Examining Parental Expectations of Good Childhood Nutrition

Table of contents:

Chapter 1: Introduction

Children's health is an important concern in any discussion about the evolution of human diet because child health has major ramifications for well-being in adulthood. Most basically, survival through childhood is necessary for reproductive success. Mortality rates are higher in infancy and early childhood than at any other time except old age, and thus we might expect that there would be a great opportunity for diet to act as a basis for natural selection during childhood. Even when poor childhood health does not result in childhood mortality, it can have negative consequences later in life, such as a reduced ability to perform energy-intensive activities or a reduced ability to successfully bear children.

A healthy and proper diet has an impact upon disease, physical health, emotional well-being, and provides numerous other benefits. Thus it is important for persons to become nutritionally aware early in order to maintain the health of themselves as well as the health of their children. Surprisingly, there have been few research studies which address the importance of learning children's balanced nutrition, and concurrently provide an evaluation of the material taught/learned. Some of studies showed that by eliminating refined carbohydrate foods, and in its place establishing fresh foods, both behavior and learning patterns of the children improved. This study also supported the theory that certain behavioral disturbances of children, such as hyperactivity, is related to various foods (Schlosser, 2001). Cruz MI (2003) studied the behavioral effects of breakfast and simple sugars in normal and psychiatrically impaired children. They found that a healthy breakfast, i.e. one that is well-balanced among the five major food groups, enhanced the capacity of the children to do academic work and benefited the children emotionally. The skipping of breakfast by children had an adverse effect on the child's late morning

problem-solving performance and that a relationship exists between a healthy nutritional status and a child's capacity to learn. Schlosser (2001) taught a nutritional education program to ten to thirteen year-olds and found that while nutritional knowledge improved, dietary quality and selection of healthy foods did not improve.

The purpose of the current paper is to establish a model for healthy child nutrition, while concomitantly encouraging parents to develop an interest in their child's intake habits and learning proper nutrition themselves. This study explores each stage across the life of a child in the context of physiologic, social, psychological, and cognitive development, which influence nutrition needs and food-related behaviors and practices. Unique characteristics and nutrition-related concerns are emphasized along with some of the basic information and skills needed to apply nutrition principles. The paper also explores techniques for measuring and evaluating nutrition status, and planning and counseling for changing food-related behavior and improving nutrition status. In each section interrelationships among physiologic, biochemical, and sociological factors and their impact on nutrient recommendations and food behaviors are explored. Areas of nutrition that are common to many stages of the child development —eating dilemmas and physical activity and fitness—will be discussed thoroughly.

Chapter 2: Literature Review

2.1. Basics of nutrition and balanced diet

Nutrition is a complex science that involves consideration of more than 40 nutrients. Nutrients are those substances which are essential to growth and health into adulthood and beyond. From a practical standpoint these nutrients fall into six categories: carbohydrate, fats, protein, water, vitamins, and minerals. Nutrients perform one or more of the following functions: they provide energy; form structural components of the body; and/or regulate body functions. Some nutrients, such as protein, fulfill all three functions, whereas others, such as vitamins, which function only as regulators, fulfill only one.

Food Energy

The fuel or energy obtained from food is measured in kilocalories or joules. The term "calorie" is often substituted for kilocalorie in popular literature. In fact, the Nutrition Facts Panel required for nutrition labeling lists the energy content of foods in calories. The three components of energy expenditure are basal metabolism or basal energy need, the thermic effect of food, and physical activity. For adults the basal energy need is estimated to be between 1300 and 1800 kilocalories per day (Schlosser, 2001), which, depending on activity levels, represents one-half to three fourths of total energy expended. A small portion (6% to 10%) of the daily energy is expended as the thermic effect of food. The remaining physical activity can be highly variable. Individual levels of expenditure depend on the individual's body weight as well as the intensity and duration of the activity.

Macronutrients

The major function of dietary carbohydrate and fats or lipids is to provide energy. Dietary protein also yields energy, but its primary role is to provide amino acids for synthesis of body proteins. While alcohol also provides energy, it represents predominantly "empty calories" providing few other nutrients and, in excess, alcohol can have detrimental effects on nutritional status and health.

Protein performs many important functions in the body. A major role is building and maintaining structural body tissues such as muscle, bone matrix, and connective tissue. Other body proteins include serum proteins such as albumin, some hormones and enzymes, as well as those proteins complexed with nucleic acids (DNA), carbohydrates (glycoproteins or mucoproteins), chromophores (rhodopsin for vision in dim light), lipids (lipoproteins), and metals (hemoglobin). Through this variety of different structures, forms and locations, proteins are essential to a multitude of functions in the body.

In the typical British diet, protein provides from 12% to 17% of the energy. In diets that provide sufficient energy to maintain body weight, this level meets and exceeds recommended levels of intake. (Ernst, 2004)

Carbohydrate is of prime importance in the diets of people throughout the world. It provides quick energy as well as the largest proportion of energy in the total diet. It is available in an abundance of foods and is the least expensive source of energy. Carbohydrate is obtained primarily from plant foods and is usually divided into simple (sugars) and complex (starches). Dietary fiber is a complex mixture of many indigestible substances, of which most, but not all, are carbohydrates. Epidemiologic research on dietary fiber suggests that it may be important in the prevention of constipation, diverticulosis, and colon cancer.

Lipids are an important source of energy to the body and provide fatty acids for the synthesis of many body compounds. Most dietary lipids are in the form of triglycerides. The characteristics of individual dietary fats are determined by which fatty acids are present in the lipid. Fatty acids have been classified, based on structure, as saturated (no double bonds between the carbon chains), monounsaturated (one double bond), and polyunsaturated (two or more double bonds). Polyunsaturated fatty acids are further classified by the location of the double bonds in the carbon chain. Fatty acids essential for humans are derived from linoleic acid (18 carbons, 2 double bonds) and linolenic acid (18 carbons, 3 double bonds). Linoleic acid is referred to as an omega-6 fatty acid and linolenic acid as an omega-3 fatty acid, indicating that the double bond occurs at the sixth and third carbons from the methyl (-CH 3) end of the fatty acid, respectively. Recently, attention has been focused on the potential health benefits of omega-3 fatty acids, which are found in fish and fish oils (Bellinger, 2001).

Over the last several decades the role of the kind and amount of dietary fat in the development and/or progression of chronic diseases has been studied extensively. *Cholesterol* is a fat-like substance that is found in foods of animal origin and also is synthesized in the human body. It is an important component of cell membranes and is found in many tissues, such as the brain and nervous system. Cholesterol and its derivatives are also precursors of vitamin D and various hormones and bile acids.

Lipoprotein. Because cholesterol is not soluble in water, it moves through the bloodstream as a component of lipoprotein molecules. Most of the cholesterol is transported by three types of lipoproteins: high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very-low-density lipoprotein (VLDL). Cholesterol found in each of these lipoproteins is referred to, respectively, as HDL cholesterol, LDL cholesterol, and

VLDL cholesterol. The sum of cholesterol in the lipoproteins is the total serum cholesterol. Numerous studies have established that both high total serum cholesterol and high LDL cholesterol levels are related to increased risk of coronary artery disease and that high HDL-cholesterol levels are inversely related to risk (Schaefer, 1993).

Water

Although it is often overlooked, water is the most immediate of the nutrient needs and is essential for almost every body function. For most individuals thirst mechanisms automatically ensure adequate fluid intake, but under circumstances of rapid water loss from the body or impairment of the thirst sensation fluid levels can become depleted, which may lead to dehydration.

Minerals

The minerals that are essential in human nutrition are as diverse as their functions in the body itself. They are constituents of body compounds such as bone, hemoglobin, and enzymes. Minerals also function as free ions in hundreds of body reactions.

Vitamins

Vitamins are found in food and the body in exceedingly small quantities, have diverse chemical structures, and are essential as regulators of body metabolism. A vitamin may participate in one, several, or even hundreds of reactions in the body. The absence of any vitamin can lead to lowered tissue levels and, eventually, negative effects on health and, in extreme circumstances, death.

Nutrition is an evolving science. As research continues to expand our understanding of food and its relationship to health, recommendations for dietary intake are constantly

changing. There is evidence that some substances that do not meet current criteria for a nutrient may be required in certain circumstances or for very specialized functions. Some dietary components currently under investigation that may, in the future, be considered essential in human nutrition include phytochemicals, carotenoids, carnitine, and glutamine.

2.2. Child growth and development needs in child nutrition

Childhood, the period between infancy and adolescence, encompasses great diversity in size, age, growth rates, and developmental skills. The timing and pattern of growth and development in an individual are influenced by heredity, hormones and environment, including nutrition. Growth patterns are highly individual, erratic at times, with spurts in height and weight followed by periods of little or no growth. In healthy children these patterns usually correspond to similar changes in appetite and food intake.

An adequate intake of energy and nutrients is essential to maintain health and support growth. In addition, childhood is a critical period for development of the attitudes and behaviors that can influence lifestyle and health habits through adolescence into adulthood. During this time, there are rapid changes in physiologic, psychological, and social growth and development, which may place some children at nutritional risk.

In this paper, childhood growth is divided into two periods. The preschool period includes the year between 1 and 2, often designated as late infancy or toddlerhood, and ages 2 to 6 years. Compared to infancy, the preschool years are characterized by a decreased rate of growth, and a child's interest in eating may diminish during this period. The ages of 6 to 10 years in girls and 6 to 12 years in boys are often referred to as the "latent growth period," a period during which growth is slow and steady, preceding the prepubertal growth spurt.

Growth and Body Composition

As in infancy, the growth of a child is measured in terms of gains in stature and weight and, in the first 3 years, head circumference. During childhood there is a general deceleration in the rapid incremental height and weight gains that were characteristic of infancy. Annual increments are about 2.5 kg (5-6 lb) and 12 cm (5 in) during the second and third year of life and approximately 6 to 8 cm (2.5-3.5 in) and 2 kg (4.5 lb) from 3 to 5 years of age.

During the early school years the velocity of growth slows but remains relatively steady until the preadolescent growth spurt at about 10 years of age in girls and 12 in boys. Increments in height are generally 6 cm (2 in) per year, and increments in weight are 3 to 3.5 kg (7 lb) per year. Limb length increases more than trunk length, resulting in a change in body proportions. The upper to lower body segment ratio is about 1.3 at 3 years, 1.1 at 6 years, and 1.0 at 10 years of age.

Growth of the brain decelerates after infancy, and head circumference, a rough indicator of brain growth, is usually monitored only until 36 months of age. Whereas head circumference increases approximately 12 cm (4.5 in) during infancy, the gain is only 2 cm (0.75 in) in the second year. After the Body proportions change with growth and development.

Major body compartments are water, protein, fat, and minerals. By the time the child is 2 to 3 years of age, the proportion of body weight that is water is 60% to 65%, similar to that of an adult. Because of the growth of new cells, the extracellular fluid compartment decreases to about 20% to 25%, while intracellular fluid increases to about 35% to 40% of body weight. Rapid shifts of fluid between intracellular and extracellular compartments are

less likely, making the child less vulnerable to dehydration than the infant. Throughout the childhood years the percentage of weight as fat remains relatively constant, while fat-free body mass (skeletal muscle, bone, and soft tissue protein) increases. By 10 years of age, lean body mass has reached approximately 17% in boys and 15% in girls. Mineral content, less than 3.5% in infancy, increases gradually throughout childhood to reach 4.8% of body weight by the end of puberty.

Development

The preschool years, ages 1 to 6 years, are a period of rapid social, intellectual, and emotional growth. As overall physical growth is decelerating, motor skills are being fine-tuned. These changes influence the development of eating skills and the child's successful participation in the feeding process.

PHYSICAL DEVELOPMENT Although there are only limited increases in head size after 2 years of age, there are significant changes in facial configuration during the preschool period. The length of the skull increases, and the face tends to grow proportionately more than the cranial cavity. The jaw widens to accommodate development of permanent teeth.

As the second year progresses some of the subcutaneous "baby" fat is lost, and the plump infant slowly evolves into a lean and muscular child. During the third, fourth, and fifth years, most children are lean in comparison with their earlier body configuration. The protuberant (projecting) abdomen characteristic of the second and third years of life generally disappears by the fourth year.

NEURODEVELOPMENT Toddlers and children in this age group derive pleasure from the exercise of new skills. During the second year the child moves from an awkward

upright stance and wobbly walk to a high degree of locomotor control. At 18 months he or she is able to run stiffly, and by 24 months, he or she runs easily. Motor skills become more sophisticated. By the end of the fourth year the child can ascend and descend stairs, and a year later he or she can hop and skip.

Fine motor skills also progress rapidly during the preschool years. At 12 months a toddler is able to pick up and release a pellet or piece of food, and by 18 months he or she is able to put it into and dump it out from a small bottle. An 18-month-old can spontaneously scribble; a 3-year-old can imitate crudely the drawing of a cross; a 5□ year-old can copy figures in correct proportions. These skills are reflected in the progression from using hands to eat finger foods to effective use of a spoon and fork.

COGNITIVE DEVELOPMENT Healthy preschool children are often described as alert and curious as they actively explore their environment. From ages 1 to 6 years, the imitative and conceptual behavior of infancy continues to evolve. During the second year the child develops a sense of self. She demonstrates memory, anticipation, and original thinking and becomes capable of taking initiative and making choices in behavior. The preschool child becomes increasingly concerned with the expectations of adults.

The preschool child learns to use speech for communication with increasing precision. The child who has a vocabulary of 10 words at 18 months of age has progressed to putting three words together by the second birthday. The 3-year-old can use short sentences and sustain a brief conversation. Longer conversations occur in the 4th year, and by age 5 language is used in most social functions.

PSYCHOSOCIAL DEVELOPMENT During the second year imitative behavior extends from parents to siblings and playmates. Play is generally solitary, with occasional contests

with other children over possession of objects or toys. Frustration or anger with societal expectations may result in temper tantrums and other outbursts.

As children progress through the preschool period they become increasingly aware that they will become larger children and eventually adults and begin to emulate role models. Often they enter play activities with other children and eventually act out imaginative roles. Late in this period, peer groups begin to influence the child's preferences and behavior.

Early School Years

PHYSICAL DEVELOPMENT Although there is great variation in body fat among individual children at any stage of growth, body fat remains a relatively constant percentage of body weight during the school years. Because of shifts in accumulation and location of body fat, most children develop a slimmer appearance as childhood progresses. With the increase in skeletal muscle, the child becomes stronger. Development of skeletal muscles means an increase in intracellular water, because skeletal muscles have a high water content.

Throughout life, bone is continually remodeled or rearranged in response to the stress of body weight and exercise. This is especially true of trabecular bone. Bone is in a dynamic state of formation and resorption. The outer shell, cortical bone, grows by adding new tissue on the outer surface and resorbing from the inner surface. In the growing years, bone formation exceeds resorption and. School-age children are of varying sizes and grow at different rates.

NEURODEVELOPMENT The school years are a time of vigorous physical activity. The spine becomes straighter, but the child's body is flexible. The motor skills developed in

earlier years, such as running and climbing, become increasingly directed toward physical activities and games that require specialized motor and muscular skills.

COGNITIVE DEVELOPMENT During the early school years the child develops an increasing ability to monitor his or her own mental processes. Intuitive thinking advances to the concrete operational level. Concepts of conservation of volume and mass are achieved. In art, the notion of perspective evolves. Speech becomes reasoning and expressive.

PSYCHOSOCIAL DEVELOPMENT The early school years are complex as children grow physically and The long bone has a central part (shaft) and two terminal parts (epiphysis). The shaft of the bone consists of cancellous bone on the outside and trabecular bone on the inside. The epiphyseal growth plate allows bone lengthening. When the epiphyses close, linear growth ceases. They develop a sense of responsibility and of realistic accomplishment. By ages 5 and 6 years, school has assumed a central role in their lives. As they become increasingly independent, friends and acquaintances become a significant influence in forming standards of behavior. The habits and patterns that children develop during these years are strong influences on later dietary patterns, health, and well-being.

2.3. Energy and nutrient needs of children

Children's nutritional needs are determined by the individual child's size and rate of growth. Because children come in many sizes, growth rates change from day to day, nutritional needs and dietary intakes vary widely. The Recommended Dietary Allowances (RDAs) for children from 1 to 10 years make no distinction between boys and girls. Much of the information used to determine these recommendations was extrapolated from data from studies of adults. As for all of the RDAs except energy, a margin of safety or

sufficiency over requirements is included, which means that recommended levels exceed the physiologic requirements for most children. It should be remembered that the RDAs are meant to be applied to groups, not to individual children.

The diversity of energy needs of healthy children is related to differences in the energy expended for growth, basal metabolism, physical activity, and the thermic effect of food. The energy allowances are based on age groups of 1 to 3 years, 4 to 6 years, and 7 to 10 years. A reference weight and height is established for each age group.

Because the size of children varies, and because growth occurs in spurts, age alone is not an adequate criterion for energy needs. Kilocalories per kilogram (kcal/kg) of body weight is an appropriate reference for children between the 15th and 85th percentiles on the NCHS growth charts, but kcal/kg would be misleading for underweight and overweight children. Kilocalories per centimeter (kcal/cm), as shown in Table 6-5, would yield a more appropriate estimate of energy needs for an individual child. For example, on the RDA chart, the energy recommendation for a child 4 to 6 years old is 1800 kcal. If a 5-year-old is 112 cm (44.1 in) tall, it is an appropriate level. However, a 5-year□ old who has short parents and is 100 cm (39.4 in) tall would require only 1600 kcal, whereas a tall child of 125 cm (49.2 in) might need 2000 kcal each day. Such energy recommendations are only guidelines, and the child's appetite is a better indicator of day-to-day needs.

Protein

Adequate protein is essential to support optimal growth in children. For dietary protein to be utilized effectively, sufficient energy must be consumed to make amino acids available for protein synthesis. Recommendations for protein intake range from 0.18 to 0.21 g/cm of height for ages 1 to 10 years. The values established for protein assume the diet contains a

mixture of animal and vegetable protein and that energy intake is adequate to support growth.

Data from the USDA Food Consumption Survey (1985) indicate that American children consume approximately 16% of their kilocalories from protein, a level that exceeds the RDA. Children who have low food intakes and must use protein for energy may be at risk for malnutrition.

Vitamins and Minerals

Minerals and vitamins are essential to adequate nutrition. Although studies of food consumption of children in the United States indicate that intakes of some nutrients are likely to be low, clinical signs of vitamin or mineral deficiencies are rare. Intakes below recommended levels are found most frequently for calcium, iron, ascorbic acid, vitamin A, folate, and Vitamin B 6 (USDA, 1985). Children at particular risk for inadequate diets are those from low income families and other groups with limited food and health resources, particularly homeless families.

VITAMINS Vitamins function in numerous metabolic processes. Vitamin needs are often dependent on en ergy intake or the levels of other nutrients. Most of the RDAs for children have been extrapolated from studies on infants and adults.

CALCIUM Children require calcium not only to maintain existing bone but also to support growth of new bone. Approximately 100 mg of calcium are retained as bone each day, and this amount doubles and triples during peak periods of adolescent growth (Matkovik et al, 1990). The RDA for calcium is only a guide because of the large variability in calcium requirements. Calcium needs of individual children are influenced

by the velocity of growth, the efficiency of calcium absorption, and the availability of other nutrients, including phosphorus, vitamin D, and protein.

An adequate intake of calcium throughout childhood, adolescence and early adulthood is needed to attain peak bone mass (Johnston et al, 1992), which is believed to diminish the risk of bone loss later in life (Matkovik et al, 1990).

Bone mineral density in children may be enhanced by calcium intakes greater than the current RDA. A recent study compared bone mineral density of 22 pairs of prepubertal identical twins. One twin of each pair consumed 1600 mg of calcium a day and the other 900 mg per day. After 3 years, the twin who had the higher calcium intake had a greater bone density. A similar increase in total body and spine bone was observed in 12-year-old girls who increased their calcium intake by 30% for 18 months (Lloyd et al, 1993).

Because dairy products are the major sources of calcium, children with limited amounts of these foods in their diets are at risk for calcium deficiency. Attention also must be given to vitamin D intake because it has a major role in calcium absorption and metabolism. For children with limited exposure to sunshine, meeting the RDA of 10 µg they dissolve calcium and phosphate. As mineral loss continues, the enamel breaks down, producing visible tooth destruction.

The ability of a food to be cariogenic is related to its ability to produce acid. Foods should be selected on the basis of their nutritional contribution to the diet but, because ingestion of carbohydrates presents an acid challenge to the teeth, it is desirable to limit the frequency of food consumption and encourage brushing following meals and snacks (American Dietetic Association, 1996).

The fluoride ion, when present at the tooth surface, acts to inhibit enamel demineralization and encourages calcium and phosphorus to leave saliva and remineralize the tooth as well as inhibit formation of dental plaque. For Parts of a tooth and its supporting structure.

In addition to fluoride, a program to avoid accumulation of plaque and prevent dental caries and periodontal disease includes brushing, regular use of dental floss and regular professional care beginning by 2 years of age.

Consumption of dietary fiber in childhood is associated with important health benefits, particularly the promotion of normal laxation (Williams et al, 1995). It may also help reduce future risk of cardiovascular disease, some cancers, and adult-onset diabetes. In 1995, the Conference on Dietary Fiber in Childhood concluded that current dietary fiber intakes of children in the United States are suboptimal (Saldanha, 1995) and recommended increasing dietary fiber in childhood by increasing consumption of fruits, vegetables, and cereals and other grain products. According to these recommendations, children older than 2 years should increase their fiber to an amount equal to or greater than their age plus 5 g. Thus, fiber intake would increase from 8 g/day at age 3 years to 25 g/day by age 20.

High-fiber diets are not recommended for children younger than 1 year of age, and caution should be exercised in the use of high-fiber foods for older children. Foods high in fiber usually have low caloric density and, if consumed in large quantities, the total diet may not provide adequate calories for growth. A high fiber intake may impair the absorption of certain essential minerals, such as calcium, iron, zinc, copper, magnesium, and phosphorus (Committee on Nutrition, 1993).

2.4. Factors influencing good food

Poverty

Poverty is a significant risk factor threatening the health of children. Nationwide, one out of every five children lives in a family whose income is below the poverty level. Despite the availability of food and nutrition programs (discussed in Application 6), economically disadvantaged children have a greater prevalence of short stature (Yip et al, 1993) and an increased risk of nutrient deficiencies, especially among subgroups (Drake, 1991) and homeless children (Taylor and Koblinsky, 1993).

The 1990— 92 Consumer Expenditure Survey reveals that poor households with children spend 32% of their income on food, compared to 16% for non-poor families. However, the annual expenditure for food of poor households was approximately $2,500 less, even when poor households included more people (Lino, 1996).

Data from the Food Consumption Surveys in the United States and Canada (USDA, 1986; USDA, 1993; Evers and Hooper, 1995) indicate that average kilocalorie intake levels for children are less than those recommended but that mean nutrient intakes exceed the recommended levels for many nutrients. Mean levels of intakes in large surveys can mask large swings in intake, however. Although more than 80% of children in these surveys met target levels for nutrients, obviously, many did not.

In one survey, questions were asked about household food insecurity. Children were asked if enough food and enough of the kinds of food they wanted were available. As responses moved from more food secure to less food secure, the mean level of energy intake for children fell and levels of fat and saturated fat increased (Kennedy and Goldberg, 1995).

Family

The infant's rapid growth is reflected in her insistent demands for food. As infancy ends and toddlerhood begins, the slowed rate of growth is accompanied by a dramatic decrease in appetite. During early childhood, growth is steady but sporadic. Because a child's appetite ordinarily reflects his or her rate of growth, food intake is often inconsistent. Parents may become concerned that their young child is not eating enough. Such concern can lead to unnecessary anxiety over the child's eating habits and even create a battlefield between the parent and child in the kitchen and at the dinner table. In reality, studies of daily intakes of children have found that, although there was a high degree of variability from meal to meal, overall energy and nutrient intakes were relatively constant (Birch et al, 1991, Shea et al, 1992).

Dietary habits are formed early in life and often establish patterns that are carried into adulthood. Dietary patterns are shaped by the availabile choices and depend on food availability as well as cultural, environmental, and societal factors. Feeding young children depends on providing a variety of nutritious foods to meet nutritional needs and a social and emotional environment conducive to the enjoyment of food and the development of positive eating behaviors. In the preschool years, parents usually determine what foods are available to children and how they are presented. Not unexpectedly, there is a significant correlation between parents' and children's food preferences and attitudes toward food. Parents are responsible for providing young children with foods that are nutritionally and developmentally appropriate at regular mealtimes and snacks. Although parents provide food to the child, it is the child who determines how much he will eat or even if he will eat. Allowing a child to make that decision, within limits, creates a structure that promotes positive eating behaviors.

Social and economic changes during recent decades have affected the family significantly. There are more single-parent families, most of which are headed by women. In addition, more mothers are employed outside the home, which may influence food patterns due to less time available for food shopping and preparation, and more meals eaten away from home. An analysis of the nutrient contents of the diets of children 2 to 5 years of age in the Nationwide Food Consumption Survey, however, found that maternal employment alone did not diminish the quality of the child's diet (Johnson et al, 1992). A recent survey conducted by the Food Marketing Institute and Better Homes and Gardens magazine found that having dinner together is a strong commitment of American families. Forty-three percent of families with young children indicated they ate dinner together 7 days a week, and another 28% said they ate together 4 to 6 times weekly (Food Marketing Institute, 1995).

Peers

As children move into daycare, preschool, or school, food choices are influenced increasingly by people outside the home. In the daycare or preschool setting, meal and snack times may provide an opportunity to expand a child's exposure to and acceptance of new foods. As the child becomes increasingly concerned with peer acceptance, eating becomes more of a social activity away from home.

Media and Advertising

Television reaches many children before they are capable of verbal communication. It has been estimated that children and adolescents in the United States watch 22 to 25 hours of television each week (Huston et al, 1992). Preschool children usually are not able to discriminate between regular programming and commercial messages and often watch

commercials more closely than older children. Because commercial messages are based on emotional or psychological appeal and often promote products of low nutrient density, they may not support development of positive eating habits. Approximately 60% of all advertising shown during children's programming is for food products (Sylvester et al, 1995), most commonly for sweetened breakfast cereals, snack foods, candy, cookies or other desserts, and fast food restaurants.

There has been much discussion of the potential contribution of television viewing to the development of obesity in childhood. It may be that excess television viewing promotes increased snacking and inactivity, a lifestyle that is consistent with the development of obesity (DuRant et al, 1994). Insofar as it precludes other activities that require greater energy expenditure, extensive television viewing may promote inactivity. It has been observed that leaner children watch less television and are more physically active, and it is likely that television viewing is a manifestation of an individual who chooses to be less active.

Nutrition Knowledge and Education

The education level and nutrition knowledge of parents are important factors in determining foods available to their children. Young children are knowledgeable about nutrition. They can name the five food groups, and are able to understand the general relationship of food to exercise, body fat, and health (Murphy et al, 1995). Children who are allowed control over their food intake are significantly more aware of the role of foods in energy balance and are more likely to make healthful food choices (Anliker et al, 1992). Although the use of pressure or rewards may result temporarily in a child eating a certain food or meal, the long-term effects of such behavior may have a negative impact on food habits (Birch et al, 1984).

2.5. Undernutrition

Severe Undernutrition

With favorable conditions, a child will follow a genetically predetermined growth curve. Growth retardation is the inevitable consequence of inadequate food intake, however. In developing countries, growth retardation is primarily the result of a synergistic relationship between inadequate food intake and infection, whereas in developed countries it is more frequently the result of inadequate absorption, chronic disease, psychological stress, or nonorganic failure to thrive. The overall impact on an individual child's growth is determined by the type, timing, and duration of the nutritional deficit.

Successful nutrition rehabilitation depends on correction of the underlying condition and improvement of nutrient and energy intake. Initial dietary management begins with small, frequent feeding, with progressive increases in volume and concentration. The term "catch up growth" is used to describe the acceleration in growth that occurs when a period of growth retardation ends and favorable conditions are restored. Weight gain may occur at a rate several times faster than that of normal healthy children the same age. The energy cost of weight gain can range from 10 kcal/g of muscle gained to 2 kcal/g of fat (Solomon, 1985).

Undernutrition and Cognition

Severe undernutrition occurs infrequently in North America, but the impact of moderate undernutrition or inadequate food intake is of concern. Recent investigations have explored the subtle behavioral and cognitive consequences of inadequate intake and short-term fasting. Such studies have been hampered by difficulty in measuring cognition and

distinguishing the effects of nutrition from those of genetics and other environmental factors.

Measuring Cognition

Most development in the human brain occurs prenatally and during the first 2 years of postnatal life. Cognition in infants has been measured using developmental scales, most commonly the Bayley Scales of Mental and Motor Development (BSMMD). These scales assume that observed behavior is a reflection of intelligence or mental competence. For preschool and school-age children, IQ tests, learning tasks (such as discrimination and oddity learning), and school achievement are used most often to estimate cognitive development.

Short-Term Fasting and Cognition

For decades it has been accepted that good nutrition has a positive effect on a child's ability to learn and that skipping a meal, especially breakfast, can have a negative impact on learning. In the 1950s, a series of studies suggested academic performance was improved when children consumed breakfast, but, due to small sample sizes and poor experimental designs, no definitive benefits could be documented.

In the 1980s, carefully controlled experimental studies in a controlled setting measured problem-solving performance of well-nourished 9- to 11-year-old children after they ate breakfast and after they skipped breakfast (Pollitt et al, 1982; Simeon et al, 1989). When the children ate breakfast they made fewer errors on tasks of picture identification, response to stimulus on a computer display, and arithmetic tests than when they had skipped breakfast.

The acute effects of skipping breakfast involve the short term physiologic changes associated with a diminished supply of nutrients to the brain. Under normal short-term fasting conditions, homeostatic mechanisms attempt to maintain blood glucose within physiologic ranges to ensure adequate brain function. A prolonged fast requires more adaptation on the part of the body to maintain blood glucose levels. It may be that a decline (even within normal physiologic range) results in metabolic changes that influence cognition.

Over the past several years there has been increasing evidence that a moderate elevation of blood glucose regulates a variety of brain functions, including memory and learning. Brain scans show that cognitive functions increase the rate at which glucose is metabolized, and there is some evidence that moderate increases in blood glucose levels improve cognitive functioning in children (Hall et al, 1989). One proposed mechanism by which raised blood glucose levels may influence cognition is through the synthesis of acetylcholine, a neurotransmitter that has a well-established role in memory functions.

These recent studies led participants in a 1995 International Symposium on Breakfast and Performance and Health to conclude that children who skip breakfast are less efficient in problem solving, have reduced recall of newly acquired information, and have decreased verbal fluency and creativity (Pollitt, 1995). The conferees encouraged development of policies to promote recognition of the importance of breakfast and intervention to ensure that breakfast is available to children.

Eating breakfast also has a long-term impact on an individual's nutrient intake. When breakfast is skipped, the nutrients usually consumed at the breakfast meal are not recovered from intake during the remainder of the day (Nicklas et al, 1993). Nonetheless, examination of data from national surveys indicates a decline in breakfast consumption

across all age groups. It is estimated that on any given day as many as half of school-age children skip breakfast, but a school breakfast program is associated with decreased absenteeism and tardiness (Pollitt, 1995).

2.6. Nutrition labelling

In this era of health consciousness, British people are actively interested in what they eat. Unfortunately, in spite of the vast quantity of nutrition information available, it is difficult for consumers to make informed food choices. In response to the need for reliable, consistent, useful information, the Nutrition Labeling and Education Act of 1990 mandated new food labels and established regulations governing nutrient and health claims for foods. Food labels are designed as a tool to help consumers select a healthy diet within the framework of the Food Guide Pyramid. Nutrition information on the label of most foods uses serving sizes that reflect portions of food usually eaten. These labels provide information on how the food fits in an overall daily diet.

Nutrition Facts Panel

The nutrition label illustrates the required format and content for nutrition labels. This "Nutrition Facts" panel contains information to help consumers fit the food into their overall daily diet. The nutrient content of the food is listed as a percentage of a standard amount referred to as the daily values (DV). The DVs give only one standard for all individuals over the age of 4 years, except pregnant and lactating women. They consist of two separate sets of reference values: Daily Reference Value (DRV) for macronutrients—carbohydrate, fat, protein, saturated fat, cholesterol, fiber, sodium and potassium, and Recommended Dietary Intake (RDI) for vitamins, other minerals, and protein for certain age groups. Thus, the DVs are a simpler set of standards than the RDA.

Since 1973, food labels have used the UK Recommended Daily Allowances (UKRDA) established by the FDA for vitamins and minerals, but the RDIs have now replaced the UKRDA. They are based on the highest RDA value from among the various gender and age groups listed in RDA tables published in 1968.

Percent Daily Value (%DV) shows how a food fits into the overall daily diet. Higher percentages reflect greater concentrations, and greater amounts, of nutrients. For most people the goal is to choose foods that add up to about 100% DV or more for total carbohydrate, dietary fiber, and vitamins and minerals, and 100% DV or less for total fat, saturated fat, cholesterol, and sodium. Defining nutrients as a percent of the Daily Value is intended to help consumers understand the role of individual foods in the context of the total daily diet.

The Daily Values for certain nutrients appear on package labels for both a 2000- and a 2500-calorie diet. While the 2000 calorie diet is assumed to be appropriate for many women, teenage girls, and less active men and the 2500 calorie diet for many men, teenage boys, and very active women, the actual range of energy intakes is very wide and must be adjusted accordingly. For example, the 65 g of fat listed for a 2000-calorie diet represents 30% of total kcal; however, a woman whose habitual intake is 1600 kilocalories who consumes 65 g of fat will be getting 36% of her energy from fat rather than the 30% or 53 g considered desirable.

Ingredient Labeling

Current labeling regulations require complete ingredient labeling on all processed, packaged foods, including standardized foods such as mayonnaise, macaroni, and bread, which previously were exempt. Ingredients are listed in the order of prevalence by weight

so that the consumer knows which ingredients are dominant. The list assists people who may need to omit or limit certain ingredients from their diets due to allergies or intolerances.

Nutrient Content Claims

Certain terms defined by the FDA and the U.S. Department of Agriculture (USDA) can be used on the label to describe a food's nutrient content. Any term used to describe the nutrient content of a food means the same thing on every product on which it appears. Samples of such nutrient content claims are illustrated in Figure 1-5. The terms that can be used are "free," "low," "fewer," "light" (or "lite"), "reduced," "less," "more," and "high." "Lean" and "extra lean" also have been defined and apply specifically to the fat content of meat, poultry, and fish.

Health Claims

Under certain circumstances, health claims linking a nutrient or a food to the risk of a disease or health-related condition are allowed on FDA-regulated products. The FDA has strict requirements about when and how these claims can be used, however. Health claims may use only the terms "may" or "might" in discussing the relationship of a food to a disease, may not state the degree of risk, may state that other foods play a role in that disease, and must phrase the claim so that the consumer can understand the nutrient and the disease and the nutrient's importance in a daily diet. Currently, the FDA allows statements about the relationships between a specific food or nutrient and the eight health claims.

Promoting Use of Food Labels

For food labeling to be effective, consumers must understand and use the labels on a regular basis. To facilitate this, the FDA and the UKDA have embarked on a multiyear campaign to educate the public about the new food label. The FDA and the UKDA and other government agencies will lead the campaign, but other participants include consumer, trade, and health groups. The goal of this educational campaign is to increase consumers' knowledge and effective use of the food label to allow them to make accurate and sound dietary choices.

Dietary Supplements

Since passage of the Nutrition Labeling and Education Act in 1990, there has been much controversy about the regulation of dietary supplements. Concerns have focused primarily on nutrition labeling, nutrient content, and the regulation of health claims. While the FDA supported regulating dietary supplements under the same rules as those established for conventional foods, the multibillion-dollar health food and supplements industries lobbied for a different and less restrictive network (Special Report, 1995).

The Dietary Supplement Health and Education Act passed in 1994 represented a compromise between the positions of the supplement industry and the FDA. The new law defines a dietary supplement as a new category of food containing one or more of the following: a vitamin; a mineral; an herb or other botanical ingredient; an amino acid; a dietary substance used to supplement the diet by increasing total dietary intake; and a concentrate, metabolite, constituent, or extract of any of the aforementioned ingredients.

Under the Act, labels on supplements are permitted to carry statements that describe how the intended nutrient or dietary supplement may affect physiologic structure or function in human beings, such as "Vitamin D is required for proper bone development," but the label

must also carry the declaration "This statement has not been evaluated by the U.S. Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease."Health claims such as the claim that a supplement reduces the risk of a specific disease must meet the standard of "significant scientific agreement" and are subject to FDA oversight. Companies have 30 days after they begin marketing a dietary supplements to file their health claims and substantiating evidence with the FDA.Provisions to protect public health allow the FDA to prove a product is unsafe for human consumption by evaluating whether the product poses a "significant or unreasonable risk." The FDA can prohibit marketing of a product if it is deemed unsafe or if it has been adulterated. Supplement manufacturers are required to notify the FDA at least 75 days before marketing a non-food product for which history of use or evidence of safety does not exist. Manufacturers must establish that the dietary ingredients or products are reasonably safe when used under the conditions recommended or suggested on the product label.The FDA is responsible for drafting regulations to implement the new law.

Chapter 3: Research

3.1. Method

The present study was designed to define parents' views on their children's eating habits. Particularly the accent is made on parents' vision of childrens' well-balanced and regular nutrition if that is what is supposed to be countes by parents as a right nutrition.

To collect necessary data, I executed interviews with 10 parents of the group of children that was used for this study. The questions were gathered in a well structured interview and are provided with variants of answers in the end of this dissertation (Appendix A). Each of ten interviews lasted about 20 minutes and was taken at school. Before conducting the interview the convenient time for parents was chosen in accordance to their disposition. To carry out present reseach, two permissions were received: one from the parents that were actually the main objects of the data presented further, and one from the school. The school representatives reviewed the topic and asked for the outline of dissertation. I explained that the topic was aimed to define parents' understanding of balanced nutrition and diet for children in order to present comprehensive report about child nutrition as well as to provide recommendations and applications for future research. Ater the school confirmed the topic, the interviewes were undertaken. The questions were of general character such as what were parents usually giving their children for breakfast, lunch and the dinner; what group of foods parents suggested were better to meet the balance of children's diet; where parents usually bought the food and weather they paid attention to food labelling.

The half of parents interviewed were from middle class (three females and two males) and the half from the low social economic area (five females). All parents were employed and took a great care of their child buying high quality foods and standing for regular and often nutrition.

3.2. Results

Foods eaten for breakfast, lunch, and dinner were broken down according to the food groups pyramid: (1) cereals (bread and grains), (2) breakfast bar (vegetables), (3) fruits, (4) toast, (5) milk and milk products, and (6) juice. Not all groups of food are good for a breakfast, however those were chosen in accordance to probable parents' preferences as to chidlren's nutrition. Most parents suppose that is it optimal to give milk for a breakfast (6 answers), other think that fruits are best to start the day (5 answers), the rest are more or less divided between cereals (4), fruit juice (4), and the less is breakfast bar (2).

More than half of parents find it essential to give fruits for breakfast, particularly – banana is given by 3 interviewed parents, orange and apple give and apple or an orange.

Another question related to children snack was important to carry out current research. Snacks compose a great part of daily nutrition and it is important to define what can be counted as a healthy snack so that no harm was made to health and no balance in food was disrupted. As it appeared from the interview, most snacks are composed of sweets (4 of parents provided those answers. Naturarally, children like sweets and are happy to get them as snacks, however it is not the healthiest choice. Parents specified that children liked to eat daily either ice-cream, doughnuts, cakes, candies and cookies or, if they do not get it, parents have to include hot chocolate, sweetened yogurt, sweetened cereals or pudding in childrens' ration.

The choice of foods that parents are usually buying for their children is basically the result of advertisement policy that one or another product makes (4 parents); pester-power choice is of 3 parents, e habit to buy the same products is the answers of 2 parents and finally, the way the product is packed defines the choise of one parent interviewed.

3.3. Discussion

The prediction that there would be significant differences in the foods preferred by parents for their children has been supported. These results introduce the possibility that nutritional differences may contribute to the early onset of development in British children. Specifically, the differences in calcium consumption may be important. The present study found that parents today give the preference to their children's consumption of milk and fruits more often during breakfast, and more milk and milk products during lunch, resulting in an increase in daily calcium intake. Significantly, an earlier study by Wang et al. (1997) found a positive relationship between calcium consumption and the onset of early development.

British parents today consider that it is healthier to give children today balanced meals full of vitamins and calcium. In last generations for example, parents were giving children more breads/grains, vegetables, and meats/proteins at lunch than did the older generation. In addition to the balanced diet, present-day parents reported giving meals more often than it was done previously. It is possible that this increased consumption, in quality as well as quantity, may contribute to British children being heavier now than they were in the past. As Pratt and Pratt (1996) and Jennings (1997) point out, increased body fat, which produces the hormone leptin, may contribute to the onset of early development.

Further, the data collected indicated differences in the types of bread and meat consumed by the children. For example, in previous generations parents gave their children cornbread as being most common, and salt pork, ham hock, and pork liver as being the most commonly eaten meats. The present-day children were eating white bread and chicken and catfish. These qualitative differences may also factor into the explanations for the early onset of development; as researchers point out, foods consumed today may be affected by insecticides that degrade into substances that have estrogen-related physiological effects

on living things (Marshall, 1993; McKinney & Waller, 1994; Sharpe & Skappeback, 1993).

Although the present findings indicate that nutrition makes a significant contribution to early onset of development, some shortcomings should be acknowledged. This was a pilot study; a more extensive study could include a larger sample. The effects of nutrition could also be corroborated by using archival data, cafeteria observations, and by having all the respondents report their daily meal intake by using the nutritional chart. This would better indicate the total nutritional intake.

As most researchers have acknowledged, nutrition, although important, is only one of the factors in the onset of early puberty. Further research should focus on testing the other theories. As Herman-Giddens et al. (1997) point out, early puberty is a phenomenon that has important clinical, educational, and social implications. The consequences of emotionally and psychologically immature children having to cope with bodies that are maturing earlier definitely need to be investigated. The effects and awareness of early pubertal signs may reveal compelling relationships in such areas as teenage pregnancy and the need for social-support systems for these "child-women." The timing and content of sex education programs in schools are also brought into question.

Chapter 4: Recommendations for food intake

4.1. Appropriate dietary recommendations for children to promote long-term health

Atherosclerosis is a life-long disease process that begins with fatty streak formation in childhood and adolescence and progresses to fibrous plaques leading to coronary heart disease (CHD) in adulthood (National Cholesterol Education Program, 1992). Many of the risk factors associated with coronary heart disease, such as diets high in total and saturated fat, obesity, hypertension, and lack of exercise, may originate early in life. Substantial evidence implies elevated blood cholesterol levels in childhood in the eventual development of coronary artery disease.

It has been suggested that the cardiovascular disease process can be slowed or prevented by modifying risk-related behaviors early in life. The National Cholesterol Education Panel (NCEP) has issued recommendations for a population-wide reduction in the average levels of blood cholesterol through changes in eating patterns of children 2 years and older. These recommendations, the same as those recommended as Step One for adults, include a distribution of energy sources as approximately 55% carbohydrate, 15% protein, and 30% fat, with almost equal amounts from polyunsaturated, monounsaturated, and saturated fatty acids, and a dietary cholesterol less than 300 mg/day.

It is important to emphasize that the primary role of diet is to provide sufficient kilocalories and nutrients to support normal growth and development and that caution must be exercised when decreasing the fat intake of children (Sylvester, 1995). Severe restriction of children's fat intake with the intention of reducing the risk of heart disease will have a negative impact on growth. Although dietary fat can be restricted safely to approximately 30% of kilocalories, care in planning is necessary to ensure an adequate energy and nutrient intake. This means including all food groups and making low-fat

choices within each group, such as low-fat milk and fish, lean meats and poultry, and a wide variety of foods in moderation.

A sedentary lifestyle is also linked to development of CHD and other chronic diseases. Regular physical activity results in substantial health benefits for adults and children. In addition, the energy expended allows larger amounts of food to be consumed with a decreased risk of obesity.

According to the survey "Food, Physical Activity and Fun: What Kids Think" conducted by the Gallup Organization (1995), most American children have positive attitudes about food, nutrition, and physical activity. The children surveyed agreed that a balanced diet and regular physical activity are important for health. They also indi cated that they were aware of the importance of eating a variety of foods and a willingness to try new foods. While recognizing that physical activity is good for health, most children reported they were physically active because it was fun and they enjoyed it.

The best preparation for a long, healthy life is a healthy lifestyle that includes a balanced, varied diet and enjoyable physical activity. Efforts to improve the nutrition and health of children must target families, schools, and others who work with children to encourage them to involve and motivate children to appreciate that physical activity is fun and that healthful eating tastes good (Borra et al, 1995; Luepker et al, 1996).

Guidance to help children make healthy food choices is believed to be important in preventing or retarding the progression of some chronic diseases. A tool to assist in making food choices for healthy individuals aged 2 years or more is the 1995 Dietary Guidelines for British. To meet these guidelines individuals must choose a diet in which most of the calories come from grain products, vegetables, fruits, lowfat milk products,

lean meats, fish, poultry, and beans while choosing fewer kilocalories from fats and sweets. Nutrition experts believe following these seven principles will lead to improved health status and reduced risk of certain chronic diseases, such as coronary artery disease, stroke, diabetes mellitus, and some forms of cancer. The 1995 Dietary Guidelines emphasize the importance of eating a variety of foods and balancing food intake with physical activity to maintain or improve weight. Other guidelines incorporate recommendations to reduce consumption of fat, saturated fat, and cholesterol; to moderate consumption of sodium and sugar; and to increase intake of complex carbohydrates and fiber. If an individual consumes alcoholic beverages, moderation is important. Each of these recommendations is supported by a research base of established health benefits.

It is important for the total dietary intake to be balanced. Compliance with the Dietary Guidelines depends on the content of the total diet. The way in which a particular food fits into the diet depends on which other foods are consumed that day. For example, if most of the foods chosen are low in total and saturated fat, cholesterol, sugar, and sodium, some foods containing moderate amounts of these substances can be included. The reverse is also true. If one or more foods chosen are relatively high in total and saturated fat and cholesterol, other foods selected that day should be lower in these components. The Dietary Guidelines are designed to be a flexible guide to balance intake over a period of several days.

The Committee on Diet and Health, Food and Nutrition Board, Institute of Medicine of the National Academy of Sciences has also formulated guidelines to reduce the risk of chronic disease (Sabate, 2001). These nine guidelines are similar to the Dietary Guidelines for British but also include recommendations regarding calcium, fluoride, and dietary supplements.

The Food Guide Pyramid is a practical and flexible tool developed to help consumers make healthy food choices. Because it incorporates the seven basic principles in the Dietary Guidelines for Americans, it is also an important tool in making food choices to reduce the risk of chronic disease. The pyramid is based on five food groups which, when the recommended number of servings from each group are consumed daily, form the foundation of a nutritionally adequate diet. The number of servings appropriate for an individual depends on the caloric level he or she requires. Caloric needs and the number of servings vary with age, gender, body size, and activity level. For most individuals, a diet that provides the recommended levels of nutrients will require at least the minimum number of servings recommended.

The Dietary Guidelines recommend that foods from the grain products group, along with fruits and vegetables, form the foundation of healthful diets. Such foods tend to be low in fat, saturated fat, cholesterol, added sugar, and sodium. These foods should be accompanied by lean and low-fat choices from the third tier. Foods at the tip of the pyramid (fats, oils, and sweets) should be used sparingly. These foods, such as oil, butter, margarine, salad dressings, sugar, sodas, candy, and sweet desserts, are concentrated sources of fats and sugars that provide energy but few nutrients.

4.2. Feeding the Preschool Child

Early in the preschool years, the child is developing self feeding skills using large motor skills, a process that involves frequent spills and the use of fingers and hands. These somewhat messy behaviors are a normal part of the development and maturation of young children. The shift from large motor to fine motor skills provides a greater precision in eating and marks a time when preschoolers can participate in food preparation. The preschool years are important in the development of positive attitudes toward food and

learning to make food choices. This process is promoted by an eating environment that is pleasant, both physically and emotionally. It includes a positive atmosphere with companionship and gentle guidance in fostering food-related behaviors.

Children require smaller portions than adults but will eat more often. In general, an appropriate portion size is a tablespoon of each type of food for every year of the child's age. More can be provided according to the child's appetite.

Because a young child has a smaller capacity and variations in appetite, she needs snacks as well as regularly scheduled meals. Snacks should be planned to provide nutrient-dense foods and timed so that they contribute to total nutrient intake but do not interfere with meals. Overall, preschool children prefer unmixed dishes with mild flavors at moderate temperatures that can be handled easily with utensils or hands.

Children aged 3 years and younger are at greatest risk for choking on food and require supervision while eating. The foods that most often cause choking are hot dogs, hard pieces of fruit or vegetables, peanut butter, popcorn, and nuts (Harris, 1984). Almost any other food can also cause problems with choking if the mouth is too full or if the child is running while eating.

Parents are often concerned when a toddler shows decreased interest in eating and refuses some favorite foods. Appetites may become erratic and unpredictable. Rejection of meats and vegetables is common. Children may refuse milk or may want to drink it to the exclusion of other foods. Often the preschool period is characterized by food jags during which the child may eat only a few foods or may want the same food meal after meal. Most jags (e.g., peanut butter and jelly sandwiches) last only a few days or weeks. When they are treated casually, they become passing food behaviors that are soon forgotten.

However, placing greater importance on them may increase rather than decrease such behavior, which may influence long-term food habits.

4.3. Feeding the School-Age Child

The period from 7 to 12 years of age is one of slow but steady growth. As appetite increases, so does food intake. Most food-related behavior problems of the preschool years have been resolved. Older children develop more autonomy with eating and take the initiative in making changes, usually accepting a wider variety of foods. They make their own eating decisions, but parents still exert an influence in terms of family food habits, attitudes, and expectations.

Because children spend much of their day in school, they do not eat as often as preschoolers. Individuals who work with children recognize the "barter and swap" environment of eating at school. The acceptance of a school lunch meal or a lunch packed at home is decided less by the foods themselves than by the preferences of peers. After-school snacks are almost universal. In the elementary school years, children increasingly assume responsibility for their own meals and snacks. Because of working parents and demanding schedules, many children are responsible for getting themselves off to school, packing their own lunches, and finding snacks. Participation in organized sports and other after-school activities may reduce the frequency of family meals. In addition, children in the early school years may be forced to assume responsibility for family shopping and preparation of the evening meal. As a result, children are targets of sophisticated advertising for a wide variety of food products.

4.4. Vegetarian Diets for Children

As the number of adults adopting vegetarian life styles increases, it is expected that more children will become vegetarians (Carrier, 2003). The diets that sustain health in adult vegetarians are not necessarily appropriate for periods of rapid growth, however. The form of vegetarianism that is practiced determines the nutritional adequacy of the child's diet. The vegan diet, which excludes all animal products, may pose a risk for deficiencies of protein, calcium, iron, zinc, riboflavin, vitamins B 6 and B 12, and vitamin D (Sigurs, 2002).

Decreased growth of children following vegan-like diets compared to omnivore children has been reported, but the differences are small. Meal planning, especially for young children, may be complicated by limited food choices and the restriction of the number of meals and snacks. Because of the high fiber content and low caloric density of a vegetarian diet and the smaller stomach capacity of children, a child may be unable to consume a sufficient volume of food to meet his or her needs (Sigurs, 2002). Caloric density can be improved by emphasizing cereals, nut butters, and legumes. Diets that include dairy products are lower in fiber and provide several of the nutrients often lacking in strict vegan diets.

Vegetarian diets that include a variety of foods can be planned to provide all the nutritional requirements for growth (Schlosser, 2001). As for all children, however, special attention must be paid to ensure adequate intake of energy, protein, vitamins B 12 and D, calcium, zinc, and iron.

4.5. Dietary Intakes of Children

Adequate energy and nutrient intakes are easily achieved from dietary sources. Data from nationally representative surveys of the United States population found that energy intakes are stable or declining slightly but are consistent with recommended levels (Kennedy and Goldberg, 1995). In the USDA Continuing Food Consumption Survey, children from 0 to 5 years and 6 to 11 years of age consumed between 82% and 92% of the RDA for energy. For a majority of children intakes exceeded 75% of the RDA for all nutrients except for calcium, iron, and zinc.

Use of nutrient supplements is a common practice in the United States. Up to 60% of children use vitamin and mineral supplements regularly or occasionally (USDA, 1993), but supplement use declines with age (Bowering and Clancy, 1986). Parents of young children may assume that giving a supplement compensates for poor or marginal dietary intakes, but this is not necessarily true. For example, a child who consumes no dairy products may have a diet low in calcium, which probably would not be provided in a pediatric supplement. A balanced diet rather than supplementation is the best source of nutrition for healthy children (except for fluoride supplementation in areas where the fluoride level of water is below that which is consistent with prevention of dental caries).

Giving a child a single-dose, standard pediatric multivitamin presents no risk of nutrient excess. However, giving large or multiple doses of single nutrients or small groups of nutrients, particularly of vitamins A and D, is inappropriate. An important caution is to keep all vitamin preparations out of the reach of children. The most common cause of pediatric poisoning deaths reported to poison control centers in the United States is the accidental ingestion of iron supplements. Of the 5144 ingestions of iron supplements

reported to poison control centers during 1991, 69.9% were in children less than 6 years of age, and 11 cases were fatal (Hall, 2001)

Chapter 5: Conclusions

Current paper discussed dietary expectations of parents towards their children. Although many parents assume that their children should consume diets that approach nutritional adequacy, the habitual intakes of a significant proportion fall short of nutrient needs and dietary recommendations. Typical dietary patterns of parents' comprehension is not consistent with dietary guidelines. Early results from NHANES III indicate that the percentages of energy from saturated fat were highest for those aged 16 to 19. Because lifestyle habits observed in youth tend to persist over time, promotion of positive health and nutrition habits in adolescence seems to be warranted.

The emphasis in this paper has also been made on the dietary and physical activity recommendations for healthy children. It was discussed the current content of children's diets, reviewed the adverse health consequences of increased intakes of calories (relative to energy expenditure), saturated and trans fat, and cholesterol, provided age-specific guidelines for implementation of the recommended diet, including the period from before birth to 2 years of age. Medical practitioners are the intended audience, and guidelines to implement recommendations in clinical practice settings are provided. Public health strategies for improving the quality of children's diets are also discussed.

It was suggested to find creative approaches to the improvement of overall health and nutrition status of children. Effective nutrition education requires community-based support from parents, schools, health care professionals, and agencies to accomplish positive changes in knowledge, attitudes and behaviors. Late adolescence is a period when

youngsters can consider possible consequences of their behaviors in making decisions about their dietary practices. The most effective changes occur when adolescents are armed with knowledge about nutrition and are in an environment in which standard or normative behaviors among their peers support sound health practices.

A critical component of contemporary guidelines is the strength of the scientific evidence base for recommendations. Whereas the scientific base for understanding the potential harm and benefit of current dietary practices and the relationship to risk factors is strong, the scientific base for recommended interventions is weaker for several reasons: limited number, statistical power, and scope of intervention studies; limited efficacy of attempted interventions; and lack of generalizability of studies of feeding behaviors at younger ages. Historically, most have had small sample size and have not had ethnic diversity among participants. Nonetheless, given the current obesity epidemic, sufficient natural history and prevalence data exist to justify intervention, although continued evaluation is necessary to identify optimal strategies.

Appendix A: Questionnaire

Question 1:

How much money do you spend on your weekly shopping?

£0 -30	1
£31-60	3
£61- 90	3
£91-120	4
£121 +	0

Question 2:

Where do you do your weekly shopping?

Asda	0
Sainsbury	3
Tesco	3
Aldi	2
Corner shop	2
Co-op	0
Other	1

Question 3:

For Breakfast what food does your child have?

Cereals	4
Breakfast Bar	2
Piece of Fruit	5
Toast	3
Fruit Juice	4
Milk	6
Other	0

Question 4:

Does our child have fruit with breakfast?

Yes	5

No	6

Question 5:

Which Fruit do they consume?

Apple	1
Banana	3
Pear	0
Orange	1
Other	0

Question 6:

Can you tell me what your child likes as a snack?

Sweets	4
Crisps	3
Fruit Bars	1
Fruit	3
Chocolates	3
Biscuits & Cakes	0
Cereals	2
Yoghurts	2
Other	1

Question 7:
Can you tell why you buy these snacks?

Pester-power	3
Special promotion	1
Always purchased product	2
Packaging	1
Other	0
Advertising	4

Question 8:

What food groups do we need each day?

Bread, cereals, pasta, rice	7
Fruit & Vegetables	11
Dairy Products	9
Fatty foods	7
Sugary foods	7

Meat, poultry & fish	7
Other	0

Question 9:

What factors influence your food purchases?

Cost	3
Brand	1
Special Promotion	2
Packaging	1
Advertising	2
Nutrition	2
Other	

Question 10:
Do you look for nutritional labelling on food?

Yes	6
No	5

Question 11:
Can you give examples of food stores that have understandable nutritional food labelling?

Asda	0
Tesco	4
Marks& Spencer's	3
Sainsbury	3
Co-op	3
Aldi	0
Other	2

Question 12:

Would you like more information to be made available on nutritional food labelling?

Yes	8
No	3

Question 13:

Do Health issues influence the foods you purchase?

Yes	6

No	5

Question 14:

Do claims on packaging such as low fat influence your purchase?

Yes	6
No	5

Question15:

Do you feel that schools provide more information on nutrition for parents?

Yes	8
No	3

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