Inches	Standard Deviation
A	64.72	2.62
B	65.00	2.32
C	64.25	2.31
D	62.50	1.90

$F(3,123) = 3.58, p = .02$

CHAPTER IV

DISCUSSION

This chapter will present sections considering the hypotheses, sample variability from NCHS growth charts, discussion regarding pertinent relationships obtained from the data analysis, and evaluations of the nurse's role in childhood weight regulation.

Consideration of the Hypotheses

There may be several reasons that the hypotheses of the study were not supported. First, response rates were lowest for Group D (page 30). Self-selection may have averted better returns from this group. Sensitivity to the issue of obesity, or the feeling of having their daughter "labeled" may have discouraged these (and other) mothers from returning the questionnaire.

Mothers may have checked categories they thought the researcher would prefer, or categories that they thought represented better nutritional or lifestyle habits than they actually employ.

However, since overall responses for all questions indicated very high homogeneity of the groups, it would seem that the most likely reason for lack of hypothesis support is that, indeed, the various groups of mothers who perceive their daughters as possessing a weight control problem employ similar numbers of weight maintenance measures, regardless of the child's actual degree of obesity or of their perception of their own weight.

Sample Variability from NCHS Growth Charts

Vancouver children are clearly heavier than would be expected if these 1976-developed charts remain representative of national norms. There were 350 females available for the weight-for-height determination. The researcher would have expected some 180+ to fall below the 51st percentile. But only 116 females fell below the 51st percentile.

Discussion of Pertinent Relationships Obtained from Data Analysis

Infant Feeding Practices

Those children with the highest breastfeeding scores ranged from the 91st to 95th percentiles in weight for height by the average age of 8 years. Mothers should be advised that weight problems are multifactorial and that breastfeeding, while nutritionally most superior for their infant, will not necessarily guarantee future leanness. Crummette's (1980) study relating that a mother's own experiences most influenced her infant feeding decisions was supported by this study as well.

Portion Control

Although mothers who view their daughters as possessing a weight control problem tend to restrict second helpings, they report poorer quality snack choices. This has educational implications for schools, health care providers, and for the communications industry.

Physical Activity

Mothers who perceive their daughters as having a weight control problem reported significantly less sports participation than the other mothers. Several commented upon the high cost of youth sports in the Vancouver area, particularly for swimming lessons. The Vancouver School District does provide fourth-grade swim lessons for two weeks per student, but has eliminated P.E. teachers from the elementary schools. Classroom teachers direct their own P.E. activities. After-school sports include volleyball, basketball, and track. There are considerable opportunities for youth sports with community soccer, Little League baseball, swim teams, and youth basketball attracting large numbers of participants. Most parents would probably not have difficulty affording the minimal player fees, but the additional cost of outfitting children with sports equipment could be prohibitive for those with low incomes. The community offers a centrally-located recreation center which has fairly inexpensive activities, and several community schools in more outlying areas. The cost of transportation to the central facility was mentioned by several mothers as prohibitive for them. Swimming lessons at private clubs average \$2.50-\$3.00 apiece.

Perceptions of Weight Status and Need for Management

The mothers of the most overweight females were also the most unsure of where to obtain advice about weight management for their daughters. One-third of those mothers of the females falling within the top 24% of the NCHS chart had attempted weight management procedures,

but they waited an average of two years following their initial perception of the problem before weight gain reduction was attempted. This lends support to the literature stating that most of those in need of childhood weight management do not obtain help (Humphrey, 1979).

The fact that these mothers do not accurately perceive their daughters' extent of obesity in pounds is disturbing. It would be helpful to show the NCHS grids to parents to enable them to see the weight in pounds of those children who are of average weight for height.

Nursing Roles in Childhood Weight Management

Mothers obviously perceived nurses as very minor influences when considering infant feeding and childhood weight management decisions (Figures 3 and 4). Nurses in pediatric offices, public health, and school settings have many opportunities to participate in educational and counseling interactions with parents and children. An awareness of the research findings can aid them toward productive efforts in their endeavors to educate parents and children about prevention and treatment of obesity.

CHAPTER V

SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

This chapter presents a summary of the study and its pertinent findings, conclusions of the researcher, limitations of the study, and recommendations for further research in the realm of childhood weight regulation.

Summary

Persons with an obese condition have increased morbidity and mortality risks. Childhood obesity, difficult to treat, is of interest because studies have shown that some 10-15% of prepubescent children are overweight or obese, and that approximately 20% of adult obesity originates in childhood. Exogenous obesity is felt to be multifactorial in nature. Shared environments with obese persons have been highly associated with development of childhood obesity. Few research studies have examined parental perceptions of obesity as a "problem" or parent-initiated treatment measures.

While prevention through proper nutrition and encouragement of normal levels of physical activity is the ideal goal, childhood obesity has been successfully treated using caloric restriction, increased physical activity, and behavior modification in a family therapy setting. Unfortunately, many of the most obese children remain untreated.

Environmental and genetic factors interact to produce obesity, which in turn has psychological and social consequences in addition to

the health risks encountered. Parental compliance is viewed in Becker's (1977) health belief model as based upon the belief that one's expectations and valuations of the outcome influence one's compliance with a given treatment regimen.

This ex post facto retrospective study examined maternal perceptions and maternally-attempted treatment measures related to female prepubescent obesity. It was hypothesized that mothers of the children > 90th percentile by NCHS growth chart standards and also those mothers who perceived themselves as > 30 pounds overweight would attempt fewer treatment measures than mothers of less overweight children or mothers who perceived themselves as < 30 pounds overweight. The study also examined infant feeding practices, portion control, selected food consumption habits, physical activity, treatment measures used by parents, and interest in school-based childhood weight regulation programs. The subjects were the 137 of 234 mothers who responded to an investigator-developed questionnaire (Appendix D) mailed to parents of second and third grade females in eight Vancouver, Washington School District #37 elementary schools. The sample was drawn from schools selected for even geographical and SES level distribution. All available second and third grade females with recorded heights and weights were selected from four percentile groups in accordance with their placement on NCHS growth chart weight-for-height grids as follows: 104 in the 51-75th percentile, 68 in the 76th-90th percentile, 33 in the 91st-95th percentile, and 29 who exceeded the 95th percentile.

The two instruments used for this study were the National Center for Health Statistics growth charts (Appendix B) and the investigator-developed Childhood Weight Regulation Questionnaire (Appendix D). Data analysis was accomplished through use of t-tests to compare means of the hypothesis groups and Chi-squares and ANOVAs upon scores obtained from the research questions. Neuman-Keul's procedure was used to compare means for ANOVAs with significant F values.

Conclusions

Neither hypothesis was supported. Group means of weight reduction measures were nearly homogeneous. Significant findings related to research questions included the following:

1. Females in the 90-95th percentiles of weight for height were breastfed for longer periods of time and/or with less supplementation of formula than children in the other percentile groups within the study.
2. A mother's own experiences, her physician's instructions, and her education most influence her infant feeding decisions.
3. Mothers who perceive their daughter has a weight problem are more likely to restrict second helpings. Their daughters eat more high-calorie, less-nutritious snacks.
4. A mother's own experiences and her relatives most influence her decisions about childhood weight management. The mothers of the most obese females were more unsure of where to obtain advice about childhood weight control.

5. Mothers of the most obese females were able to identify that their daughter had a "problem" but could not accurately perceive the extent in pounds of the obese condition.
6. Mothers who perceived their daughters as having a problem with weight regulation were most likely to restrict calories, encourage sports and activity participation, and exercises.
7. Mothers who perceived themselves as > 31 pounds overweight reported more success at helping their daughters reduce weight gain.
8. Over half of the mothers in the study expressed interest in school-based weight regulation programs, even though only a fourth indicated that they felt their daughter had a weight regulation problem.
9. Self-reported heights of the mothers of the most obese females were approximately $1\frac{1}{2}$ -2 inches shorter than those of the other mothers in the study.

Additional descriptive findings included mother's reports that large numbers of the children prepared their own meals and that mothers waited some two years following perception of the weight problem before initiating treatment measures.

Limitations

The 59% response rate limited the number of perceptions gleaned from the study. Response rates were lowest among the mothers of the most obese females.

The researcher used height and weight measurements taken by teachers and parent volunteers for determination of weight-for-height percentile category of each child, and therefore had no means of determining their absolute accuracy.

The Childhood Weight Regulation Questionnaire was investigator-developed. Although the four subscales, FEED, SNK1, SNK2, and REDUC, have high reliability, the questionnaire as an entity lacks established statistical reliability.

Recommendations for Further Research

The fact that the mothers of the most obese children were significantly shorter in height than the other mothers should be explored.

An additional question regarding the particular emphases parents would prefer to be included in children's weight management programs would have clarified the nature of parents' interest in such programs.

Many children are obviously preparing their own meals. It would be interesting and valuable to explore their concepts and choices regarding nutrition, especially in view of media advertisements extolling the benefits of name-brand cereals, snacks, etc. Do kindergarten and

first-grade nutrition curricula address the likelihood of the "child chef?" It would also be advisable to ask parents if they think their children are preparing well-balanced, nutritious meals for themselves.

Due to concern about the sensitive nature of this topic the questions were carefully worded so as not to offend the mothers. Most of their written comments were favorable toward research in this area of concern. Several questions not included for reasons of sensitivity might not have caused as much concern among the mothers as previously thought. It would have been helpful to address some psychological entities of the daughter's overweight condition. Several comments alluded to the child's low self-esteem, the taunts and rejection Bruch (1975) discussed, and also to the problems faced by other overweight members of the household.

REFERENCES

- Becker, M.H., Maiman, L., Kirscht, J., Haefner, D., & Drachman, R. The health belief model and prediction of dietary compliance: a field experiment. Journal of Health and Social Behavior, 1977, 18, 348-366.
- Brook, C.G.D. Genetic aspects of obesity. In D. Barltrop (ed.), Paediatric implications for some adult disorders. London: Fellowship of Postgraduate Medicine, 1977.
- Brownell, K. D. & Kaye, F. S. A school-based behavior modification, nutrition education, and physical activity program for obese children. American Journal of Clinical Nutrition, 1982, 35, 277-283.
- Brownell, K. D. & Stunkard, A. J. Behavioral treatment of obesity in children. American Journal of Diseases of Children, 1978, 132, 403-412.
- Bruch, H. Emotional aspects of obesity in children. Pediatric Annals, 1975, 4(5), 91-99.
- Coates, T. & Thoreson, C. Treating obesity in children and adolescents: a review. American Journal of Public Health, 1978, 68(2), 143-151.
- Copeland, E. & Baucom-Copeland, S. Childhood obesity: a family systems view. American Family Physician, 1981, 24(2), 153-157.
- Crummette, B. D. & Munton, M. T. Mothers' decisions about infant nutrition. Pediatric Nursing, 1980, 6(6), 16-19.
- DeLameter, P. Obesity - incidence, causes, prevention and treatment. Occupational Health Nursing, 1981, 29(9), 22-24.
- Dillman, D. A. Mail and telephone surveys. New York: John Wiley & Sons, 1978.
- DuRant, A. H. & Linder, C. W. An evaluation of five indexes of relative body weight for use with children. Journal of the American Dietetic Association, 1981, 78, 35-40.
- Edelman, B. Developmental differences in the conceptualization of obesity. Journal of the American Dietetic Association, 1982, 80, 122-127.

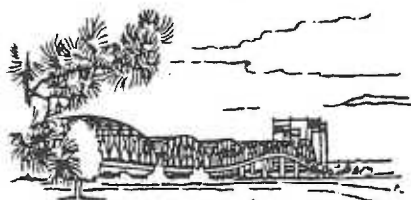
- Filer, L. Early nutrition: its long-term role. Hospital Practice, 1978, 13(2), 87-95.
- Garn, S. M. & Clark, D. C. Nutrition, growth, development, and maturation: findings from the ten-state nutrition survey of 1968-1970. Pediatrics, 1975, 56(2), 306-319.
- Garn, S. M., Hopkins, P., & Ryan, A. Differential fatness gain of low income boys and girls. American Journal of Clinical Nutrition, 1981, 34, 1465-1468.
- Golden, M. An approach to the management of obesity in childhood. Pediatric Clinics of North America, 1979, 26(1), 187-197.
- Grollman, A. Drug therapy of obesity in children. Pediatric Annals, 1975, 4(5), 39-56.
- Hager, A. Adipose cell size and number in relation to obesity. In D. Barltrop (ed.), Paediatric implications for some adult disorders. London: Fellowship of Postgraduate Medicine, 1977.
- Hamill, P. & Moore, W. Contemporary growth charts: needs, construction and application. Pediatric Nursing Currents, 1976, 23(5), 17-20.
- Hammar, S. L. Obesity--early identification and treatment. Pediatric Annals, 1975, 4(5), 11-23.
- Hertzler, A. A. & Vaughan, E. The relationship of family structure and interaction to nutrition. Journal of the American Dietetic Association, 1979, 74, 23-27.
- Himes, J. H. Infant feeding practices and obesity. Journal of the American Dietetic Association, 1979, 75, 122-125.
- Humphrey, P. Height/weight disproportion in elementary school children. The Journal of School Health, 1979, 49(1), 25-29.
- Jerome, N. W. Dietary patterning and change: a continuous process. Contemporary Nutrition, 1982, 7(6), 1-2.
- Jonides, L. Childhood obesity: a treatment approach for private practice. Pediatric Nursing, 1982, 8(5), 320-322.
- Lasky, P. & Eichelberger, K. Implications, considerations, and nursing interventions of obesity in neonatal and preschool patients. Nursing Clinics of North America, 1982, 17(2), 199-205.

- Litman, T. J. The family as a basic unit in health and medical care: a social-behavioral overview. Social Science and Medicine, 8, 495-519.
- Lowe, C. U., Coursin, D., & Heald, F. Measurement of skinfold thickness in childhood. Pediatrics, 1966, 42(3), 538-543.
- Lloyd, J. Prognosis of obesity in infancy and childhood. In D. Barltrop (ed.), Paediatric implications for some adult disorders. London: Fellowship of Postgraduate Medicine, 1977.
- Maiman, A., Wang, V., Becker, M., Finlay, J., & Simonson, M. Attitudes toward obesity and the obese among professionals. Journal of the American Dietetic Association, 1979, 74, 331-336.
- Mayer, J. Introduction. In P. Collipp (ed.), Childhood obesity, Acton, Massachusetts: Publishing Sciences Group, Inc., 1975.
- Merritt, R. J. Obesity. Current Problems in Pediatrics, 1982, 12(11), 5-57.
- McClain, L. G. Hypertension in Childhood: a review. American Heart Journal, 1976, 92(5), 634-647.
- Morris, S. S., Farrier, S., Rogers, C., & Taper, J. Feeding behaviors, food attitudes, and body fatness in infants. Journal of the American Dietetic Association, 1982, 80, 330-334.
- Myres, A. & Yeung, D. Obesity in infants: significance, aetiology, and prevention. Canadian Journal of Public Health, 1979, 70(2), 113-119.
- Nutt, H. Infant nutrition and obesity. Nursing Forum, 1979, 18(2), 131-155.
- Osancova, K. & Hejda, A. Epidemiology of obesity. In T. Silverstone (ed.), Obesity: its pathogenesis and management. Acton, Massachusetts: Publishing Sciences Group, Inc., 1975.
- Pisacano, J., Lichter, H., Ritter, J., & Siegal, A. An attempt at prevention of obesity in infancy. Pediatrics, 1978, 61(3), 360-364.
- Quay, H. & Werry, J. (ed.), Psychopathological disorders of childhood. New York: John Wiley & Sons, 1972.
- Ravussin, E., Burnand, B., Schultz, Y., & Je'quier, E. 24-hour energy expenditure and resting metabolic rate in obese, moderately obese, and control subjects. American Journal of Clinical Nutrition, 1982, 35, 566-573.

- Rowe, N. Childhood obesity: growth charts vs. calipers. Pediatric Nursing, 1980, 6(2), 24-27.
- Schafer, R. B. & Keith, P. M. Influence on food decisions across the family life cycle. Journal of the American Dietetic Association, 1981, 78, 144-148.
- Selzer, C. C. & Mayer, J. Greater reliability of the triceps skinfold over the subscapular skinfold as an index of obesity. The American Journal of Clinical Nutrition, 1967, 20(9), 950-953.
- Shick, M. E. A study of blood pressure values in children and their relationship to weight, height, and family history of heart disease. Unpublished master's thesis. The Oregon Health Sciences University, Portland, 1981.
- Smickiklas-Wright, H. & D'Augelli, A. R. Primary prevention for overweight: preschool eating patterns (PEP) programs. Journal of the American Dietetic Association, 1978, 72, 626-629.
- Stark, O., Atkins, E., Wolff, O., & Douglas, J. Longitudinal study of obesity in the national survey of health and development. British Medical Journal, 1981, 283(4 July), 13-15.
- Stunkard, A. & Burt, V. Obesity and the body image: II: age at onset of disturbance in the body image. American Journal of Psychiatry, 1967, 123(11), 1443-1447.
- Stuart, R. & Davis, B. Slim chance in a fat world. Champaign, Illinois: Research Press, 1972.
- Tobias, A. L. & Gordon, J. B. Social consequences of obesity. Journal of the American Dietetic Association, 1980, 76, 338-342.
- Weil, W. Current controversies in childhood obesity. The Journal of Pediatrics, 1977, 91(2), 175-187.
- Winckler, I. How well-fed are our children? Nursing Times, 1978, March 30, (Supplement), iii-viii.
- Wineman, N. M. Obesity: locus of control, body image, weight loss, and age at onset. Nursing Research, 1980, 29(4), 231-237.

APPENDIX A

Explanation Letter Sent to Parents
of all Second and Third Grade Females



EDUCATION - A Bridge to the Future

VANCOUVER PUBLIC SCHOOLS

SCHOOL DISTRICT NO. 37 - CLARK COUNTY
VANCOUVER, WASHINGTON 98661
605 North Devine Road

May 19, 1983

Dear Parents,

A graduate student from Oregon Health Sciences University School of Nursing has been given permission by the school district to complete her Master's thesis by doing a study within the district. Her study examines the relationship between attitudes and actions regarding childhood weight regulation. The graduate nurse will identify some 2nd and 3rd-grade girls, using their heights and weights measured at school last fall during the health screening. Questionnaires will be mailed to the mothers of the selected girls. These mothers may or may not choose to participate in the study. No school personnel will be involved in this study. If you do not want your daughter's height and weight card examined by the graduate nurse, please sign the form below and return it to the principal within a week.

Date _____

Check and return only if (you)...

_____ I do not wish my daughter's height and weight card examined by this graduate student.

Child's name _____ School _____

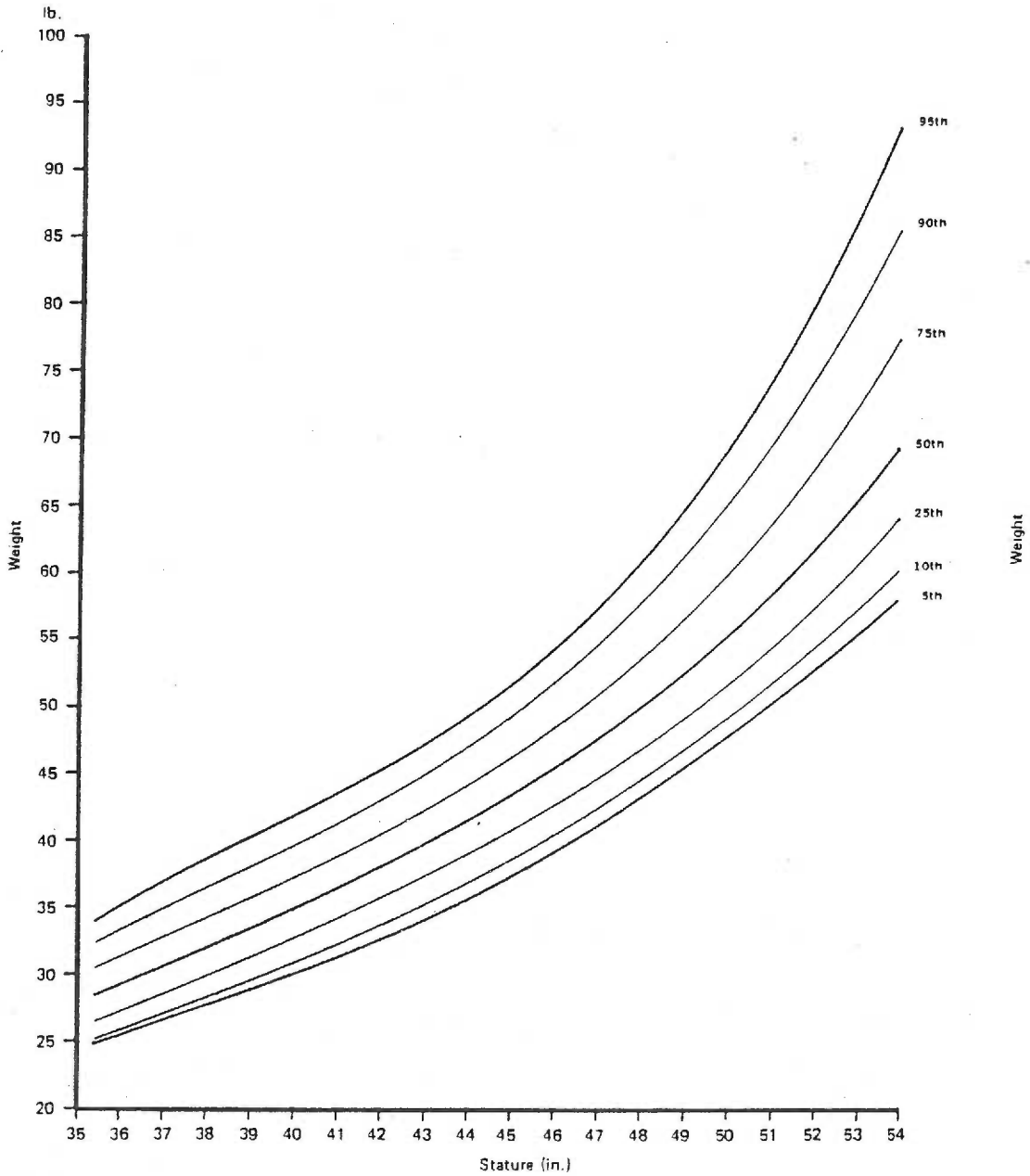
Grade _____ Parent's Signature _____

Vancouver School District No. 37 is an Equal Opportunity District

APPENDIX B

National Center for Health Statistics Growth Charts

PRE-PUBERTAL GIRLS FROM 2 TO 10 YEARS WEIGHT FOR STATURE



APPENDIX C
Cover Letter

525 Cascade Drive
Vancouver, Washington 98664

Dear Parents:

Your daughter has been chosen to be part of a research study done with permission of the Vancouver School District. This study examines your views on childhood weight regulation. Second and third grade girls whose weights vary from average to overweight have been selected for this study. The reason for this study is that very little scientific research has been done on parents' attitudes about children's weight control.

You will notice a code number on the accompanying questionnaire. Results of the study will be compiled statistically in groups using the code numbers, and both you and your daughter will remain anonymous. It is important to the success of this study that only the "mother of the house" fill out the questionnaire. In some instances this may be a stepmother, grandmother, etc., and this will not affect the results of the survey. However, if there is no female "mother figure" in the home, please indicate on the front of the questionnaire in the space provided, and return it.

School nurses have indicated that our community lacks resources for referral of overweight children. This study will help by shedding light on some of the concerns these children and their parents face. I appreciate your cooperation in filling out the questionnaire. Enclosed are the questionnaire, which will take about 15-minutes to complete, and a stamped return envelope for your convenience. Any questions you may have can be directed to myself, Carol Hill, at 696-4718, or my master's thesis advisor, Doris Julian, (503) 225-8382 at the Oregon Health Sciences University.

Sincerely yours,

Carol Hill, R.N.
Pediatric Nurse
Practitioner Program,
The OHSU

APPENDIX D

Childhood Weight Regulation Questionnaire

CODE # _____

DATE _____

Please check one of the following categories and return the questionnaire, as all of them must be accounted for to make the study meaningful. If you do not wish to participate in the survey, check the appropriate space below and return the questionnaire, and a follow-up letter will not be sent to you.

_____ THE QUESTIONNAIRE HAS BEEN COMPLETED BY THE MOTHER OF THE HOME

_____ THE MOTHER IS NOT IN THE HOME

_____ THE MOTHER CHOSE NOT TO PARTICIPATE; PLEASE STATE REASON FOR NOT PARTICIPATING: _____

Thank you very much!

Childhood Weight Regulation Questionnaire

Infant feeding practices have been studied by some scientists, and there is disagreement about whether or not they contribute to later weight status. I would like to ask first a few questions about how your daughter was fed as an infant. If you have difficulty remembering some of the information due to the passage of time, just try to answer them as closely as you can. Thank you very much!

Q-1. Please indicate below by checking the appropriate boxes which type of milk your daughter was fed month by month as an infant.

Daughter's Age	Breast-Fed Entirely	Mostly Breast, Some Formula	Mostly Formula Some Breast	Formula Entirely	Milk Other Than Formula
Newborn					
1 Month					
2 Months					
3 Months					
4 Months					
5 Months					
6 Months					

Q-2. After formula or breast-feeding was stopped, what kind of milk did your daughter then drink?

_____ Whole Cow's Milk (3.8%)

_____ Skim Cow's Milk

_____ 2% Cow's Milk

_____ Other (Please name below)

_____ 1% Cow's Milk

Q-3. When did your daughter begin eating baby foods as an infant?

(baby cereal, pureed fruits, or vegetables). Check one:

- During the 1st Month During 5th Month
 During 2nd Month During 6th Month
 During 3rd Month During 7th Month
 During 4th Month During 8th Month or Later

Q-4. Please rate the influence of the following persons or things upon your decisions of how you fed your daughter as a baby. Circle one response for each listed person or thing:

My Own Experiences	----	No Influence	A Little	Moderate	Great Deal
My Daughter's Doctor	--	No Influence	A Little	Moderate	Great Deal
My Daughter's Father	--	No Influence	A Little	Moderate	Great Deal
My Own Mother	-----	No Influence	A Little	Moderate	Great Deal
My Mother-in-Law	-----	No Influence	A Little	Moderate	Great Deal
My Friends	-----	No Influence	A Little	Moderate	Great Deal
A Nurse	-----	No Influence	A Little	Moderate	Great Deal
Books or Magazines	----	No Influence	A Little	Moderate	Great Deal
Television	-----	No Influence	A Little	Moderate	Great Deal
Education	-----	No Influence	A Little	Moderate	Great Deal
Other (Describe Below)		No Influence	A Little	Moderate	Great Deal

Q-5. At the present time how is your daughter's dinner served:

She is allowed to put her own food on her plate

Her plate is filled by an adult

Other (please explain) _____

Q-6. How many days a week does your daughter eat her evening meal away from home? (Eating out, fast food, restaurant, friend's home, grandparent's home, etc.).

_____ One evening or less per week

_____ Two or three evenings per week

_____ Four evenings or more per week

Q-7. How frequently does your daughter prepare one of the following meals for herself? (Please include whether or not she prepares her own lunch).

Breakfast-----Never Rarely Sometimes Often

Lunch-----Never Rarely Sometimes Often

Dinner-----Never Rarely Sometimes Often

Q-8. How do you handle it if your daughter wants second helpings?

_____ She may have seconds of any food served for the meal

_____ She may have seconds of some foods served (name type)

_____ No second helpings are allowed

Q-9. Please circle how often the following foods are eaten as snacks in your home by your daughter:

Cookies-----	Never	Rarely	Sometimes	Often
Soda Pop-----	Never	Rarely	Sometimes	Often
Fruit-----	Never	Rarely	Sometimes	Often
Chips-----	Never	Rarely	Sometimes	Often
Cakes-----	Never	Rarely	Sometimes	Often
Cheese-----	Never	Rarely	Sometimes	Often
Crackers-----	Never	Rarely	Sometimes	Often
Vegetables-----	Never	Rarely	Sometimes	Often
Candy-----	Never	Rarely	Sometimes	Often
Popcorn-----	Never	Rarely	Sometimes	Often
Ice Cream-----	Never	Rarely	Sometimes	Often
Yoghurt-----	Never	Rarely	Sometimes	Often
Pie-----	Never	Rarely	Sometimes	Often
Popsicles-----	Never	Rarely	Sometimes	Often
Cereal-----	Never	Rarely	Sometimes	Often
Bread-----	Never	Rarely	Sometimes	Often
Peanut Butter-----	Never	Rarely	Sometimes	Often
Other (Name Below)-----	Never	Rarely	Sometimes	Often

Q-10. My daughter normally gets to school by: (Check all that apply)

Car

Walking

Bus

Bicycling

Q-11. Please check below any of the following organized sports or activities that your daughter has been involved in on a regular basis (even if seasonal for a few months) during the past year:

<input type="checkbox"/> Soccer	<input type="checkbox"/> Gymnastics	<input type="checkbox"/> Basketball
<input type="checkbox"/> Swimming	<input type="checkbox"/> Baseball	<input type="checkbox"/> Track: Running
<input type="checkbox"/> Dancing	<input type="checkbox"/> Hiking	<input type="checkbox"/> Playing Outside (Describe)

Other (Please name) _____

Q-12. Does your daughter ride a bicycle?

No, she is unable to ride one

No, she does not have one

Yes, she rides it rarely

Yes, she rides it a moderate amount

Yes, she rides it frequently

Other (Please explain) _____

Q-13. If you were to describe your daughter's weight, it would be:

Underweight for her height

At desirable weight for her height

1-9 pounds over desirable weight for her height

10-19 pounds over desirable weight for her height

20-24 pounds over desirable weight for her height

25 pounds or more over desirable weight for her height

Q-14. Do you think that your daughter has a weight control problem?

No -- (Please skip to Question 22 on the next to last page)

Yes---(Please respond to the following questions)

Q-15. If you answered YES, how much of a problem?

Slight Problem

Moderate Problem

Serious Problem

Q-16. At about what age did you think weight control was beginning to be a problem for her?

Birth-11 months

5-6 years old

1-2 years old

7-8 years old

3-4 years old

9 years old or more

Q-17. Have you tried to reduce the amount of weight your daughter was gaining?

No----(Skip to question 22)

Yes---(Please respond to the following questions)

Q-18. Rate each of the following persons or things in terms of how much they influenced your decisions of how to help your daughter reduce the amount of weight she was gaining:

My Experiences-----	No Influence	A Little	Moderate	Great Deal
Books, Magazines-----	No Influence	A Little	Moderate	Great Deal
Relatives-----	No Influence	A Little	Moderate	Great Deal
A Doctor-----	No Influence	A Little	Moderate	Great Deal
A Clinic-----	No Influence	A Little	Moderate	Great Deal
Friends-----	No Influence	A Little	Moderate	Great Deal
School Nurse-----	No Influence	A Little	Moderate	Great Deal
Television-----	No Influence	A Little	Moderate	Great Deal
Other (Explain Below)--	No Influence	A Little	Moderate	Great Deal

Q-19. Which of the following have you used to help your daughter reduce her weight gain?

Reduced Calories-----	Never	Rarely	Sometimes	Often
Exercises-----	Never	Rarely	Sometimes	Often
Sports or Activities-----	Never	Rarely	Sometimes	Often
Offered Rewards-----	Never	Rarely	Sometimes	Often
Special Program (Describe) -	Never	Rarely	Sometimes	Often

Other (Please Indicate)---	Never	Rarely	Sometimes	Often
----------------------------	-------	--------	-----------	-------

Q-20. How successful have your efforts been, in general?

Her Weight Gain-----
 Has increased even faster
 Has remained the same
 Has been slowed a little
 Has been slowed moderately
 Has been slowed considerably

 She has lost a few pounds

Q-21. How long have you been attempting to help your daughter slow down her rate of weight gain?

During the Past-----
 Year
 Two Years
 Three Years
 Four Years
 Five Years
 Six Years
 Seven Years or More

Q-22. Answer each statement by circling the response underneath which most closely represents your views about childhood weight regulation:

A. I wouldn't know where to get the advice I would need.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

B. My efforts at losing weight are/have been discouraging (if attempted).

Strongly Agree Agree No Opinion Disagree Strongly Disagree

C. I couldn't afford the advice I would need.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

D. My daughter doesn't cooperate.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

E. I don't think anything I would try would help her control weight.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

F. The rest of the family aren't supportive.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

G. I couldn't afford the treatments.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

H. Other (Please explain) _____

Strongly Agree Agree No Opinion Disagree Strongly Disagree

Q-23. How old was your daughter on her last birthday?

_____ 7

_____ 9

_____ 8

_____ Other (Please give) _____

Q-24. Please circle the highest grade you have completed:

Grade School 1 2 3 4 5 6 7 8 College 13 14 15 16
 High School 9 10 11 12 Graduate 17 18 19 20 or more

Q-25. Please check the category for your yearly family income:

____ Under \$4,999 ____ \$15,000-\$19,999
 ____ \$5,000-\$9,999 ____ \$20,000-\$24,999
 ____ \$10,000-\$14,999 ____ \$25,000 or more

Q-26. Please indicate other family members in your household and their ages below. Be sure to include any grandparents, aunts, uncles, etc. living with you at the present time:

<u>Relationship to Child</u>	<u>Age in Years</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Q-27. If you were to describe your own weight, it would be (Check one):

____ Under desirable weight for my height
 ____ At desirable weight for my height
 ____ Within 15 pounds over desirable weight for my height
 ____ 16-31 pounds over desirable weight for my height
 ____ 31-45 pounds over desirable weight for my height
 ____ 46 or more pounds over desirable weight for my height

My height is _____ inches. My weight is _____ pounds.

Q-28. If a special weight control program for children was made available through the school system, for instance, would you be interested in having your daughter attend?

No

Yes

Are there any additional comments you would like to make but didn't see expressed in the Questionnaire? If so, you may use the bottom of this page. Thank you for filling out the Questionnaire, and for taking your time to express your opinions and perceptions.

APPENDIX E

Response Sheet for Parents Desiring a Summary of Results

If you desire a brief summary of the results of this study, write your name and address below, and enclose with your questionnaire. An early fall mailing is anticipated.

Name _____
(First) (Last)

Address _____
(Street, or P.O. Box)

(City) (State) (Zip)

APPENDIX F

Question-Answer Sheet for Principals and Teachers

Q/A FOR WEIGHT REGULATION STUDY

Possible Parent Questions to Teachers and Principals:

Q: Do I have to participate if my daughter's name is chosen?

A: No, participation is entirely voluntary. If you don't want to be part of the study, check the appropriate box on the front of the questionnaire and return it in the enclosed stamped, self-addressed envelope.

Q: Why is she asking about children's weight regulation?

A: The school nurses have indicated that there are few valid community resources for referral of overweight children. Some of the children will have weight problems the rest of their lives. This study is designed to collect a variety of information from parents. Few such studies have asked parents directly about ways in which they have dealt with an overweight child.

Q: May I leave out any of the questions?

A: You may leave a question blank if you object to answering it, but it will give the researcher less information.

Q: What do I do with the questionnaire after I fill it out?

A: Return it to Carol Hill in the enclosed stamped, self-addressed envelope. If you have lost that envelope, you may send it to school with your child in an envelope marked with Carol Hill's name and give it to the principal.

Q: Will the researcher have access to any other information about my child?

A: No. Only height, weight, as measured at school during the health screening day, sex, name, and grade. This information is recorded on forms that are kept separate from all other information about your child.

Q: How many were sent out to parents?

A: Over 200.

Q: Will my name or my daughter's be used?

A: No, all information will be reported in groups of 40 respondents. Your name will be on a master list retained by the researcher until all the questionnaires have been returned, then destroyed. Information from the questionnaires will be keypunched onto computer cards for statistical computation. Neither the questionnaires nor the cards contain your name, just the group designation and a number from 1-40 called the subject number.

Q: Who do I call if I have a question the principal can't answer?

A: You may call Carol Hill at 696-4718 (most likely home evenings).

Q: Will our names be used or given to any other group in any way?

A: No.

Q: When can I find out the results of the study?

A: If you wish to know what parents have indicated on the questionnaires, there is a place to indicate this on the front of the questionnaire. Mail it with the questionnaire. A brief summary will be mailed to you after the thesis is completed.

Q: Why don't I have to fill out a consent form?

A: Return of the questionnaire implies consent to participate in the study.

Q: What will happen to the information from the study?

A: It will be presented as a Master's thesis requirement for graduation. A copy will be presented to Steven Schuman, Supervisor of Research for the school district. Copies will remain in the Oregon Health Sciences library and School of Nursing dean's library. The researcher will present the information to the school nurses and attempt to publish it in one of several professional journals.

Q: If my daughter was identified for the study, has the researcher decided she is overweight?

A: The girls were selected by using National Center for Health Statistics growth charts using percentiles of weight for height. Half of the girls varied from the 50th to 90th percentiles on these charts, and the other half exceeded the 90th percentile, or were heavier for their height than 90% of American girls. Weight for height is a continuous measurement, and there is not an agreed "cut-off point" at which all nutritionists would state a weight problem exists. However, most indicate that children who exceed the 90th percentile (some say the 95th) by these ages are overweight for their height.

Q: Will the researcher have any contact with my daughter or myself?

A: She will only be in the building to look at the height and weight information filed there. The only contact she will have with you is through the questionnaire.

APPENDIX G

Postcard

July 14, 1983

Dear Parents:

Last week a questionnaire seeking your views on childhood weight control problems was mailed to you. Your 2nd or 3rd grade daughter was among 233 of varying weights for height (most near average when compared with national norms) polled from 8 schools.

If you already have completed and returned it to me please accept my sincere thanks. If not, please do so! It is extremely important to the success of the study that yours be included if the results are to be representative.

If you did not receive the questionnaire or have misplaced it, please call me at 696-4718 and I will send another one to you.

Sincerely,

Carol Hill, R.N.
Pediatric Nurse
Practitioner
Program, The
OHSU

APPENDIX H
District-Format Abstract

RESEARCH PROPOSAL ABSTRACT

- Title of Project: Maternal Perceptions and Treatment Measures Related to Prepubescent Weight Regulation
- Person Proposing the Research: Carol Hill, R.N.
Graduate student, The Oregon Health Sciences University: Pediatric Nurse Practitioner Program
- Statement of the Research Issues: Persons with an obese condition have increased morbidity and mortality risks. Childhood obesity, difficult to treat, is of interest because studies have shown that 10-15% of prepubescent children are overweight or obese, and that approximately 20% of adult obesity originates in childhood. This study examines maternal perceptions and maternally-attempted treatment measures related to female prepubescent obesity.
- Hypotheses: It is hypothesized that the mothers of the most obese females, and also the mothers who perceive themselves as 30 or more pounds over desirable weight for height will have attempted fewer weight regulation measures than the other mothers. Additional research questions will examine infant feeding practices, portion control, physical activity levels, and attitudes toward childhood weight regulation.
- Procedures:
- A) Subjects: Subjects will be 160 mothers of overweight and obese third grade females attending the Vancouver School District elementary schools. School nurses will select 40 children in each of the major National Center for Health Statistics percentile categories exceeding the 50th percentile of weight for height.

Procedures: (continued)

- B) Controls: Sex of subjects and age of daughters.
- C) Measurement Tool: An investigator-developed Childhood Weight Regulation Questionnaire will be mailed to the subjects (see attached copy).
- D) Timeline: The study will be implemented upon approval of the Research Advisory Council. The questionnaires requires approximately ten minutes to complete.
- E) Debriefing: Parent letters accompanying the questionnaires will explain the purpose of the study. Summaries of the results will be made available to participating parents. The researcher will present findings of the study to the school nurses. Both the researcher and thesis advisor will be available by telephone to answer parent questions (see attached letters).
- F) Statistical Analysis: Data analysis will include t-tests of group means to support the hypothesis and Chi-squares and ANOVAs upon scores obtained from the research questions. Threats to reliability include selection and possibly history in some individual instances.

Appendix: Copies of letters accompanying the questionnaire and those for follow-up. The Childhood Weight Regulation Questionnaire.

APPENDIX I

Codebook

Codebook

Column No.	Column Size	Variable Name	Question No.	Code
1	1	GROUP1	GROUP ID	A-D = 1-4
2-4	3	ID1	ID No.	001-105
5	1	CARD1	Card No.	1
6	1	NEWBORN	1	0(Formula, Other)
7	1	M01	1	1(Mostly Formula)
8	1	M02	1	2(Mostly Breast)
9	1	M03	1	3(Breast Entirely)
10	1	M04	1	9(No Response)
11	1	M05	1	
12	1	M06	1	
13	1	MILK	2	0(Other) 1(Skim) 2(1%) 3(2%) 4(3.8%) 9(No Response)
14	1	SOLIDS	3	1(1st Month) 2(2nd Month) 3(3rd Month) 4(4th Month) 5(5th Month) 6(6th Month) 7(7th Month)

Column No.	Column Size	Variable Name	Question No.	Code
				8(8th Month or Later)
				9(No Response)
15	1	FD1	4	0(No Influence)
16	1	FD2	4	1(A Little)
17	1	FD3	4	2(Moderate)
18	1	FD4	4	3(Great Deal)
19	1	FD5	4	9(No Response)
20	1	FD6	4	
21	1	FD7	4	
22	1	FD8	4	
23	1	FD9	4	
24	1	FD10	4	
25	1	FD11	4	
26	1	PORTION	5	0(Fills Own Plate)
				1(Adult Fills Plate)
				9(No Response)
27	1	EVEMEAL	6	0(4 or More)
				1(2 or 3)
				2(1 or Less)
				9(No Response)
28	1	COOKB	7	0(Never)
29	1	COOKL	7	1(Rarely)

Column No.	Column Size	Variable Name	Question No.	Code
30	1	COOKD	7	2(Sometimes) 3(Often) 9(No Response)
31	1	SECONDS	8	0(Any Food) 1(Some Food) 2(None) 9(No Response)
32	1	SN1	9	0(Never)
33	1	SN2	9	1(Rarely)
34	1	SN3	9	2(Sometimes)
35	1	SN4	9	3(Often)
36	1	SN5	9	9(No Response)
37	1	SN6	9	
38	1	SN7	9	
39	1	SN8	9	
40	1	SN9	9	
41	1	SN10	9	
42	1	SN11	9	
43	1	SN12	9	
44	1	SN13	9	
45	1	SN14	9	
46	1	SN15	9	
47	1	SN16	9	
48	1	SN17	9	

Column No.	Column Size	Variable Name	Question No.	Code
49	1	SN18	9	
50	1	CAR	10	0(Not Checked)
51	1	BUS	10	1(Checked)
52	1	WALK	10	
53	1	BIKE	10	
54-55	2	SPORTS	11	01-10(No.Checked) 99(No Response)
56	1	RIDEBIKE	12	0(Unable, has None) 1(Rarely) 2(Moderately) 3(Frequently) 9(No Response)
57	1	WT STATUS	13	1(Under) 2(At) 3(1-9# Over) 4(10-19# Over) 5(20-24# Over) 6(25# and Above) 9(No Response)
58	1	PROBLEM	14	0(No) 1(Yes) 9(No Response)

Column No.	Column Size	Variable Name	Question No.	Code
59	1	MUCH PROB	15	1(Slight) 2(Moderate) 3(Serious) 9(No Response)
60	1	AGE PROB	16	1(Birth-11mo.) 2(1-2 Years) 3(3-4 Years) 4(5-6 Years) 5(7-8 Years) 6(9 Years or Older) 9(No Response)
61	1	TRY RED	17	0(No) 1(Yes) 9(No Response)
62	1	INF1	18	0(No Influence)
63	1	INF2	18	1(A Little)
64	1	INF3	18	2(Moderate)
65	1	INF4	18	3(Great Deal)
66	1	INF5	18	9(No Response)
67	1	INF6	18	
68	1	INF7	18	
69	1	INF8	18	
70	1	INF9	18	

Column No.	Column Size	Variable Name	Question No.	Code
71	1	WAYSTRY1	19	0(Never)
72	1	WAYSTRY2	19	1(Rarely)
73	1	WAYSTRY3	19	2(Sometimes)
74	1	WAYSTRY4	19	3(Often)
75	1	WAYSTRY5	19	9(No Response)
76	1	WAYSTRY6	19	
77	1	SUCCESS	20	0(Faster)
				1(Same Rate)
				2(Slowed a Little)
				3(Slowed Moderately)
				4(Slowed Considerably)
				5(Lost)
				9(No Response)
78	1	YRSTRIED	21	1(1 Year)
				2(2 Years)etc.
				9(No Response)
79	1	DISC1	22	1(Strongly Disagree)
80	1	DISC2	22	2(Disagree)
81	1	DISC3	22	3(No Opinion)
82	1	DISC4	22	4(Agree)
83	1	DISC5	22	5(Strongly Agree)
84	1	DISC6	22	9(No Response)

Column No.	Column Size	Variable Name	Question No.	Code
85	1	DISC7	22	
86	1	DISC8		
87-88	2	AGEDAU	23	7-10 9(No Response)
89-90	2	EDUC	24	Grade Completed 99(No Response)
91	1	INCOME	25	1(Under \$4,999) 2(\$5,000-\$9,999) 3(\$10,000-\$14,999) 4(\$15,000-\$19,999) 5(\$20,000-\$24,999) 6(\$25,000 and Over) 9(No Response)
92	1	FAM SIZE	26	No. Persons Through 8 9(No Response)
93	1	MOMS WT	27	1(< 31 lbs. Over) 2(\geq 31 & Over) 9(No Response)
94-95	2	MHT	27	No. Inches Tall 99(No Response)
96-99	3	MWT	27	No. lbs. 999(No Response)
100	1	SPPROG	28	0(No) 1(Yes) 9(No Response)

APPENDIX J
Parent Letter

525 Cascade Drive
Vancouver, WA 98664

March 24, 1984

Dear Parents:

I am writing to share the results obtained from the Childhood Weight Regulation Questionnaire which you so kindly returned to me last summer. The questionnaire was sent to 234 mothers of 2nd and 3rd grade girls of varying weights.

One-fourth of the mothers who returned completed questionnaires felt their daughters had a weight control problem. Mothers who had attempted treatment for their daughters employed caloric restriction, sports and activity participation, and exercises. They also indicated that their daughters ate less nutritious snacks. Mothers who thought themselves overweight reported more success with their daughter's weight control, but the mothers of the heaviest girls were most unsure of where to obtain advice for their child's weight problem. These mothers, incidentally, averaged $1\frac{1}{2}$ to $2\frac{1}{2}$ inches shorter in height than the heights of the other mothers. This was an unexpected finding.

The study also found daughters are preparing many of their own meals. For instance, 68% of the daughters prepared their own breakfasts "sometimes to often," 50% prepared their own lunches "sometimes to often," and 38% their own dinners "occasionally to sometimes." Parents and schools may want to recognize that these fairly large numbers of children are preparing their own meals and, thusly, may want to reinforce good nutritional choices.

Finally, half of the respondents were interested in school programs to help children regulate their weight. I wish I had asked you what you would have preferred to be included in such a program, but I did receive many written comments indicating nutrition interest. I have met with the school nurses and shared these findings with them. Thank you again very much for returning your questionnaires.

Sincerely,

Carol Hill, R.N.

AN ABSTRACT OF THE THESIS OF
CAROL BRIGHAM HILL

For the MASTER OF NURSING

Date Receiving this Degree: June 8, 1984

Title: Maternal Perceptions and Treatment Measures
Related to Prepubescent Weight Regulation

Approved: _____

Doris Julian, R.N., M.N., Thesis Advisor

Obesity increases one's morbidity and mortality risks, in addition to risks of psychological and social trauma. Some 20-40% of obese prepubescent children become obese adults. Although many factors contribute to an obese condition, a shared environment with obese persons has been highly implicated. Treatments include behavior modification in conjunction with moderate caloric restriction and increased physical activity in a family therapy setting.

This ex post facto retrospective study examined maternal perceptions and maternally-attempted treatment measures related to female prepubescent obesity. Subjects were 137 of 234 mothers of overweight and obese second and third grade females attending eight Vancouver, Washington School District #37 elementary schools and were selected in the following manner: the researcher selected all available females using district height and weight information from each of the major percentile

groups (51-75, 76-90, 91-95, over 95th) of weight for height on the National Center for Health Statistics growth charts. An investigator-developed Childhood Weight Regulation Questionnaire was mailed to the girls' mothers with consent implied by return of the questionnaire. One week past the initial mailing date a combination thank-you and reminder postcard was sent to each subject.

It was hypothesized that the mothers of the most obese females, and also the mothers who perceived themselves as > 30 pounds over desirable weight for height would have attempted fewer treatment measures than the other mothers. Additional research questions examined infant feeding practices, portion control, physical activity, and attitudes toward childhood weight regulation. Data analysis included t-tests of group means to support the hypotheses and Chi-squares and ANOVAs upon scores obtained from the research questions. Threats to reliability included selection and possibly history.

The hypotheses were not supported. Descriptive findings included that mothers are most influenced by their own experiences when making infant feeding and childhood weight regulation decisions, and that large numbers of these children prepare their own meals. Half of the sample expressed interest in school-based children's weight regulation programs, though only a fourth indicated they felt their daughter possessed a weight management problem. Mothers of the most obese females were able to identify that their daughters had a problem, but not perceive its extent in pounds. These mothers waited a mean of two

years before attempting treatment. Caloric restriction, sports and activity participation, and exercises were most often employed, although these children ate less nutritious snacks. Mothers who perceived their own weight status as > 31 pounds overweight reported more success with their daughters' weight maintenance. The mothers of the most obese females indicated they were most unsure of where to obtain help. An incidental finding was that these mothers were significantly shorter by self-reported height than the other mothers within the study.

The research findings have implications for nurses in various settings, as well as in the nutrition education and advertising industries. Recommendations for further research include investigation of maternal heights for those children > 95 th percentile, children's food preparation choices, and emphasis parents would like to see in school-based weight regulation programs.