



Adolescent Health Research Updates

Supplement to the Adolescent Health Plan

No 7 — December 1998

Research Updates are periodically distributed from the Alaska Adolescent Health Advisory Committee (AHAC). AHAC believes that effective planning for the health of Alaska's adolescents should have a strong scientific basis. Alaska's Adolescents: A Plan for the Future, the 1994 publication by AHAC, was the product of the committee's review of research related to adolescent health at that time. In order to stay current with new information, AHAC continually reviews research dealing with a broad range of adolescent health topics. Summary reports are prepared by AHAC members for distribution to people interested in teen health, especially those who use Alaska's Adolescents as a guide for their efforts in the field. Feedback about the usefulness of these updates would be welcomed.

Obesity in Adolescents

Of all the hazards to health and well being faced by adolescents, nutritional ones are among the most widespread. Anorexia nervosa and bulimia get much attention, but obesity is far more common and can involve severe physical and emotional burdens.

This Research Update looks at what we know about adolescent obesity and overweight, and explores the questions of if or how we can prevent or treat these conditions.

Does fat hurt?

Obesity and overweight can be defined by body mass and skin fold thickness measurements. Typically though, obesity and overweight are determined by height and weight graphs. Obese teens have been considered to be those teens who are at or above the 95th percentile for weight; overweight teens have been considered to be those teens who are at or above the 85th percentile for weight. Clinically, the conditions are often determined visually.

As a nation, we are getting heavier at a faster and faster rate, starting in infancy.^{1,2,3} We have more overweight adults than 10 years ago, and the already overweight are getting disproportionately more overweight.^{1,3,4} Alaskan teens are no exception: the Alaska Nutrition News of March, 1993 reports that 35% of our adolescents are overweight.⁵

Is being fat harmful to a teenager? The answer is a definite "yes" for the very obese and a "maybe" for the overweight.^{6,7}

Medical problems for obese teens can include higher blood lipids, adult type diabetes, high blood pressure and some less common problems such as sleep apnea and weight related bone and joint disorders.⁷ The more obese a teenager is, the more likely he or she is to become an obese adult. As obese adults, they will be at risk for lipid, insulin, and hypertension problems, which can lead to earlier death.^{1,9,10}

Overweight teenagers also face this culture's well documented stigma against obesity. Even primary grade school children show strong preferences for thin friends. Fat kids are viewed as lazy and sloppy. A study of college applicants showed that acceptance rates for the overweight were lower in spite of equal admission credentials.⁹

Obese female adolescents go on to experience a lower educational level, a lower income level and a lower marriage rate as adults.¹⁰

Young people, especially girls, tend to worry about their body weight, perhaps because of the stigma against being fat. One national review found that more than 25% of high school students believed themselves to be overweight, but more than 40% were trying to lose weight.¹¹ In Alaska, more than 50% of teenaged girls are trying to lose weight.¹²

An interesting side note is that girls who mature early are especially dissatisfied with their physical appearance, and are less happy, have lower self-esteem and have lower educational achievement than girls maturing at average ages.¹¹ They also are more prone to obesity.⁷

Why kids get fat

We know that genetics influence not only the production of fat cells in children, but also the distribution of fat. In addition, some researchers think genes influence our metabolic rate, insulin production, fat storage activity, physical activity, eating behavior, and even food preferences. Estimates of the degree to which genetics determine total body size vary from 30% to as great as 80%.^{4,13,14} Children of fat parents tend to be fat, but the exact roles of genetics and environmental influences are unclear. Early obesity seems to have a stronger genetic link than adult onset obesity.

However, the rate at which our population is becoming heavier is much too fast to be caused by genetics. Non-genetic causes must also be at work.¹⁵ Some researchers feel the situation can be summed up in a word: Television. Others blame the deteriorating physical activity requirements in schools. An urban childhood, low socioeconomic status, small family, and low physical activity are all correlated with childhood overweight, starting with preschoolers.¹⁴

The causes of overweight seem to be a combination of individual metabolism, eating behavior, and exercise, which are influenced by both genetics and environmental factors.

Metabolism: Set point

Animal studies show that there are specific genes that cause fat cells to produce certain proteins that enter the blood and signal various parts of the body (including the endocrine system and nervous system) to keep fat stored at a set level. This complicated process is known as energy homeostasis or the "set point."

Human studies show that changing the set point is very difficult. Ninety to ninety-five percent of the children and adults who lose weight eventually regain the weight.¹⁴ Even after several years of losing and maintaining a lower weight, metabolism works to regain the weight. Both obese and non-obese people seem to have set points; gaining weight can be as difficult as losing it.¹⁵ Changing the set point in children would presumably be easier than in adults, but we don't know this for fact.

Set points can be moved over time, however, and they are moving upward in our population.¹⁵ From an evolutionary point of view, having efficient protective genetic systems to store fat was beneficial. In this modern age of grocery stores and TV, the body is unfortunately still working with an ancient genetic code that says: store fat.

Eating

Neither when we introduce foods nor the types of foods introduced to babies seems to be a large factor in their weight.¹⁴ The role of genetics in eating behavior is unclear. We know that children's preferring and eating high-fat foods is directly related to the fat status of their parents, who generally provide both the genetic background and the food choices and familiarities for their children.¹³ Studies also show:

Preference for sweet, salty and energy rich (fat) food is apparently in-born, and preference for energy rich (fat) foods is also quickly learned.¹³

Children like familiar foods. And children eat what they like and leave what they don't like.¹³

Children given free access to food will regulate their food intake over time to maintain a stable average. Studies with school children show that when fruits and vegetables are available and accessible at school, more fruits and vegetables are preferred and eaten.¹³

There is some evidence that children model their eating behavior from their parents and their peers.¹³

Too much parent control over children's eating can be harmful. It may keep children from learning their own internal clues about being hungry and full, because they have external rewards for cleaning their plates or are being prompted to eat.¹⁶ Negative effects can also result from either forbidding "bad" foods or pushing "good" foods with children: The forbidden is wanted and the forced food can be rejected.¹³

Peer influence on teen eating behavior is significant.

Unfortunately the adolescent eating pattern is not healthy. In a national survey, only 1% of young people met all U.S. nutrient recommendations. Only one-third of teens get enough fruits and vegetables.¹⁷ (and one-fourth of the "vegetables" are french fries).¹⁸ Fat intake tends to be high.¹⁷ Half of the Alaska teens surveyed reported having chosen some high-fat food that day.¹²

The influence of adult eating patterns may not be particularly healthy either. In Alaska less than 25% of adults eat the recommended amounts of fruits and vegetables.¹⁹ However, a comparison of two nationwide surveys, done more than a decade apart, showed an improvement in the number of adults following national nutritional recommendations for all racial and socioeconomic groups.²⁰

Exercise

Nationwide, as adolescents get older, physical activity decreases, especially among girls. Television viewing and weakened physical activity requirements in schools are seen as two specific factors that contribute to lowered activity levels and increased number of overweight teens.^{4,14,21} In addition, parents, peers and genetics are predictors of physical activity in young people.²²

TV watching is directly and strongly correlated with obesity. The more TV time, the more weight. The sedentary nature of viewing TV replaces more active pursuits.^{21,22} On average, children and teens spend 22 hours each week watching TV, nearly the amount of time spent in school: 33 hours per week.²³

In schools, less time is spent in physical activity, and there is less participation of older students, especially teen girls.^{4, 14} Physical education classes include about a third of all school children and about a third of class time is in actual physical activity. Alaska teens do better than teens in most other states. According to the 1995 Youth Risk Behavior Survey, 72% exercise 3 times a week or more; the national average is 64%. Female and Native teens exercise less than other groups.²⁴

Active parents have more active kids by a wide margin.²²

Peer influence on activity becomes important in the teenage years.²²

Some studies have shown a genetic link to activity preference.²²

Treating overweight kids

At least one researcher has noted that independent dieting to control or maintain weight is very common in the population and may be successful for many people. Obese people in clinical studies who lose weight but then regain it may be a subset of the population and not entirely representative of all dieters.²⁵

Studies have shown positive short term effects of exercise on weight loss in children and adolescents.²² Studies of long term effects are lacking. A 1997 comprehensive review by Epstein of the treatment of childhood and adolescent obesity described more than 30 studies, but only two were long term (5 years and 10 years).²⁶ And subjects in the 10-year study were few and not broadly representative of our nation's children.²⁷ We can summarize Epstein's review as follows:

- Total calorie intake has been studied more than the source of calories (fat , protein, carbohydrate).
- Diet information alone does not result in weight loss.
- Exercise alone did not work in at least one study.
- Treatment plans featuring diet plus exercise have better results.
- Lifestyle exercise, rather than programmed aerobic exercise is more successful.
- A diet called the traffic light diet (green for go, red for stop), used by the reviewing author in his own studies, within a comprehensive treatment program of exercise, family, and behavioral components, can decrease obesity in preadolescents.
- Parent involvement in school behavioral change programs seems to be an important factor for success with younger children, but does not improve results with preteens or teenagers.²⁶

Epstein also has done some studies on reinforcement techniques for changing sedentary behavior. His conclusion is that it is "premature to assume that there are standardized treatments that are efficacious---."26, p.564

Commercial programs

Good information on popular programs such as Weight Watchers is meager. Short term weight losses (up to one year) are well documented.^{25,26} There are various commercial weight loss programs that are marketed to adolescents. SHAPEDOWN is one with university research backing. It uses a broad cognitive, behavioral, affective approach that includes diet, exercise, parent involvement, and communication. The frequently quoted validation study was on modest numbers of participants from four different

places in California, evaluated at 15 months. There was about a 9% mean weight loss in the study group.²⁸

School-based Treatment

Although Epstein's review claims "initial research on school-based programs has not been promising,"^{126, p. 568} behavior modification as well as exercise and nutrition education have been used in school based treatment for obese adolescents. Short term results of a third of obese students losing weight are reported.²⁹

A review of school based interventions³⁰ indicates that:

Nutrition-education-only programs have failed.

Programs that include behavioral diet change, peer education, and large multifaceted interventions have shown short term results.

Changing the environment, (offering a good healthy selection in the school cafeteria) has shown promise. A large study (CATCH) of a broad spectrum of elementary schools across the nation found that changes in the fat content of school lunch program plus increasing physical activity, resulted in changes in eating and activity behavior over a 3 year period.³¹

Dieting: is there a downside?

Worries about possible negative effects of dieting include concerns that dieting can lead to unhealthy nutrient intake, unhealthy practices like vomiting and purging, unhealthy weight swings, and unhealthy psychological effects like decreased self-esteem and depression.^{6, 25} Reviews indicate that

Nutrient intake seems to be adequate in most dieters.²⁵

Dieting is a risk factor for anorexia and other eating disorders, but this may be a subset of adolescents with other preexisting psychopathology.²⁵

Both positive and negative psychological effects of dieting have been reported. Behavior therapy seems to be associated with improvement in mood and feelings of well being.³²

Increased self esteem may in some cases be an antecedent to dieting and weight loss rather than a result.³²

Unnecessary dieting is a major concern, especially for adolescent girls.³² As one author states, "The aim of weight reduction should be to decrease morbidity rather than to meet a cosmetic standard of thinness".^{14, p. 402}

Conclusions

Adolescents are getting heavier, as are all other age groups. Obesity in teens can lead to adult obesity, which can lead to increased disease and earlier death. Obesity in teens is associated with poor self esteem and other negative effects, including poor peer relationships and barriers to educational and employment opportunities. Adolescents in general tend to be dissatisfied with their body weight. Both overweight and normal weight teens choose to diet.

Improving school lunches and physical activity holds promise for school based programs. Treatment of obese adolescents has not yielded highly satisfying results. A focus on not gaining more weight may make more sense than efforts to lose large amounts of weight.

There seems to be a metabolic set point for body fat which is difficult to alter, making permanent changes in body weight hard to accomplish. Certain children are most at risk for overweight, especially those with obese parents. Obesity often starts in the preschool years. Like so many health problems, prevention is easier than treatment. Diet and exercise patterns can be influenced by parents in the early years. This is where our efforts need to focus.

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