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Childhood Obesity and the Relationship to Well-Child Visits

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CHILDHOOD OBESITY AND THE RELATIONSHIOP TO WELL-CHILD VISITS

by

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ABSTRACT

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by

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Trends during the past 20 years have revealed a dramatic increase in childhood obesity in the United States. At present, approximately nine million children over 6 years of age are considered obese (Institute of Medicine [IOM], 2011). According to (American Academy of Pediatrics [AAP], 2009) the protocol for obesity care for youth is to monitor the body mass index (BMI) routinely (at least annually) and offer appropriate counseling and guidance to children and their families. A report in the literature indicated that the number of children attending yearly well-child visits that include measurement of BMI is well below the AAP recommendation (Selden, 2006).

The dramatic increase in childhood obesity raises the question of what is the healthcare provider's level of involvement in prevention, identification, and treatment of childhood obesity, and the prevalence of childhood obesity. The purpose of this retrospective exploratory design was to examine the number and content of well-child visits and describe the difference in attendance and content of the healthcare visit based on type of provider.

Data were accessed through medical records of two clinics in the rural Midwest to describe the well-child visits and childhood obesity in children 6-11 years of age. However, there was an increase in frequency of healthcare visits for children who were being cared for by

pediatricians. Regardless of healthcare provider, the rates of overweight and obesity reported during the healthcare visits did not follow a specific upward or downward trend. Children with an elevated BMI did not have providers consistently documenting a secondary diagnosis of overweight or obese. No follow up of one month for children whose BMI was in the obese category was found. The frequency of secondary diagnosis and intervention was consistent for children who saw pediatricians, yet inconsistent for children who saw family practice providers, physician assistants, and nurse practitioners, suggesting that providers vary in diagnosing and offering interventions for obese children.

Examining the content of healthcare visits, more specifically the physical exam and education provided, nurses may acquire greater insight into gaps in strategies for health promotion and interventions that address the outcomes of overweight and obesity.

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Chapter One

Introduction

Approximately thirty-two percent of children in the United States over 6 years of age are considered overweight or obese (Institute of Medicine [IOM], 2011). The overall obesity trends during the past 20 years have revealed a dramatic increase in childhood obesity in the United States, with only four states having a rate of obesity less than 20% (Wang & Beydoun, 2007). The high prevalence of childhood obesity is associated with increasing rates of health conditions that until recently were found exclusively in adults (Cook, Weitzman, Auinger & Barlow, 2005). With the obesity rates continuing to rise, effective weight management for children is needed to prevent the development of secondary health issues.

The dramatic increase in childhood obesity raises the question of what the healthcare provider's level of involvement is in prevention, identification, and treatment of childhood obesity, and the prevalence of childhood obesity. The protocol for obesity care for children and youth is to monitor the body mass index (BMI) routinely (at least annually) and offer appropriate counseling and guidance to children and their families (American Academy of Pediatrics [AAP], 2003). The literature demonstrates, however, that the number of children attending yearly well-child visits that include measurement of BMI is well below the AAP recommendation (Selden, 2006). Of children receiving annual examinations during well-child visits, many have a BMI in the obesity range and are not being diagnosed as having childhood obesity; suggesting that weight management strategies may not be implemented (Louthan, et al., 2005).

Background

Well-child visits.

Well-child visits are recommended to identify risk factors, prevent disease and disability,

and promote health and well-being in children and adolescents (AAP, 2003). Routine assessments of eating and activity patterns in children and recognition of excessive weight gain relative to linear growth are essential throughout childhood (AAP, 2003). It is likely that anticipatory guidance, the process by which healthcare providers counsel parents about their child's health and development, will be more successful if done during well-child visits before children become obese (Eneli, Crum & Tylka, 2008). According to Kogan et al. (2004), the quality of a child's environment, especially the quality of care-giving relationships, influences the child's development and long-term outcomes. It has been reported in the literature that healthcare provider interactions can assist in promoting healthy behaviors while preventing risky ones (Eneli, Crum & Tylka, 2008; Anis, Lee, Ellerbeck, Nazir, Greiner & Ahluwalia, 2004; Story, Neumark-Stzainer, Sherwood, Holt, Sofka, Trowbridge & Barlow, 2002).

Health assessment of children during well-child visits makes early identification of diseases, including obesity, possible (Halfon, et al., 2004; Kaufman & Reich, 1999), thus allowing for early management of disease. Discussions with parents allow healthcare providers to raise parental awareness of their children's dietary and physical activity requirements. It is hoped that knowledge of health requirements would lead to changes in behavior, which could improve the health of children and families as a whole (Larsen, Mandleco, Williams, & Tiedman, 2006).

The American Academy of Pediatrics (2008) endorses screening and counseling of families for childhood obesity as a regular part of well-child examinations. The well-child visit should include identifying weight categorization using BMI for age and gender, promoting healthy dietary patterns, physical activity, and discussing limiting television or computer screen time (Larsen et al., 2006). One role of the health care provider during the well-child examination

is to provide anticipatory guidance for any potential problems, while educating children and parents regarding any areas of concern. According to the AAP (2001) well-child visits are recommended at 1, 2, 4, 6, 9, 12, 15, 18, and 24 months, and yearly from 3 to 21 years of age.

The National Association of Pediatric Nurse Practitioners (NAPNAP) provides clear guidelines for the identification and prevention of overweight in infants, children, and adolescents (NAPNAP, 2006). NAPNAP recommends assessment of the child's weight, and education on effective weight management at each well-child visit or at least annually (Hill, 2006).

Healthcare provider practice behaviors.

Guidelines for care during the well-child visit have been developed by multiple organizations (AAP, 2008; NAPNAP, 2006; SPN, 2006) however, implementing the guidelines requires a team approach to be most effective (Barlow, 2007). Utilizing a team approach to planned care, such as a nurse-mediated organizational change plus peer leader education, is one model that has the potential for improving obesity care in the primary care setting. Peer leader education consists of training 1 physician per practice in health guidelines and peer teaching methods. Nurse-mediated organizational change occurs through planned visits with assessments, care planning, and self-management support by nurses, in collaboration with physicians (Lozano, et al., 2004).

The multidisciplinary team is another option for implementing a team approach within practice. Multidisciplinary teams, as the name implies, are teams of people from different disciplines that come together for a common purpose. The concept is that it is best to address an issue or problem from all angles. This approach provides better care than an individual plan that has in the past, just involved doctor and patient. When properly implemented, this

multidisciplinary team approach provides positive measurable outcomes. With a diverse group of healthcare professionals, such as physicians, nurses, pharmacists, dieticians, and health educators, social service and mental health providers there is more certainty that all of the needs of the patient will be met. Multidisciplinary team approach education may also serve as a useful model for improving obesity care (Veronica, 2007).

Despite recommendations from AAP and other professional organizations, many children of all ages do not receive the recommended well-child visits. There is no mechanism for mandating that all children receive the recommended well-child visits, especially in the 7 – 12 year age range, and no strategy for ensuring all children receive well-child visits has been reported in the literature (Hakim & Bye, 2001). Children from birth to age 6 are more likely to be seen consistently for scheduled well-child checks and immunizations as set forth by the AAP (2001), due to daycare and school requirements for immunizations. According to the Health Plan Employer and Data Set (HEDIS) (2011), 70% of children age 3 to 6 years and 43% of children age 12 to 19 years receive the recommended number of well-child visits. Once a child is past the age of 6 years, there are inconsistencies between the recommended number and the actual number of well-child visits being attended (AAP, 2001; Cook et al., 2005; Hakim & Bye, 2001).

It is important for children to have well-child visits in order to prevent health problems, and to promote optimal health, including the development of healthy eating and activity patterns. Additionally, the well-child visits allow parents to have regular interactions with healthcare providers so they can promote optimal wellness in their child. The AAP guidelines for well-child visits have increasingly emphasized the need for anticipatory guidance to prevent health problems regarding a range of family and community influences on the health of children

(Kogan, et al., 2004). One reason well-child visits are encouraged is that healthcare providers have the most current evidence-based knowledge for anticipatory guidance and prevention issues related to the health of children (Cook et al., 2005).

Childhood obesity.

Over the past three decades, the childhood obesity rate has more than doubled for preschool children aged 2 to 5 years and adolescents aged 12 to 19 years, and more than tripled for children aged 6 to 11 years (CDC, 2007). According to the third National Health and Nutrition Examination Survey (NHANES III) (2004), the prevalence rates of childhood obesity increased between 1974 to 2004 from 5% to 14% in 2-to 5-year-olds, 4% to 19% in 6- to 11-year-olds, and 6% to 17% in 12- to 19-year olds. The obesity rates in children have remained nearly unchanged between 2004 and 2010 according to NHANES 2009-2010 data, with obesity rates at 12% in 2-to 5-year-olds, 18% in 6- to 11-year-olds, and 18% in 12- to 19-year olds. The largest increase in the numbers of obese children between 1988 and 2008 was found among Mexican-American males along with Non-Hispanic Black females in the 6-to11-year-old range (CDC, 2009; NHANES, 2009).

Research has demonstrated a significant increase in adverse chronic medical conditions secondary to obesity in children. Examples of medical conditions identified as secondary to childhood obesity include: (a) cardiac (hypertension, hyperlipidemia, and dyslipidemia); (b) endocrine (Type 2 diabetes, menstrual irregularity, and insulin resistance); (c) gastrointestinal (fatty liver); (d) pulmonary (obstructive sleep apnea); (e) skeletal (abnormal bone growth) (American Heart Association [AHA], 2008; Anderson & Butcher, 2006; Harbaugh, Jordan-Welch, Bounds, Blom & Fisher, 2007).

The magnitude of the secondary health problems that develop due to childhood obesity is

reflected in monetary expense, as the obesity-associated diseases and complications have increased the cost of healthcare for children (Harper, 2006). The cost of health problems secondary to childhood obesity is important to consider, as the costs do not just occur during childhood, but have the potential to continue through adulthood. Obesity-attributable medical costs for all age groups in the United States in 2003 were estimated at $75 billion, accounting for 9.1% of national health spending (Gately et al., 2005).

Studies from a variety of disciplines demonstrate that childhood obesity is due to a combination of factors including: genetics, environment, biology, physiology, sociocultural status, and family (Cook, Weitzman, Auinger, Nguyen & Dietz, 2006; Snethen, Broome, & Cashin, 2006; Stice, Presnel, & Shaw, 2005). According to AAP (2003), children are at greater risk for becoming obese if their parents are obese or if their mothers have diabetes. For children under 3 years of age, parental obesity is a stronger predictor of childhood obesity than the child's actual weight status.

One causative factor contributing to childhood obesity is unhealthy eating patterns, which can have a direct relationship to nutrient intake (Nicklas, Baranowski, Cullen & Berenson, 2001). Multiple factors can contribute to children developing unhealthy eating patterns, including high consumption of "fast foods," sugary beverages, larger portion sizes, consuming greater quantities of energy-dense foods, and the intake of high-calorie foods (Faith, Scanlon, Birch & Sherry, 2004; Gyovai, Gonzales, Ferran & Wolff, 2003; Murray, 2009).

Behaviors associated with childhood obesity are low activity levels and sedentary lifestyles (Burdette, Whitaker & Daniels, 2004; Gordon-Larson, Adair, & Popkin, 2002; Harrell, Halls & Taliaferro, 2003; Sallis & Glanz, 2006). Data support that children are increasingly sedentary and do not engage in aerobic activity on a regular basis (Crespo et al., 2001; Kimm,

Glynn, Voorhees, Striegel-Moore & Daniels, 2006). Factors associated with a decrease of physical activity and an increase of sedentary lifestyle include safety concerns, built environment (human-made surroundings), increased time spent on sedentary entertainment, and decreased availability of physical education programs (Berkey et al., 2000; Harper, 2006; Sallis & Glanz, 2006).

Obesity is a complex disease with many implications for children, parents, families, and society as a whole. Once a child has become obese, treatment to decrease weight is challenging and often unsuccessful (AAP, 2003). Thus, it is crucial to take steps to prevent children from gaining excess weight before they become obese.

Challenges with childhood obesity.

The people in the U.S. recognize childhood obesity as a major public health concern resulting in the potential for substantial health care costs to the nation (IOM, 2006); however, the current level of financial investment by the public and private sectors in the development of effective prevention and weight management strategies is not consistent with the gravity of the problem. There is a substantial underinvestment of resources to adequately address the scope of the childhood obesity crisis (IOM, 2006). Effective responses to the increasing levels of childhood obesity is needed in the form of developing, tracking, and evaluating effective weight management policies, programs, and initiatives that can be replicated, adapted, refined, and translated into practice.

An “expert committee”, established by the American Medical Association, Department of Health and Human Services, Health Resources and Services Administration, and the Center for Disease Control and Prevention, which consists of professionals from the American Academy of Pediatrics, the American Dietetic Association, the American Heart Association, the National

Association of Pediatric Nurse Associates and Practitioners, the Maternal and Child Health Bureau, the National Institutes of Health, the Centers for Disease Control and Prevention**,** the Food and Drug Administration, and the US Department of Agriculture, in 2005, made recommendations on how to effectively respond to the childhood obesity epidemic (Barlow, 2007).

This committee recommended the implementation of new standards to categorically identify childhood overweight and obesity based on BMI measurements. Childhood overweight is identified categorically as a BMI $\geq 85^{th}$ percentile but $<95^{th}$ percentile for age and gender, and childhood obesity is categorically classified as a BMI $\geq 95^{th}$ percentile for age and gender. Overweight and obesity will always be referred to together in this study, unless specified differently as they are both labels for BMI ranges greater than what is generally considered categorically as 'normal'.

Additionally, the expert committee made recommendations for effective weight management and prevention strategies based on the child's weight categories (Koplan, Liverman, & Kraak, 2005). The American Academy of Pediatrics (Barlow, 2007) adapted the recommendations of the expert committee to develop prevention and intervention strategies. According to the AAP, an effective childhood obesity prevention and intervention program structure includes healthcare providers, professional organizations, clinics, schools, and community members (Barlow, 2007). All healthcare professionals who provide care to children should address weight management and lifestyle issues with all patients and families annually, regardless of presenting weight. An opportune time for health care providers to address effective weight management and lifestyle issues would be during American Academy of Pediatrics (AAP) recommended well-child visits (2001).

Currently, however, there is no mechanism mandating children have well-child visits. Limited information is available regarding adherence to the AAP recommended well-child visit schedule, specifically in the 7 – 11 year old age group (Hakim & Bye, 2001, Selden, 2006). As children receive the majority of their immunizations from birth to age 6, they are more consistently seen by healthcare providers for well-child visits (AAP, 2001; CDC, 2007). Limited information is available in the literature regarding the consistency of well-child visits past the age of 6, the same age when the majority of the childhood immunizations are completed (Selden, 2006). The effectiveness of preventing and monitoring childhood obesity and effective weight management strategies is hard to assess when children are not routinely followed by their health care provider.

Assessment of risk factors and behaviors leading to childhood overweight are essential when designing interventions for prevention and treatment of weight issues (Harbaugh et al., 2007). A thorough health history and physical, diagnostic tests as indicated, and nutritional and activity assessments are generally recommended (Harbaugh et al., 2007; NAPNAP, 2006). Researchers have found associations between increased well-child visits and the outcomes of improved child health (Selden, 2006; Schneider, Wiblin, Downs, & O'Donnell, 2001; Zuckerman, Stevens, Inkelas, & Halfon, 2004). However, in order for health care providers to monitor the effectiveness of any prevention or intervention protocols, they need to be able to routinely assess the child to whom they are providing care (Barlow, 2007), which requires children to be followed regularly by healthcare professionals.

Rationale for studying childhood obesity and well-child visits.

Empirical and theoretical evidence suggests that pediatric primary care plays a role in prevention of disease, disabilities, and injuries and in promotion of children's health and well-

being (Cox, 2003; Zuckerman, Stevens, Inkelas & Halfon, 2004). Early health supervision, beginning at birth, is purposefully frequent in order to accommodate the immunizations schedule, monitor early childhood development, and provide guidance to parents about measures to maintain the health of their children (Hakim & Bye, 2001; McInerny, Cull, & Yudkowsky, 2005). It has been reported in the literature that health behaviors of children related to obesity has the potential to be influenced by interaction with healthcare providers (Eneli, Kalogiros, McDonald & Todem, 2007; Robinson & Thomas, 2004). The consistency and content of interactions with healthcare providers could potentially influence the prevention or development of obesity in children. If children are interacting with healthcare providers, but are not being correctly identified as overweight or obese, there is the potential that children will not receive effective weight management treatment and follow-up. Healthcare providers who identify the appropriate diagnosis of overweight or obesity, as well as effective treatment, and follow-up with the child and family, could positively impact the health behaviors related to obesity in children.

Studies have been conducted to examine the occurrence of well-child visits as related to the immunization schedule, the level of pediatric preventive services, and awareness of recommended guidelines (Cook et al., 2005; Gentile et al., 2004; Louthman et al., 2005; McInerny, William, Cull & Yudkowsky, 2005; Larsen et al., 2006). There is limited information, however, on the actual number of well-child visits after the age of 6 and on the content of the well-child visits related to assessment, diagnosis, and treatment of obesity. Children in the 6-to11-year age range have the highest increase in obesity rates and after the age of 6 is when well-child visits decrease dramatically (CDC, 2007). The potential exists that annual interactions with healthcare providers—specifically related to children 6-11 years of age and their diagnosis, treatment, and follow-up—could have a significant impact on the prevention and effective

management of obesity. Conversely, health behaviors can potentially be influenced by whether the interaction of healthcare providers with children involves an accurate assessment and diagnosis followed by prevention and treatment for children who are overweight or obese.

Professional Nurses (Registered Nurses – RN), who are registered by the state board of nursing, are the optimal initial contact that children and families will have during the well-child visit, as they gather the baseline information during the visit. Professional Nurses receive training to identify health behaviors that would include examining how children's health is being affected by their diet and exercise patterns. Professional Nurses are optimally positioned to examine the number and content of well-child visits and healthcare interactions in relation to childhood obesity. Knowledge of well-child visits would allow the development of strategies targeted to improve the effectiveness of the well-child visits, including impacting changes in health behaviors and ensuring effective weight management for children.

Additionally, professional nurses have the expertise to explore with parents their perceptions of health behaviors about their children who are overweight or obese. Health behaviors to be examined could include eating or activity patterns, current health status and how behaviors influence long-term health outcomes. Obtaining health behavior information from children and their parents would provide additional information for developing appropriate prevention and intervention strategies for children, as well as determining the frequency and duration of follow up healthcare visits.

Finally, professional nurses in the advanced practice role, frequently termed advanced practice nurses (APN) provide cost-effective, quality patient care for patients across the lifespan to include children. Advanced practice nurses in their role incorporate; case management, clinical pathway development, consultation and education, research, and collaboration, with the

specific knowledge and skills to interact effectively with children and parents in several healthcare areas which would include health promotion and disease or condition management (Teicher, Crawford, Williams, Nelson & Andrew, 2001).

The purpose of this study was to examine the number and content of well-child visits and describe the difference in attendance and content of the healthcare visit based on type of provider.

The study investigated the following questions:

1) What were the frequencies of healthcare visits by child age?
2) What were the frequencies of obesity rates for children who attended healthcare visits?
3) What were the frequencies of secondary diagnosis (obesity), intervention, and follow-up for children who had an elevated BMI?
4) What were the frequencies of healthcare visits, secondary diagnosis, and intervention based on the healthcare provider caring for the child?
5) Were there any differences in the frequency of healthcare visits based on gender or ethnicity?

Definition of Terms.

Conceptual definitions.

Child: Individual who is transitioning between toddler and adolescent developmental stages.

Child who is obese: Child who has an excessively high amount of body fat or adipose tissue in relation to lean body mass (CDC, 2006).

Child who is overweight: Child who has an excess of body weight but not necessarily body fat (CDC, 2006).

Body Mass Index (BMI): Indirect screening tool for measuring fat to assist in identifying weight categories (CDC, 2007).

Well-Child Visits: Routine assessments to evaluate general health, growth, and development of children (AAP, 2008).

Anticipatory Guidance: Preparation of a patient or a group of patients for anticipated or developmental health care situations (NIC, 2006)

Healthcare Visits: A visit for the prevention, treatment, and management of illness and the preservation of mental and physical well-being through services offered by medical and allied health professionals (CDC, 2007).

Primary Diagnosis: The condition motivating treatment and interaction with a healthcare provider.

Secondary Diagnosis: A condition that exists in addition to the primary reason to interact with a healthcare provider.

Intervention: A measure to improve health or alter the course of a disease.

Healthcare Provider: A group of healthcare professionals who provide a service to patients.

Operational definitions.

Child: Individual 2 to 12 years of age.

Obese Child: BMI $\geq 95^{th}$ percentile for age and gender (CDC, 2007).

Overweight Child: BMI $\geq 85^{th}$ percentile but <95% for age and gender (CDC, 2007).

Body Mass Index (BMI): Body weight in kilograms divided by the height in meters squared (CDC, 2007).

Well-Child Visits: Well-child visit diagnostic codes from the International Classification of Diseases, Ninth Revision (ICD-9 codes) to include; V20.0 – Health Supervision of Infant or Child, V20.2 – Routine Health or Child Health Check, V61.20 – Counseling of parent-child problem, 995.52- Child Neglect (nutritional), V20.1 – Other healthy infant or child receiving care, and V70.0 – Routine general medical exam at a healthcare facility.

Anticipatory Guidance: Instruction on normal development and behaviors, provision of references, referral to outside resources, scheduled visits at strategic points, including family and others as appropriate (NIC, 2006).

Healthcare Visits: Interaction between a patient and a medical health professional.

Primary Diagnosis: Diagnostic codes from the International Classification of Diseases, Ninth Revision (ICD-9 codes) for the primary reason of healthcare visit.

Secondary Diagnosis: Diagnostic codes from the International Classification of Diseases, Ninth Revision (ICD-9 codes) for a secondary reason of healthcare visit.

Intervention: A physical or behavioral act that is implemented for a specific health objective.

Healthcare Provider: Physician, Physician Assistant, Nurse Practitioner.

Summary

Research in the area of childhood obesity is timely due to the increasing numbers of obese children in this country, which is a major public health concern. Examining the number and content of well-child visits may provide additional information to assist in understanding factors that could potentially lead to additional prevention or effective weight management strategies for childhood obesity. Additionally, this study increases the knowledge base of nursing

science regarding the association between well-child visits and obesity, which may assist healthcare professionals in understanding provider assessment, diagnosis, and treatment of overweight children.

Chapter Two

Review of the Literature

Introduction

The purpose of this study was to examine the number of well child visits, describe the content of well child visits and describe any differences based on the healthcare provider. This chapter will examine the number of well child visits and describe the content of the well child visits through a theoretical lens in order to better understand the phenomenon of obesity. A review of the literature will be presented on (a) obesity; (b) healthy behaviors; (c) parental involvement; (d) healthcare provider interaction; and (e) well-child visits. Theories can be utilized to guide studies, as they provide an organized, coherent, systematic explanation of a statement or event in which concepts are identified and explained, relationships and predictions made, and significant questions are articulated in a meaningful, understandable way in order to control a part of the empirical world (McEwen & Wills, 2002; Meleis, 2005).

Childhood obesity is a chronic disease with complex multi-factorial etiologies (St Jeor, Perumean-Chaney, Sigman-Grant, Williams & Foreyt, 2002), and both physical and psychological sequelae with lifelong impacts (Hodges, 2003). The development of risk factors for childhood obesity is impacted by poor health behaviors, such as a high-calorie/high-fat diet and limited amount of physical activity (Burdette, Whitaker & Daniels, 2004 [Appendix A]; Gordon-Larson et al., 2004; Nicklaus, Baranowski, Cullen & Berenson, 2001). Positive health habits developed early in life have the potential to remain stable over time from childhood to adulthood (Cook, Weitzman, Auinger, & Barlow, 2005). Research suggests that interventions to promote healthy lifestyle behaviors should begin prior to sixth grade (12 years), before behavioral patterns are resistant to change (Kelder, Perry, Klepp, & Lytle, 1994; Perry et al.,

1992). Parental and healthcare provider involvements are important factors that can influence the promotion of healthy lifestyle behaviors as well as prevention and effective management of childhood obesity. All interactions related to childhood obesity should be addressed from a health focused, nonthreatening/nonjudgmental perspective by both parents and healthcare providers (Golan & Weizman, 2001; Mikhailovich & Morrison, 2007; Rhee, De Lago, Arscott-Mills, Mehta, & Krysko, 2005).

Critical studies from the literature have been summarized in an evidentiary table (see Attachment A) and categorized by year. The studies highlight leading issues in the care of children within the following areas: obesity, healthy behaviors, parental involvement, and healthcare provider interaction.

Childhood obesity theoretical perspective.

Bronfenbrenner (1989) developed the Socio-Ecological Systems Theory in an effort to discuss and explain child development. He explains the theory is comprised of layers of the individual's environment: the microsystem, the mesosystem, the exosystem, and the macrosystem. The key to this theory is the interactions of structures within a system and the interactions of structures between systems (Paquette & Ryan, 2001). While relationships close to the child have a direct impact, other outside factors also have the potential to influence the development of a child.

According to Bronfenbrenner (1989), the most important environment for a young child is the family, as the child spends the majority of their time within the family environment; it also has the most emotional influence on the child. Other influential components of the environment are members of the extended family, early childcare and educational programs, health care settings, and other community learning sites such as neighborhoods, libraries and playgrounds.

Children's development is influenced by what they experience in these environments and the amount of time they spend in a setting (Berk, 2007).

Internal and/or intrapersonal factors, such as attitudes, knowledge, and skills related to nutrition and physical activity can influence an individual's weight (Eneli, 2007). Positive and negative external factors at the expanded levels of the Socio-Ecological Systems model that are not under the direct control of the individual can also influence behaviors and weight. Factors which may be included are activities and interactions with family members or peer groups where attitudes regarding nutrition and physical activity may be influenced. There may also be influences at school which may have an impact on knowledge regarding proper nutrition and physical activity. Mandates at the local, state, and national level also have the potential to influence attitudes, beliefs, and actions about diet or physical activity habits (Berk, 2007).

Relationships within the microsystem are *interpersonal relationships* that have bi-directional influences between the child and another individual. A good example of this is the relationship between parents and child, as they both have influence on each other (Paquette & Ryan, 2001). Berk (2007) notes that other individuals in the microsystem may affect the quality of the child-parent relationship, such as mutual support between two parents in the child-rearing roles each of them plays. An example of this might be the parent's agreement or disagreement regarding dietary intake for the child.

Bronfenbrenner classifies the mesosystem as a connection that links the structures of the child's microsystem with his or her immediate surroundings through *organizations*. An example of the mesosystem is organizations such as schools that enact policies that can affect dietary habits, such as banning soda pop machines in schools; another example would be healthcare providers, who educate the parent and child about appropriate health behaviors (Eneli, 2007).

Parents support the child's learning about health by learning appropriate health behaviors through interactions with healthcare providers and then demonstrating that knowledge within the home (Berk, 2007; Wismann & Kreider, 2005).

Bronfenbrenner describes the exosystem as various *community factors* that can influence children as they develop. The exosystem encompasses the mesosystem and the microsystem (Berk, 2007). Community settings include neighborhood advocacy groups which work to improve health conditions for families; groups may take action to improve playground safety or the parent's workplace, which might provide paid maternity leave, flexible work schedules, sick leave, or provide health insurance (Paquette & Ryan, 2001).

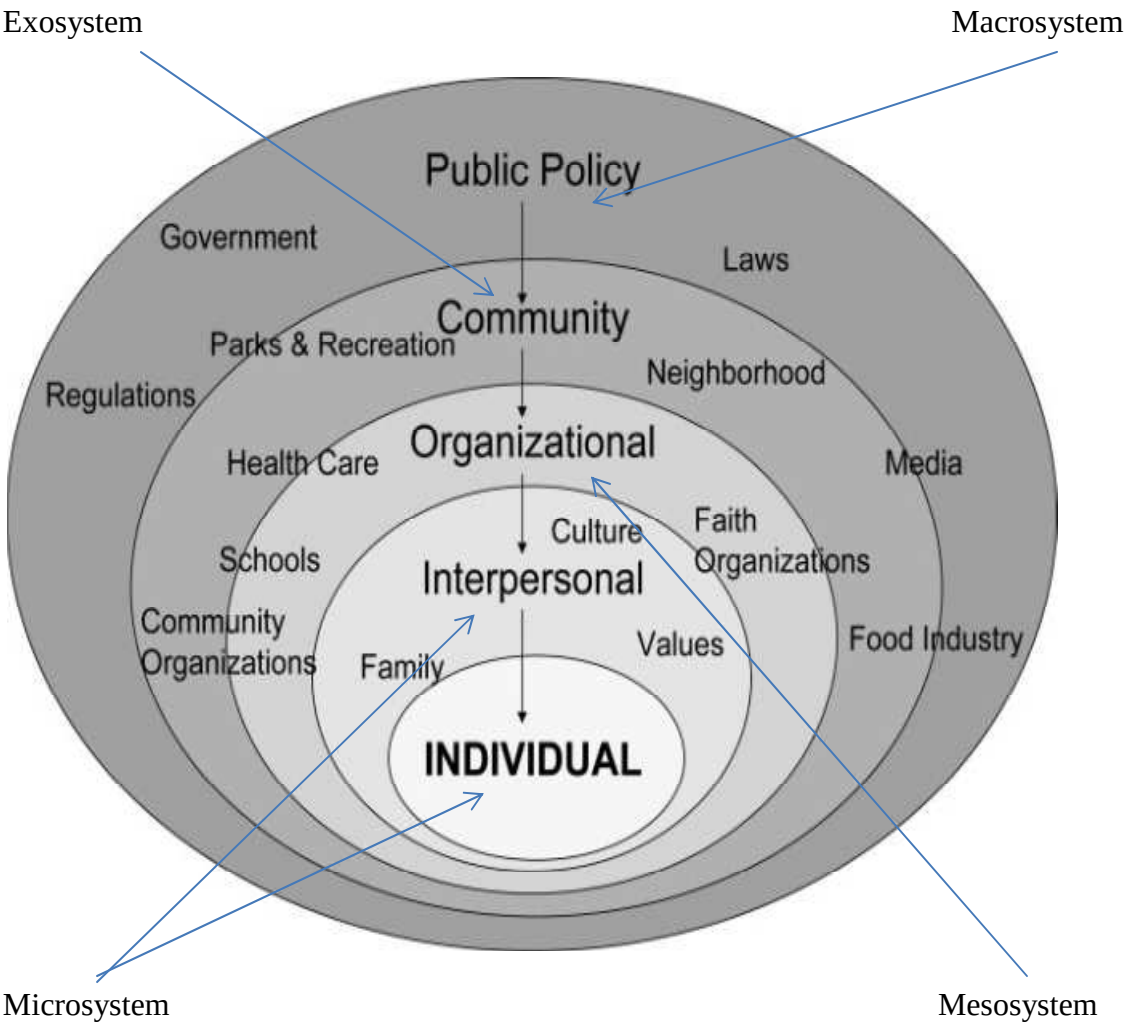
The macrosystem is the outer most level of Bronfenbrenner's socio-ecological model, influencing the child's development indirectly through *public policy*, such as state legislation or laws, customs, resources and cultural values (Eneli, 2007). A child may receive education on health behaviors in school, which may have indirectly been influenced by policies.

Bronfenbrenner believed that the socio-ecological system is an active system which is constantly developing. The size of an individual's microsystem changes every time they obtain or let go of life roles or surroundings (Eneli, 2007), and these changes are crucial to the child's development. Change is important to development because humans are able to choose, alter, and construct several of their own settings and understandings. The way in which development occurs is affected by the person's age, environment, behavior, and physical and logical characteristics. People are products and creators of their own environments. Therefore, both people and their surroundings form a system of mutually dependent effects (Berk, 2007).

The Socio-Ecological Model was developed by Urie Bronfenbrenner (1979) to provide an explanation of how everything related to a child and their environment affects the ways in

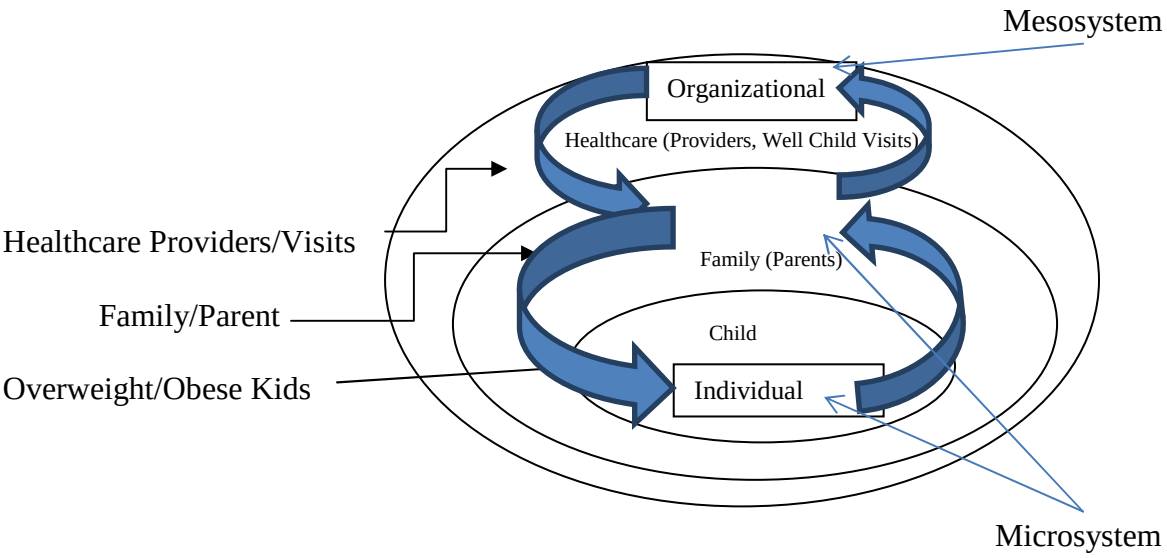
which a child grows and develops. The Socio-Ecological Model (see Fig. 1) has evolved over time and encompasses many levels with one level wrapping around another. At the center of the model is the individual. At this level, we consider the internal determinants of behavior, such as knowledge, attitudes, beliefs, and skills. This is the foundational level, but Bronfenbrenner identifies in the model that there are many external forces (interpersonal, organizational, community and public policy) that can influence these individual determinants (Caprio et al., 2008). According to Bronfenbrenner, if one is interested in facilitating the behavior change of a child, it is important to address not just the child, but the external factors that influence the child.

Figure1. The Socio-Ecological Model (Caprio et al., 2008)



The major focus of this study (see Fig. 2) are healthcare visits of children; the parents and healthcare providers (interpersonal) impact on the healthcare visits, and information/education given at the healthcare visits based on the current professional organizations recommendations (organizational) will also be used. The major hypothesis behind the socio-ecological model is that child development/behaviors takes place through processes of progressively more complex interaction between an active child and the persons, objects, and symbols in his or her immediate environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. The information to be addressed in this study is examining several factors that can influence children, including interactions with healthcare providers, and both the rates and content of those interactions. Empowering communities and families in the community to take greater control over their own health is essential to reducing and eliminating health disparities (Aggrawal, 20003). The socio-ecological model has been used to effectively examine holistically the healthcare visits, including the content and structure of visits (Lytle, 2009).

Figure 2. Application of Modified Socio-Ecological Model for Overweight/Obese Children



Macrosystem: Public policy.

A child's environment is influenced by public policy, as policy is frequently responsible for providing resources that enable every child to flourish and develop. Financial resources provided by our legislation and society also create the context in which families function (Leu, 2008). For example, the length of a typical employees' workday is governed largely by public policy. Also, laws governing the rights of families and the treatment of children are created from policy. One of the biggest contributions from policy to family welfare is the financial safety net provided by government entitlement programs (Gifford, 2006). Regulatory policies, procedures and laws have been passed on national, state, and local levels to help protect the health of communities. These policies have been traditionally focused on reducing death and disease from infectious agents. This success has now led to the development of public policy in the area of chronic diseases (Bennett, 2009). As a part of the policy development process, increasing the public's awareness of health and policy issues must be included, especially related to obesity. Developing and enforcing state and local policies that can increase beneficial health behaviors in the form of mandated healthcare visits is essential.

Exosystem: Community.

The family structures in the community of a child's system continue to change. For example, in 2009, at least 29% of children live with a single parent, and that figure rises for African American children (Census Bureau, 2009). Further, 20% of all children in this country live in a household whose annual income falls below the poverty level possibly impacting the ability to buy healthy groceries. This rate is double among African American and Latino families (Census Bureau, 2008). Increasing numbers of hours worked outside the home by both mothers

and father's means there is less time for them to spend being involved with their child and their nutrition and activities (Bianchi, 2000).

Communities provide parents with access to other parents who have similar concerns and can function as resources and emotional support. Communities also provide child care, parent employment, and programs designed to encourage interaction among families. Partnerships between community agencies and business and industry can provide invaluable resources for families (Kisker, 2003). Community provides basic needs for positive development in children: (a) a personal relationship with a caring adult; (b) a safe place to live; (c) a healthy start toward the future; (d) a marketable skill to use after graduation from high school; and (e) an opportunity to contribute to the community (Paquette & Ryan, 2001). Partnerships within the community can help provide for these needs.

Community can refer to the face-to-face primary groups to which an individual might belong. These "mediating structures," such as family, church, informal social networks, and neighborhoods, may provide social identity and resources. Community can also be concerned with the relationships among organizations within a political or geographic area (Perese, 2005). Many organizations competing for scarce resources usually results in the inefficient use of these resources, unless there is coordination and coalition building among community agencies in planning health education interventions. A community can also be defined as a population which is political and has one or more power structures. These power structures play a crucial role in defining this community's health problems as well as allocating its resources (Laverack, 2000). Often those with the most serious health problems in a community are also those with the least access to its power structures (e.g. poor, rural, uneducated, homeless, unemployed, minorities and handicapped). Coordinating the efforts of all members of a community (organizations,

community leaders, and citizens to bring about change) is essential.

Mesosystem: Organizational.

Organizational or institutional factors shape or structure the environment within which individual and interpersonal relations occur (Gregson, 2001). These aspects can be rules, policies, and acceptable business etiquette within a more formal organization. The organizational component is especially influential with younger, more impressionable employees, as it helps to shape the ethics and expectations of a typical organization for these individuals. Examples include schools, companies, churches, and sports teams. Society and community are essentially the norm-forming components of a group or organization, and the individual is an active participant in this group or organization. Bronfenbrenner (1989) also claimed that the richer the medium for communication in this system, the more influential it is on the individual.

Changing the policies, practices, and physical environment of an organization (e.g., a workplace, health care setting, a school, a child care facility, a faith organization, or another type of community organization) to support behavior change may have an impact on the individual (Bopp, 2008). Examples include setting policy about healthy foods to be included in all menus planned for events; sponsoring school, faith organization, and worksite nutrition events; including healthy eating messages in newsletters and websites; adoption of worksite policies that provide time off or flex time during work hours for healthcare visits and physical activity, establishing content of healthcare visits in a healthcare setting; and establishing a policy allowing community members access to indoor and outdoor school facilities (Wilson, 2007). Within the socio-ecological framework, organizational characteristics can be used to support behavioral change. Organizations, such as school, work, church, healthcare settings, or neighborhood groups, may have positive or negative effects on the health of their members (Aaron, 2003).

Since they are important sources and transmitters of social norms and values, organizations can provide the opportunity to build social support for a desirable behavior change (Dresler-Hawke &Whitehaed, 2009).

Organizational changes help to support long-term behavioral changes among individuals and can be the connection that links the child with their immediate surroundings (Bopp, 2008). Changing the policies, practices, and physical environment of an organization (e.g., a workplace, health care setting, a school/child care, a faith organization, or another type of community organization) to support behavior change is essential. The current study investigated the organizational component of the socio-ecological theory in relation to the healthcare visits within the healthcare setting. The assumption was made that the health care providers within this organization followed the current AAP standards for healthcare visits in relation to the specific age of the children as well as the expert committee recommendations for overweight and obese children. Specifically, this study explored the frequency of the type of education that was provided by each type of provider to the children and their parents during healthcare visits, as well as the follow-up recommendations for children with an elevated BMI.

Microsystem: Interpersonal.

Interpersonal features are those aspects of groups that comprise social identity, which may include roles that a person plays (i.e. mother, father, sister, brother, child, etc.) or characteristics these groups have in common (Gregson, 2001). These interpersonal attributes are strong factors in how an individual perceives his- or herself. These qualities and factors can be learned, as in visits to the physician, but many are ingrained, such as ethnicity or gender. In the interpersonal sphere, there are also many components of the individual, including psychological and cognitive factors, like personality, knowledge, or beliefs (Burgess, 2007).

The individual in his or her own system is constantly shaped, not only by the environment, but by any encounter or other individual with whom they come in contact. This shaping is well-explored in child development, as it would be unreasonable to believe a child is solely a product of the societal environment (Yerushalmi, 2008). There are multiple, simultaneous influences in child behavior and learning including, but not limited to, culture, school, teacher, parental support, healthcare provider interaction, education level, and involvement in extracurricular activities. Examples of how interpersonal impacts include groups of friends, family, unorganized athletics, or social clubs. Recognizing that groups provide social identity and support, interpersonal interventions target groups, such as family members or teachers (Rhodes, 2007). Examples include written information given to parents during healthcare visits, or training health advisors to assist in health education.

According to the socio-ecological model, interpersonal attributes can influence how an individual perceives their environment and their interactions with the environment. How the individual perceives themselves can be learned potentially during visits to their healthcare provider, where the healthcare providers shares information with the children and their family. Recognizing that groups provide social identity and support, interpersonal interventions should target groups, such as family members or peers of the child. This study explored the frequency of exposure of parents to the healthcare provider through the number of healthcare visits, education provided to the children and their parents during healthcare visits, interventions and follow-up recommendations.

Individual.

Creating change in individual behavior can be accomplished by increasing the individual'sknowledge, influencing their attitudes, or challenging their beliefs (Davis, 2009). The

theory of change is one of the characteristics of the individual, such as knowledge, attitudes, skills or intention to comply with certain behavioral norms (Kremers, 2006). Individual practice of risk reduction behavior is the primary avenue for prevention of ill health. Hence, the development of effective health education may achieve the expected outcome of healthy behaviors. Given the complex nature of many risky behaviors, preventing and changing risk related behavior represents a significant challenge to healthcare providers (Leventhal, 2007).

The healthcare visits for children need to include increasing the knowledge of the child through education in the areas of nutrition and activity (Barlow, 2007). In well child visits, the behaviors and attitudes of the children in the areas of diet and physical activity behaviors and attitudes about weight including readiness to change should be assessed (NICHD, 2011). Individual characteristics of children in this study included the primary and secondary diagnosis.

Obesity.

Epidemic.

It has been reported in the literature, as well as by the media that we are in the midst of an obesity epidemic (Dehghan, Akhtar-Danesh, & Merhcant, 2005; Evans, Renaud, Finkelstein, Kamerow, & Brown, 2006). The term epidemic is defined as the occurrence in a community or region of cases of an illness, specified health behavior, or other health related events clearly in excess of normal expectancy; the time or region, and the time period in which cases occur are specified (Green, et al., 2002). The area covered by an epidemic may be limited to a small area such as a school classroom, or it may extend to include many states or countries. Epidemics may last from hours to years (Nestle & Jacobson, 2000). Since the beginning of this decade the Centers for Disease Control and Prevention ([CDC], 2005) has been warning that children are at risk for health problems from their increasing weight indicative of an obesity epidemic. Research

evidence has emerged indicating that the CDC's warnings were based on questionable data that resulted in exaggerated claims of risks (Johnson, 2005). Looking at the scientific evidence it is clear that the extreme views on either side of the argument are incorrect (Flegal, Graubard, Williamson & Gail, 2005; Martosko, 2004; Holt, 2005). There is no doubt that concerns about obesity may be alarmist and exaggerated, but it is also apparent that there are real health risks associated with it.

The fact that more children are getting heavier in this country raises a significant public health concern (Ventura & Birch, 2008). The CDC began calling the problem an epidemic in the beginning of this decade based on research that estimated 280,000 annual deaths (all ages) were a consequence of obesity (Allison, Basile, & Yuker, 1999). Since then, there has been a strong media campaign devoted to convincing Americans to lose weight.

There is little argument about the fact that, as a nation, more of us (both adults and children) are heavier than ever before; the disagreement lies in the effect that this has on our health (Garcia, 2008). The campaign to convince us to lose weight gained much of its momentum in 2004; not only were there high-profile public health initiatives devoted to stopping the obesity epidemic, but the idea had pervaded popular culture as well (Johnson, 2005). Movies like *Super Size Me* were the topic of many discussions, and there were regular news reports about the dangers of eating too much fat.

Research has revealed that obesity is not the cause of ill health, but is rather the effect of sedentary living and poor nutrition, which are the actual causes (Anderson & Butcher, 2006; Johnson, 2005; Wilborn, et al, 2005). Research findings support that the risks associated with obesity can be significantly reduced if one engages in regular physical activity, even if weight loss is not present (Hill, 2002; Johnson, 2005). According to Thomas (2006), weight loss should

not be ignored but a greater focus should be placed on physical activity and good nutrition.

In 1970, researchers at the Cooper Institute for Aerobics Research in Dallas, Texas, began to gather data for the Aerobics Center Longitudinal Study (ACLS). The ACLS study examined multiple variables to estimate the health risks and benefits of certain behaviors and lifestyle choices (Lee, 1999). What set this study apart from other large-scale observational studies, however, was that instead of relying on self-reporting for variables like exercise habits, they tested fitness levels directly by way of a graded exercise test (GXT). A GXT requires a person to walk on a treadmill as long as he or she can with increases in speed and incline at regular intervals. This is the most reliable way to assess a person's physical fitness (Kirk, Zeller, Claytor, Santangelo, Khoury, & Daniels, (2005). Researchers at the Cooper Institute were able to include an accurate measure of the subjects' fitness levels as a covariate with obesity. Analysis of the data obtained in the ACLS showed that there are health risks associated with obesity, but when physical activity is controlled, much of that risk disappears (Blair & Church, 2004).

In spite of the fact that there are virtually no controlled clinical trials examining the effects of obesity in children, investigations have shown that, over time, weight cycling (temporary weight loss followed by a regain of that weight, otherwise known as yo-yoing) increases blood pressure, enlarges the heart, damages the kidney, increases abdominal fat deposits, and promotes further weight gain for all ages (Bucci, 2000; Ernsberger & Koletsky, 1999). These findings indicate that the yo-yo effect of crash dieting may be the cause of many of the problems we attribute to simply being fat. Having too much body fat is a health risk; however, there is the potential for eliminating much of the potential risk by exercising and having better nutrition (Crawford & Levitt, 2003).

None of this means, however, that the health care provider should simply abandon our

attempts to maintain a healthy weight. According to a study published in JAMA by Gregg, et al., (2005), obese children with hypertension had a greater percentage of body fat as well as diabetes compared to lean children. While health care providers are better at dealing with obesity-related health issues once they occur, it is still more effective to prevent the development of obesity (Hernandez, Uphold, Graham & Singer, 2005; Strauss, 2002). It is important for health care providers to focus on the facts related to obesity rather than the fear generated by the term "epidemic."

Prevalance.

Between 1976 and 1991 the prevalence of overweight and obesity among all age groups of children in the United States increased by about 31% (Heini & Weinsier, 1997); between 1994 and 2000 it increased by another 24% (Flegal et al., 2002). According to a 2004 analysis by the CDC, the trend of overweight and obesity does not appear to be stabilizing or decreasing (Hedley et al., 2004). According to the third National Health and Nutrition Examination Survey ([NHANES] III, 2004), rates of childhood obesity increased between 1974 to 2004 from 5% to 14% in 2 – 5 year olds, 4% to 19% in 6 – 11 year olds, and 6% to 17% in 12 – 19 year olds. The largest increase in the numbers of obese children between 1998 and 2008 was found among Mexican-American males along with Non-Hispanic black females in the 6 – 11 year-old age range (CDC, 2009, NHANES, 2009). Over the past three decades, the childhood obesity rate has more than doubled for preschool children aged 2 – 5 years and adolescents aged 12 – 19 years, and it has more than tripled for children aged 6 – 11 years.

At present, approximately 9 million children over 6 years of age are considered obese (Institute of Medicine [IOM], 2011). The overall obesity statistics during the past 20 years have revealed an increase in obesity in the United States, with only four states having a prevalence of

obesity less than 20%, and those trends are likely to continue (CDC, 2007). With obesity rates continuing to rise, understanding of effective prevention measures is needed to combat the problem before it arises.

Contributing factors.

Low activity levels (including sedentary lifestyles), poor nutrition, genetics, and environment are all well-known factors associated with childhood obesity (Burdette, Whitaker & Daniels, 2004 [Appendix A]; Gordon-Larson, Adair, & Popkin, 2004; Harrell, et al., 2003 [Appendix A]; Sallis & Glanz, 2006). Data supports that children are increasingly sedentary and do not engage in aerobic activity on a regular basis (Crespo et al., 2001; Kimm, Glynn, & Kriska, 2002). Factors associated with decreased amounts of physical activity include the built environment, increased time spent on sedentary activities (computer use, video games, television viewing), and reduced physical education programs (Berkey, et al., 2000; Harper, 2006; Sallis & Glanz, 2006).

Sedentary lifestyle.

The built environment—defined as neighborhoods, roads, buildings, food sources, and recreational facilities in which people live, work, are educated, eat, and play has a major impact on the obesity epidemic (Sallis & Glanz, 2006). Buildings, transportation, land use, community design, and recreational facilities all affect the physical activity of children. Researchers have linked recreational facilities and physical activity, showing that children and adolescents with recreational facilities and programs near their homes are more active than those without (Harrell, et al., 2003 [Appendix A]; Sallis, Prochaska, & Wendell, 2000).

Before the middle of the twentieth century, communities were designed to support convenient pedestrian travel for common activities such as shopping and attending school. As the

twentieth century progressed and America's suburbs began to grow, a variety of policies were set in place to optimize automobile travel (Saelens, Sallis, & Frank, 2003). Different forms of land were separated by zoning codes so that homes, stores, and schools were no longer within walking distance. Many neighborhoods today lack sidewalks, bike lanes, and safe paths; furthermore, they have fast traffic that endangers pedestrians (Desapriya, Pike, Basic, & Subzwari, 2007).

Sedentary recreational activities, such as watching television and videos, using computers, and playing video games are very prevalent in the lives of young people today (Berkey, et al., 2000; Ransdell, Oakland & Taylor, 2003 [Appendix A]). The widespread availability of television, videos, computers, and video games has led to increasingly sedentary children (Fogelholm, Nuutinen, Pasanen, Myohanen & Saatela, 1999 [Appendix A]). Data from the 1988 – 1994 National Health and Nutrition Examination Survey indicates that 26% of American children (up to 33% of Mexican American and 43% of non-Hispanic Black children) watches at least 4 hours of television per day, and these children are less likely to participate in vigorous physical activity (Burdette, Whitaker & Daniels, 2004 [Appendix A]).

McArdle, Katch, and Katch (2000) report that children between the ages of 6 and 11 spend as much time watching television each as they do attending school (on average 26 hours per week). AAP (2007) recommends no television watching for children less than 2 years of age and no more than 1 to 2 hours a day for older children. Findings indicate that caregivers are more concerned about the types of television programs being watched than about the quantity of time spent watching. Caregivers also report that television fills an important role of "babysitter" to pacify children (Gordon-Larsen et al., 2002; Lumeng, Gannon, Appugliese, Cabral & Zuckerman, 2004 [Appendix A]).

Toy manufacturers also play an important role in increasing sedentary entertainment. Through advertising manufacturers lure children by advertising into playing electronic games (computer or video games) that do little more than exercise the fingers (McHorter, Wallmann, & Alpert 2003). According to the US Dept of Health and Human Services (HHS) (2007), children's use of video games has become widespread. A survey of families with school-age children finds that 74% of families own video-game equipment and that school-age children play video games an average of 53 minutes per day. And while most parents (88%) report regularly supervising their children's use of television, less than half (48%) report regularly supervising their children's use of video games.

Another contributing factor to sedentary activity is the lack of physical education (PE) in schools. Children spend limited amounts of time in school on physical activity whether it is in the form of either physical education classes or recess. In the United States during 1991 – 2003, the Centers for Disease Control and Prevention (CDC) analyzed data from the national Youth Risk Behavior Survey. The report from the survey indicates that the proportion of students attending PE class daily declined significantly during 1991 – 1995 and did not change during 1995 – 2003. The proportion of students exercising or playing sports for greater than 20 minutes during PE class 3 to 5 days per week did not change significantly during 1991 – 2003. In 2003, 55.7% of students were enrolled in a PE class, while only 28.4% attended PE class daily, and only 39.2% were physically active during PE class.

Some schools use competing academic demands as a reason for decreasing or totally eliminating physical education (Harper, 2006). Only one state has mandatory physical education classes for all students, and decisions on curriculum content and specific requirements fall to local school districts or individual schools. Some schools may require one year of physical

education, whereas other states or school districts may not require physical education beyond 8th grade (Healthy People, 2010). The lack of consistency in physical education between states and school districts leads to a wide range of requirements for students at all levels (Story, Kaphingst, & French, 2006).

Physical education requirements decline drastically as a student's grade level increases. The share of schools requiring PE drops from around 50 % for grades 1 through 5, to 25 % in grade 8, to only 5 % in grade 12 (Burgeson, 2001). Although the share of high school students enrolled in PE classes appears to have increased from 1991 to 2003 (49 % to 56 %), the share of students attending PE daily fell from 42 % to 28 % (Grunbaum, 2004).

The quality of PE classes also impacts child and adolescent obesity, as only one third of adolescents were physically active in PE class for more than 20 minutes, 3 to 5 days a week (Story, Kaphingst & French, 2006). Schools must fit many subjects and activities into the school day and must balance state and local resources, priorities, and needs for education. In recent years the comprehensive curriculum has been eroding, especially in the wake of the federal No Child Left Behind Act of 2001, which focuses on student achievement in defined core academic subjects and does not include physical education (Datar & Sturm, 2004).

The National Association for Sport and Physical Education (NASPE) (2001) recommends that schools provide supervised, daily recess for students up to grades 5 or 6. The NASPE encourages recess to not be scheduled back-to-back with physical education classes. Additionally, it is suggested that recess be viewed not as a reward but as a necessary educational support, and students should not be denied recess to punish misbehavior or to make up work. The final recommendation is that recess complement, not substitute for, structured PE (NASPE, 2001). Unstructured physical activity during recess allows children to have choices, develop

rules for play, release energy and stress, and use skills developed in physical education (Story, Kaphingst & French, 2006). The School Health Policies and Programs Study Survey of 2000, however, found that 29% of elementary schools schedule no recess for students in kindergarten through 5th grade.

Nutrition.

Another major contributing factor to childhood obesity is unhealthy eating patterns. Eating patterns include, but are not limited to frequency of restaurant food consumption, portion sizes, consumption of energy-dense foods and high-calorie foods, meal patterns, meal frequency, beverage consumption, and school meal participation, all of which impact nutrient intake (Baughcum, Burklow, Deeks, Powers, & Whitaker 1998 [Appendix A]; Faith et al., 2004 [Appendix A]; Gyovai, Gonzales, Ferran & Wolff, 2003). Eating patterns have a direct relationship to nutrient intake, which can lead to chronic diseases, including obesity (Nicklas, Baranowski, Cullen & Berenson, 2001).

Eating patterns are changing among children and adults. The traditional pattern of the family's eating at the kitchen table has changed, with fewer families now eating meals together (Fisher, Mitchell, Smiciklas-Wright & Birch, 2002 [Appendix A]). Approximately 46% of family food expenditures are spent on food and beverages outside the home, with 34% of the total food dollars spent on fast foods (Putnam & Allshouse, 2000). Children consume one-quarter of their meals away from home, increasing from 18% for preschoolers, to 26% for school-age children, and 27% to 30% for adolescents. Fast-food restaurants accounted for more than half of away-from-home meals (Lin, Guthrie, & Frazo, 2001).

When eating out, people consume a greater total amount of food, choose higher-energy foods, or both, and these tendencies appear to be increasing (Putnam & Allshouse, 2000). A

comparison of food portion sizes from 1957 to 2004 is particularly striking. The typical fast-food outlet hamburger in 1957 contained a little more than one ounce of cooked meat; a burger in 1997 weighed six ounces, and a burger in 2004 weighed up to a full pound. The average soda was eight ounces in 1957, 32 to 64 ounces in 1997, and as much as 96 ounces in 2004. The average theatre serving of popcorn consisted of three cups in 1957 and 16 cups (medium size) in 1997, which is consistent with today's sizes (Nicklaus, Baranowski, Cullen, & Berenson, 2001).

Meal patterns and frequency are another component of eating patterns, with children who consume breakfast regularly having better nutrient density with adequate micronutrient intake than children who skip breakfast (Nicklas, O'Neil, & Berenson, 1998; O'Dea, 2003 [Appendix A]). Children who consume breakfast have significantly better healthy-eating scores for grains, fruits, milk products, and variety than children who do not (Bowman, Lino, Gerrior, & Basiotis, 1998). Eating a nutritious breakfast may help control body weight due to reduced dietary fat intake and minimized impulsive snacking (Schlundt, Hill, Sbrocco, Pope-Cordle & Sharp, 2002). Unfortunately, breakfast consumption has declined significantly between 1965 and 2001 for both children and adolescents (Siega-Riz, Popkin & Carson, 1998).

Eating dinner as a family has also been associated with healthy dietary patterns such as a higher consumption of fruits, vegetables, fiber, calcium, iron, and vitamins B-6, B-12, C and E, and a lower consumption of saturated and trans fatty-acids, soda, and fried foods (Gillman, Rifas-Shiman, & Frazier, et al., 2000; Fisher, Mitchell, Smiciklas, & Birch, 2002 [Appendix A]). Children not eating family meals were most likely to have a suboptimal number of servings from the fruit and vegetable group among those food groups in the USDA Food Guide Pyramid (Nicklaus, Baranowski, Cullen, & Berenson, 2001).

Soft drinks have been replacing more nutritious beverages such as milk among

adolescents (Harnack, Stang & Story, 1999). Consumption of soft drinks increased dramatically among adolescents between 1977 and 2000 (United States Department of Agriculture [USDA], 2001). The proportion of adolescent boys and girls who consumed soft drinks daily increased by 74% and 65%, respectively, and during the same time adolescents were increasing soft drink consumption, they were decreasing meal intake. It turns out that adolescents with a consistent meal pattern (i.e. three meals a day) are leaner than those with an inconsistent meal pattern (Siega-Riz, Carson & Popkin, 1998). Similarly, a link has been noted between obesity, soft drink consumption, and skipping meals as well as a decrease in milk consumption among youths (Frazao, 2005). Also, high soft drink consumption is positively associated with higher energy intakes, which may also contribute to childhood obesity (Harnack, Stang, & Story, 1999).

The National School Lunch Program (NSLP) (2010) and School Breakfast Program (SBP) (2010) have had a generally positive impact on the nutritional status of children, improving the overall dietary intake of children as well as increased mineral and vitamin intake. However, the introduction of school lunch and, later, school breakfast, has likely contributed to obesity in low-socioeconomic-status children. NSLP participation is associated with a higher percentage intake of energy from fat, saturated fat, and protein, and a lower percentage intake of energy from carbohydrates, with similar findings observed with SBP participation (Healthy People, 2002).

Genetics.

Studies from a variety of disciplines demonstrate that childhood obesity is not caused by one thing, but rather by the interplay of multiple factors, including genetics (Cook et al., 2005; Snethen et al., 2006; Stice et al., 2005). A child with a genetic predisposition to obesity, who lives in a social environment in which energy-dense foods are easily accessible and physical

activity is minimal, will be at increased risk for obesity (Golan, 2001). Research findings related to the role of genetics in the onset of overweight or obesity state that between 5% and 25% of the variance in weight within a population can be attributed to genetic variability (Fitzgibbon, Stolley, Dyer, VanHorn, & Kaufer -Christoffel, 2002). Investigators have also explored factors in the child's family environment—including mother's education, parenting styles, and family interaction—which have all had influences on children's perceptions and behaviors related to obesity (Zeller & Modi, 2007).

It has long been considered that genetic variation between individuals is likely to influence responses to environmental factors such as diet and levels of physical activity. In a series of classical twin studies, Bouchard, Lykken, McGue, Segal and Tellegen (1990) tested the effects of heredity on weight gain and weight loss in response to positive and negative energy balance in 12 male monozygotic twins. In a 100-day, continually supervised in-patient overfeeding study, subjects were given a 1000 kcal per day surplus over the energy cost for weight maintenance. The amount of weight gained during this forced overfeeding varied from 3 to 12 kg. There was at least three times more variance in response between twin pairs than within pairs for the gains in body weight, fat mass and fat-free mass (Bouchard, et al., 1996). The most powerful predictor of the amount of weight gained was the amount gained by the subject's identical twin. This strongly suggests that when food intake and exercise are controlled, inherited factors influencing either energy expenditure or nutrient partitioning has an important influence on weight gain.

Environment.

Environment, including family, specifically parents, ethnicity, culture, and socioeconomic status, are all well-known factors associated with childhood obesity The family is

the cornerstone for promoting healthy behaviors and is an important source of social support. Parents are the main source of children's health care information (Ackard & Neumark-Sztainer, 2001). Parents can play an important role in reinforcing positive influences and filtering out negative influences on their children in relation to attitudes and behaviors (Neumark-Sztainer, 2005). In particular, mothers are the primary source of health-related information and have a strong influence on adolescent attitudes toward weight and behaviors related to nutrition and activity. Poor parent-adolescent relationships could impair adolescents' psychological adjustment and increase their risk of psychopathology. Adolescents with more supportive parents are less often depressed or psychologically distressed which may impact diet and activity (Sabbah, et al., 2009). In addition, qualitative research among adolescents has shown that a negative relationship with parents is related to weight dissatisfaction (Ewell, Smith, Karmel, & Hart, 1996).

Ethnicity and culture have been noted as factors contributing to the problem of childhood obesity (Myers & Vargas, 2000 [Appendix A]). Specific attitudes about food and eating are learned and reinforced within the home, which can influence behavioral patterns leading to obesity (Bruss, Morris, & Dannison, 2003; Del Rio-Navarro, et al., 2004 [Appendix A]; Martorell, Khan, Hughes & Grummer-Strawn, 1998 [Appendix A]; Maynard, Galuska, Blanck, & Serdula, 2003 [Appendix A]). Adolescents who are most likely to be obese are children with Pacific Islander or Middle Eastern/Arabic background (Beech, et al., 2004 [Appendix A]; O'Dea, 2008). The least likely to be obese are Caucasian or Asian children and in particular, girls. Obese female adolescents from Middle Eastern/Arabic and Pacific Islander backgrounds are less likely than their Caucasian or Asian peers to perceive themselves as "too fat" as it is more culturally acceptable and perhaps more desirable among children and teens to be healthier (Caprio, et al., 2008; Marild et al., 2004). Cultural beliefs and differences in dietary intake and physical activity

have been proposed as influencing the prevalence of overweight/obesity in children (Cook et al., 2005; Golan, 2001; Snethen et al., 2006).

Sociocultural values about weight /shape vary from class to class (Botta, 2000). Upper class White children, especially girls, are taught to watch their weight from a very early age. Slenderness is also a value in the White middle class. But both Hispanic and Black children tend to be heavier in part because of a different body ideal, one that is "thick" or "healthy," terms that suggest a very different valuation of shape. Being voluptuous is clearly regarded as a good thing by many Hispanic and African American individuals. A study by Duncan and Robinson (2004) found that their participants negotiate between two contrasting standards. First, they confront an unrealistic slender body ideal encouraged by White culture; second, they face the reality of a heavier body weight and shape that may lead to obesity and other health risks. The authors find that there are cultural differences in considering what the body ideals are and that these differences need to be addressed. Differences between the Black body ideal and White body ideal include a number of concepts and ideas: (a) African American females are more likely to prefer larger body shapes than White females; (b) African American males are more likely to find larger body shapes attractive than White males; (c) African American females express less interest in dieting, eating and food related issues than White females and report greater satisfaction with their bodies; and (d) although many African American females may be overweight by medical standards, they may not view themselves as overweight.

Socioeconomic status, specifically demographic characteristics, has been found to be a predictor of obesity in children (Gable & Lutz, 2000 [Appendix A]; Green et al., 2003 [Appendix A]). Although there is a correlation between low-income single-parent families and childhood obesity, obesity impacts every class, independent of income or knowledge. Single-parent

households, as well as households in which both parents work full-time, have a tendency, due to time constraints, to consume prepared food items (Gonzales, Marshall, Heimendinger, Crane & Neal, 2002 [Appendix A]; Patrick & Nicklaus, 2005). The increased consumption of prepared or fast foods has increased the fat content in childrens' diets, and the trend appears to continue (Gentile, Oberg, Sherwood, Walsh, & Hogan, 2004). Household income has been associated with food availability, which can indirectly influence children's eating habits and weight (Gable & Lutz, 2000 [Appendix A]). Dual-worker and single-parent families may not have time to prepare healthy meals, and low-income families may not have the finances to regularly purchase healthy foods. As the pace of today's society increases, the food intake may be affected in adverse ways across all classes.

In the state of Wisconsin nutrition programs for low-income families have been implemented to promote healthier nutrition and well-being within the families. UW-Extension Family Living Programs (FLP) has a variety of programs to promote the health of families, including the Wisconsin Nutrition Education Program (WNEP). The WNEP is primarily made up of two federally-funded nutrition education programs for low-income families and individuals—the Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Program Education (SNAP-Ed). The mission of WNEP is to develop and implement educational programs in Wisconsin that fulfill the goals and missions of EFNEP and SNAP-Ed. The EFNEP is designed to assist families with limited resource to acquire the knowledge and skills to develop nutritionally sound diets. Additionally, the program is focused on contributing to the personal development and behavior changes necessary for nutritional improvement of the entire family. The goal of SNAP-Ed is to provide educational programs that increase, within a limited budget, the likelihood of all food stamp recipients to

make healthy food choices and choose active lifestyles consistent with the most recent Dietary Guidelines for Americans (WNEP, 2012).

Factors contributing to childhood obesity are numerous including the broad areas of low activity levels (including sedentary lifestyles), poor nutrition, genetics, and environment (Burdette, Whitaker & Daniels, 2004 [Appendix A]; Gordon-Larson, Adair, & Popkin, 2004; Harrell, et al., 2003 [Appendix A]; Sallis & Glanz, 2006). Healthcare providers practice behaviors must include addressing factors which contribute to childhood obesity with thorough assessments to identify obesity in children, and implementation of interventions to effectively manage obesity.

Impact of obesity on children.

Obesity is impacting children with a multiplicity of physical and psychological effects, and is contributing to serious medical problems. The high prevalence of childhood obesity is associated with increasing rates of medical conditions that until recently were found exclusively in adults (Cook et al., 2005). An increase in adverse chronic medical conditions in children who are overweight or obese include (a) cardiac (hypertension, hyperlipidemia, and dyslipidemia); (b) endocrine (Type 2 diabetes, menstrual irregularity, and insulin resistance); (c) gastrointestinal (fatty liver); (d) pulmonary (obstructive sleep apnea); and (e) skeletal disorders (abnormal bone growth) secondary to obesity of children (American Heart Association [AHA], 2008; Anderson & Butcher, 2006; Harbaugh, Jordan-Welch, Bounds, Blom & Fisher, 2007).

Physical effects.

Historically the alterations in cardiovascular system conditions in childhood were generally related to cardiac anomalies at birth. Recent research has demonstrated that this pattern is changing as the risk for elevated blood pressure, a major risk factor for heart attacks, is

significantly higher for children whose BMI is at or above the 90th percentile (Harbaugh et al., 2007). Also of importance is left ventricular hypertrophy, which is also linked to an elevated BMI. Fatty streaks, associated with hardening of the arteries, have been found during autopsy on overweight children (Robinson, 2006).

In the literature it is reported that the rates of children being affected by cardiac conditions are increasing (Rowland, 2007). In a population-based sample, approximately 60% of obese children aged 5 to 10 years had at least one cardiovascular disease (CVD) risk factor—such as elevated total cholesterol, triglycerides, insulin, or blood pressure—and 25% had 2 or more CVD risk factors (IOM, 2005). For children born in the United States in 2000, the lifetime risk of being diagnosed with type 2 diabetes at some point in their lives was estimated to be 30% for boys and 40% for girls, with a higher risk among ethnic minority groups (Harbaugh et al, 2007).

Metabolic syndrome is a constellation of risk factors which put a person at increased risk of coronary heart disease, other diseases related to plaque buildups in artery walls (e.g., stroke and peripheral vascular disease), and type 2 diabetes (AHA, 2008). The risk factors include increased waist circumference, increased levels of LDL cholesterol, and insulin resistance. According to Basco (2005), the prevalence of metabolic syndrome was found to be higher (30%) in obese children. Type II diabetes, historically an adult illness, has increased dramatically in adolescents and is now being diagnosed in children as young as 8 years of age (Harbaugh et. al, 2007).

A link has also been reported between pulmonary disorders and overweight children. Researchers speculate that obesity may increase inflammation of the bronchi, thereby contributing to asthma, or that children with asthma have reduced physical activity and therefore

become overweight (Cataletto, 2006). Additionally, a close relationship has been identified between obesity and another pulmonary disorder; sleep apnea, which can result in daytime sleepiness and poor academic performance (Robinson, 2006). Severely overweight young people have been noted as having symptoms associated with obstructive sleep apnea (Lam, 2009).

Childhood obesity can also impact the gastrointestinal system, in the form of fatty livers. Researchers have found that the same processes of fat deposit and inflammation that cause liver disease and reflux disease in adults can also afflict children and adolescents (Daniels, 2006). Liver disease has no symptoms and is often discovered in autopsy, but researchers believe as many as 50% of obese children may have fat deposits in their livers (Robinson, 2006).

The physical effects of elevated body weight in obese children are also observed in complications of the skeletal system. Orthopedic problems that affect obese children include Blount disease, a mechanical deficiency in the growth plate of adolescents, which results in a bowed appearance of the lower leg and an abnormal gait; it most commonly affects boys over nine years of age who are overweight (Akridge et al., 2007). Another orthopedic problem, most commonly seen in overweight males and African Americans, is an abnormal rotation of the bone in the upper leg and hip, requiring surgical repair (Daniels, 2006).

According to Gully, Williams, Lester & Aitkin (2007), the life expectancy in children is decreasing due to obesity-related conditions. Life expectancy has been defined by the National Center for Health Statistics (2008) as the average number of years persons born in a given year could be expected to live based on that year's age-specific death rates. It has previously been assumed that United States life expectancy would rise indefinitely; however, this expectation has been altered due to childhood obesity. According to the New England Journal of Medicine (2005), if the current epidemic of child and adolescent obesity continues unabated, life

expectancy for obese children could be shortened by 2 to 5 years in the coming decades. Preventing these chronic conditions, improving function, relieving physical pain and emotional distress, and maximizing health across the life span have become as important in public health as increasing life expectancy, largely because the latter follows from the former (Molla, 2001).

Psychological effects.

Psychological problems are cited as the most common short-term consequences related to childhood obesity, with the emotional cost for overweight children described as changes in well-being (Cohen & Budesheim, 1997 [Appendix A]; Tiggemann, 2005). For example, depression has been linked with childhood obesity. Severely obese subjects, especially young females, are at high risk for depression (Dixon & O'Brien, 2003). Some work suggests that stigma in the form of weight-based teasing may mediate the relationship between depression and obesity in youths. Eisenberg and colleagues examined weight-based teasing in 4,746 adolescents and found that weight-based teasing was related to increased likelihood of depression (Eisenberg et al., 2003). In addition, weight category was not related to most outcomes after teasing was controlled for, suggesting that teasing itself, rather than weight, may be the relevant factor predicting negative emotional well-being. Similarly, a study of middle school girls (N=372) demonstrated that after controlling for BMI, both paternal and maternal appearance-based teasing predicted depression (Keery, Boutelle, Van den Berg, & Thompson, 2005).

Another issue that is important to the psychological impact on children is stigma. One reason that adolescence is a particularly sensitive time for experiences of weight stigma is that the formation of social relationships is especially salient during this period. The literature suggests that negative attitudes about obesity by peers may adversely influence social relationships for overweight children. Research with elementary school children has documented

that obese children are liked less and more often rejected by peers than are average-weight students (Strauss, 2000). For instance, in a large-scale investigation of social peer networks among more than 90,118 adolescents (ages 13 to 18 years) from the National Longitudinal Study of Adolescent Health, overweight adolescents were more likely to be socially isolated and were less likely to be nominated by their peers as friends than were average-weight students (Strauss & Pollack, 2003). As BMI increased in students, they received fewer friendship nominations. Another study of 9,943 adolescents reported that obese students were less likely to spend time with friends than were thinner peers (Falkner et al., 2001). After controlling for grade level, race, and socioeconomic status, obese girls were less likely to interact with friends than were non-obese peers, and obese boys were less likely to spend time with friends and more likely to report that they felt their friends did not care about them than were non-obese boys.

"Quality of life" is a descriptive term that refers to people's emotional, social, and physical well-being, and their ability to perform the ordinary tasks of living (Swallen, Reither, Haas & Meier, 2005 [Appendix A]). Quality of life reflects a general sense of happiness and satisfaction with life and environment, encompassing all aspects of life, including health, recreation, culture, rights, values, beliefs, aspirations, and the conditions that support these aspects (Cameron, 1999 [Appendix A]; Drenowski & Evans, 2001). Quality of life is affected, therefore, by changes in physical health, psychological health, social relationships, level of independence, environment, and personal beliefs (Smith, 2006). It stands to reason then that children are more likely to experience alterations in quality of life if they are overweight. Furthermore, decreased quality of life scores in children have been accompanied by poor school performance for children ages 9 to12 (Fowler-Brown & Kahwati, 2004; Williams, Wake, Hesketh, Maher, & Waters, 2005).

Years of healthy life or quality of life expectancy is a combined measure developed for the *Healthy People 2010* initiative. The difference between life expectancy and years of healthy (quality) life reflects the average amount of time spent in less than optimal health because of chronic conditions. With the rate of chronic conditions in obese children increasing, the years of quality life has the potential to decline. This is an area that the healthcare professionals can discuss with obese patients, in a non-biased way. Unfortunately, overweight and obese patients (both children and adults) are vulnerable to multiple forms of weight bias in health-care settings. In 2001, Puhl and Brownell summarized a number of studies demonstrating that health-care professionals (e.g., physicians, nurses, psychologists, and medical students) possess negative attitudes toward obese patients, including beliefs that obese patients are lazy, noncompliant, undisciplined, and have low willpower. Research since 2001 expands upon this body of knowledge, providing new insight into providers' attitudes and weight management practices, and health-care experiences of obese patients. In a study of over 620 primary care physicians, more than 50% viewed obese patients as awkward, unattractive, ugly, and noncompliant. One-third of the sample further characterized obese patients as weak-willed, sloppy, and lazy. Physicians also viewed obesity as largely a behavioral problem caused by physical inactivity and overeating (Foster, et al., 2003).

Financial effects.

The magnitude of the obesity problem is also reflected in costs, as obesity-associated diseases and complications have increased the cost of raising children (Harper, 2006). Of all economic issues related to obesity, this one might be the most important. Obesity-attributable medical costs among children in the United States in 2003 were estimated at $15 billion (Hedley, et al., 2004).

Children covered by Medicaid are nearly 6 times more likely to be treated for a diagnosis of obesity than children covered by private insurance, perhaps due to private insurance premiums or reimbursement, but more than likely an underestimate of children who are obese that are insured with private insurance (Marder, 2005). Annual healthcare costs are about $6,700 for obese children covered by Medicaid and about $3,700 for those with private insurance due to the higher mean covered health expenses for Medicaid (Gately et al., 2005). Total healthcare spending for children who receive a diagnosis of obesity (a small subset of the 16% of children in the US who are considered obese) is approximately $280 million per year for those with private insurance and $470 million for those with Medicaid. If the cost differential between obese and non-obese children is half what we observe for these children who are diagnosed with obesity, then the national costs for obese children (including those who never get a diagnosis for obesity) are approximately $11 billion for private insurance and $33 billion for those with Medicaid (Marder, 2005).

Children treated for obesity are roughly 3 times more expensive for the health system than the average insured child because of other co-morbid conditions such as heart disease and diabetes (Marder, 2005). Children diagnosed with obesity are 2 to 3 times more likely to be hospitalized due to other co-morbid conditions (Hainsworth, Davies, Khan, & Weisman, 2009). It is important to note that children who receive Medicaid (whether or not they are treated for obesity) are less likely to visit the doctor and more likely to enter the hospital than comparable children with private insurance. Obesity-associated annual hospital costs for children and youth have more than tripled over 2 decades, rising from $35 million in 1979 – 1981 to $127 million in 1997 – 1999. After adjusting for inflation and converting to 2004 dollars, the national healthcare expenditures related to obesity and overweight in children alone range from $98 billion to $129

billion annually (IOM, 2001).

Childhood obesity is impacting children with a multiplicity of physical and psychological effects, and is contributing to serious medical problems An important part of healthcare providers practice behaviors is to provide appropriate care and follow-up for children who are overweight and obese to decrease the impact of the physical and psychological effects.

The solutions to childhood obesity from the health care perspective may involve revamping a broad range of health system issues that adversely affect not only the management of childhood obesity but other health problems as well. Addressing social determinants, improving communication abilities and training, and promoting the referral of children and families to qualified professionals may enhance health care providers' capacity to interact more effectively with all patients/families, and may facilitate their role as multidisciplinary team members in the response to children who are overweight or obese (Gadomski, Wolff, Tripp, Lewis, and Short 2001).

Prevention measures.

A variety of obesity prevention initiatives are currently underway at federal, state, and local levels to improve the health of children through grants, laws, and ordinances (The United States Department of Health and Human Services (HHS), 2007). At the federal level, *Healthy People 2010* includes overweight and obesity, as well as physical activity, as leading health indicators, prompting weight and nutrition initiatives at both the state and national level (HHS, 2007). The US Dept of Health and Human Services ([HHS], 2007) initiated *Healthy Youth for a Healthy Future,* which includes a number of organizations and programs, e.g.: (a) Center for Disease Control (CDC): School Health Index; (b) National Institute of Health (NIH): We can; (c) Indian Health Service (HIS): Diabetes Prevention; (d) Food and Drug Association (FDA):

Nutrition Facts Label. Two other important initiatives include CDC (2008): Division of Adolescent Health (DASH) and IOM (2005): Health in the Balance. There are other initiatives too numerous to mention that are not as well known; most of these focus on both increased physical activity and promotion of healthful eating, although some of them focus strictly on either physical activity or diet. The Maternal and Child Health Bureau, Health Resources and Services Administration, and the Department of Health and Human Services convened a committee of pediatric obesity experts to develop childhood obesity program recommendations for care (Barlow, 2007). However, the program lacked sustainable financial and physical support, and reported poor evaluation and implementation processes, which make the program ineffective and ultimately unsuccessful (IOM, 2004).

At the state and local government levels, recommendations have been made to expand and promote opportunities for physical activity, nutrition education, or wellness initiatives in schools, institute widespread body mass index measurements, and provide information on the nutritional content of school foods. Communities have implemented these opportunities through changes in ordinances, capital improvement programs, and other planning programs (National Conference of State Legislatures [NCSL], 2006). However, as with federal programs, there is a lack of direction, surveillance, and evaluation for the programs, which again may limit their success (School Nutrition Association [SNA], 2007).

Professional nursing organizations have made recommendations for effective childhood obesity prevention, including the Society of Pediatric Nurses, National Association of Pediatric Nurse Practitioners, and National Association of School Nurses (Adams & McCarthy, 2007; Katz, 2005; Tao, 2007). Prevention is an important part of healthcare and the guidelines for obesity indicate the need to routinely (at least annually) track BMI in children and youth. Most

importantly, the guidelines also identify the need to offer appropriate counseling and guidance to children who are obese and to their families (Barlow, 2007). However, the number of children receiving annual follow-up examinations for measurement of BMI is well below the annual recommendation (Selden, 2006). Nurses, as healthcare professionals, are central to promoting optimal health and can actively shape safe healthcare programs (Pangrazi, Beighle, Vehige & Vack, 2003 [Appendix A]: Sheehan & Yin, 2006).

There are several nursing initiatives that promote recommendations for childhood obesity prevention. The position statement of the Society of Pediatric Nurses ([SPN], 2006), entitled *Exercise and Physical Activity*, was published with a number of recommendations related to nursing practice, community outreach, and public policy advocacy for obese children. SPN (2006) affirms that as a routine part of care, nurses should assess the physical activity patterns of young people. Included in nursing care should be counseling and education for all young people and their families about physical activity programs, as well as referring young people to appropriate physical activity programs. Additionally, nurses should be advocating for policies that promote exercise and physical activity on an ongoing basis.

The National Association of Pediatric Nurse Practitioners ([NAPNAP], 2006) established a 5-year initiative called *Healthy Eating and Activity Together*. The goal of the program is to increase physical activity among children, educate families about healthy eating, and reduce the proportion of obese children in the United States. The objectives are to achieve leadership within the primary care setting in the promotion of good nutrition as well as in the feeding and eating and physical activity behaviors from birth through young adulthood. Additionally, one of the objectives is to develop, implement, and evaluate the corresponding clinical-practice guidelines—evidence-based and culturally appropriate—for health professionals (Koplan,

Liverman, Kraak, & Wisham, 2006). It is hoped that through these objectives, nurses can effect change in public policies, ensuring access to high-quality resources for nutrition and physical activity for all children and families.

The National Association of School Nurses ([NASN], 2005) position statement includes recommendations for screening, primary prevention, advocacy, legislation, funding, and research. School nurses have knowledge and expertise in the areas of nutrition, weight maintenance, and exercise and this knowledge can be applied in prevention programs for normal-weight children, as well as intervention programs for students who are overweight or obese. The school nurse can work with students, parents, school personnel, and healthcare providers to identify overweight or obese students by screening for height and weight, skin fold testing, and measuring BMI (Szwarc, 2008). School nurses can also refer and follow up with students who may not be seeing a health care provider on a regular basis as well as be involved with support programs, counseling services, referrals, follow-up, and support. Nurses have a unique role in prevention as advocates and educators because of their close contact and ability to provide education to families (Miedema, 2005). In many state programs, nurses are at the forefront in identifying school-age children who are underweight, of normal weight, overweight, or obese. Nurses are also often part of the management team in obesity treatment programs providing counseling, support, and follow-up (Sheehan & Yin, 2006). In addition, nurses have the opportunity to influence the thinking of non-medical professionals in the environments in which they work, such as schools and industry.

Obesity care at all levels requires lifestyle behaviors changes in the two areas of nutrition and physical activity to improve health. Nutrition and physical activity can be positively impacted by appropriate screening, diagnosing, initiation of prevention or intervention measures,

and consistent follow-up. Provision of education, strategies, and resources to families for increased physical activity and healthy diet are imperative to improve the health of children (Gyovai et al., 2003). To accomplish that goal, evidence-based resources, legislative support, appropriate funding, and follow-up are needed.

Healthy behaviors.

Evidence is accumulating that preventive strategies for children can promote healthy behaviors, beginning with early and comprehensive preventive care (Domitrovich, Bradshaw, Greenberg, Embry, Poduska & Ialongo 2010; Hogg, 2008; Rutter, 2006). Health promotion strategies include well-baby medical care, with an emphasis on disease prevention and health promotion; home visits by health care professionals, especially in homes with very young children; parental education to strengthen competence and build close parent-child relationships; parent support networks that foster health and education for their children and themselves; child care of high quality outside the home, especially in day care centers; preschool education, enhanced elementary education, and middle-grade education that is developmentally appropriate and can foster fundamental skills and encourage good health practices (Lee, Kiyu, Milman, & Jimenez, 2007; Ryan, Riley, Kang, & Starfield, 2001).

Few studies have examined the effects of "healthy behaviors," such as body movement and weight-loss dieting, on risk factors for obesity; those that have suggest that focusing on health, not weight that may be key to avoiding harm to body image and eating behaviors (Chomitz, Collins, Kim, Kramer, & McGowan, 2003). Austin, Field, Wiecha, Peterson, and Gortmaker (2005) found decreased rates of unhealthy behaviors (59%) in a school-based intervention that focused on promoting healthy diet and activity patterns, rather than on weight. It is important to promote esteem and healthy lifestyle in youth (Neumark-Sztainer, 2005). For

example, changes in weight are not always a sign of abnormal development; an increase in weight often precedes a growth spurt in children and some girls begin to gain body fat as part of normal adolescence at a very young age (Parent, 2004). Body weight should not be evaluated in a vacuum, as it is not a reliable proxy for eating behaviors and physical activity. Expanding the vision of health programs to include the prevention of unhealthy behaviors may help to ensure that the programs promote overall health and safety (Neumark-Sztainer, 2005).

The World Health Organization (2009) defines health *as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*. Consistent with this definition, interventions aimed at addressing weight concerns should be constructed from a holistic perspective, where equal consideration is given to social, emotional, and physical aspects of children's health behaviors. Interventions should focus not only on providing opportunities for appropriate levels of physical activity and healthy eating, but also promote self-esteem, body satisfaction, and respect for body size diversity (Robinson, 2006). Although statistical associations exist between body weight and risk for morbidity and mortality, being heavy or slender is not by definition pathological (Ogden, Carroll, & Flegal, 2008). Correlation does not imply causation and a location on the weight spectrum doesn't alone imply healthy or unhealthy practices. Further investigation is needed to examine healthy or unhealthy behaviors so as to not contribute to the overvaluation of weight and shape. When there is an overvaluation of weight then negative attitudes about fatness become common among children and may have harmful effects on their physical, social and psychological well-being (Austin, Field, Wiecha, Peterson, & Gortmaker, 2005; Ikeda, Crawford, & Woodward-Lopez, 2006).

Prospective studies show that body dissatisfaction and weight-related teasing are associated with binge eating and other eating disordered behaviors, lower levels of physical

activity, and increased weight gain over time (Adams, 2009; Tanofsky-Kraff, et al., 2007). Thus, constructing a social environment where all children are supported in feeling good about their bodies is essential to promoting health in youth. Interventions should focus only on modifiable behaviors (e.g. physical activity, intake of sugar-sweetened beverages, and time spent watching television), where there is evidence that such modification will improve children's health. Weight is not a behavior and therefore not an appropriate target for behavior modification. Children across the weight spectrum benefit from limiting time spent watching television and eating a healthy diet. Interventions should be weight-neutral, i.e. not have specific goals for weight change but aim to increase healthy living at any size (Gahagan, 2004). It is unrealistic to expect all children to fit into the "normal weight" category. Thus, interventions should not be marketed as "obesity prevention." Rather, interventions should be referred to as "health promotion," as the ultimate goal is positive health behaviors among of all children.

Parental involvement.

General approaches to dealing with the problem of childhood obesity emphasize the involvement of family, and the necessity of making changes in the home and family environment (Harbaugh et al., 2007). Changes are needed to help reduce cues and opportunities that are associated with increased energy intake and inactivity as well as to increase cues and opportunities for physical activity. The goals of such approaches are healthier behaviors in the form of selection and consumption of healthy foods and an increase in regular physical activity (Yin, Wu, Liu, & Yu, 2005).

A series of studies in behavioral psychology have suggested that parental involvement is important to the prevention and treatment of childhood obesity since it is in the home environment where the child first acquires health behaviors (Beckman, Hawley, & Bishop,

2006; Golan & Crow, 2004 [Appendix A]; Golan & Weizman, 2001 [Appendix A]). Learning about appropriate eating begins when the child starts to consume “table” foods and emulates parental eating behaviors in amount and types of foods. Likewise, activity levels and types are also learned by the child’s observation of the parents (Faith et al., 2004 [Appendix a]).

Parental involvement has been recognized as a necessary component to impact childhood obesity (Taveris, Mitchell & Gortmaker, 2009). Difficulties sometime emerge when health care providers communicate to parents that a child's weight is above the normal range causing negative feelings from the parents (Mikhailovich & Morrison, 2007; Rhee, De Lago, Aercott-Mills, Mehta, & Krysko, 2005). Limited information has been reported in the literature on how to effectively communicate concerns about a child's overweight to both the child and the parents. Increased knowledge of how to effectively discuss a child's weight with the child and their parents might be helpful for health care providers, especially when trying to collaborate with them on effective health behavior strategies (Arnett et al., 2007; Huettig, Sanborn, DiMarco, Popejoy & Rich, 2004 [Appendix A]). Parents’ readiness to make behavior changes to help their children lose weight is an important factor in the success of children’s weight loss as overweight parent’s impact children obesity rates (Boney, Verma, Tucker & Vohr, 2005 [Appendix A]; Whitaker, 2004 [Appendix A]). A study by Snethen, Hewitt, and Petering (2007) suggests that parental involvement is a possible means for increasing children’s engagement in healthy behaviors. Children reported that parental involvement and encouragement in physical activities such as sports were very important. Children especially wanted to have their parents come and watch them compete “because if parents encourage you and actually like say ‘oh, good job’ or congratulate you once in a while, then children would know they care, and if parents don’t care, why should the children” (Snethen, Hewitt, & Petering, 2007).

Healthcare provider interaction.

The healthcare provider's role in the battle against obesity is to identify child and parental concerns, as that allows the healthcare provider to address those concerns, which increases patient satisfaction (Finney et al., 1990) as well as the effectiveness of interventions that are developed (Bauer, Kilbourne, Neumann, Pincus & Stall, 2007). Providers may attempt to determine parents' concerns by asking the right questions, making observations, or deducing from a family's situation the problems being experienced. However, reliance on the provider to determine patients' concerns may be less effective than arranging for parents to actually state their concerns (Cromer & McCarthy, 1999). Primary health care providers participating in individualized family care are important for prevention, early detection, and intervention with regard to diseases (AAP, 2003). Patients solicit and respect advice from their primary care clinicians; this advice can motivate patients to make healthy lifestyle changes (Blackburn & Waltman, 2005). The Nationwide Children's Hospital Center for Healthy Weight and Nutrition found that two-thirds of parents in a primary care practice felt the primary care providers' office was the best place to address weight concerns (Eneli, 2007).

Other ways for health-care providers to move patients toward healthy behaviors include maintaining sensitivity to different personality types, engaging in patient-important encounters, confronting resistances to specific behaviors, participating in give-and-take, and fostering bonds by engaging individuals or group members in common topics (Blackburn & Waltman, 2005). The clinician's task is to figure out which of the above areas, alone or in combination, is most likely to be effective to change behavior for a particular individual. The more healthcare providers knows about a patient's thoughts, feelings, and opinions related to a topic, the more fully they can engage the clients in creating strategies to successfully bring about desired change

(Blackburn & Waltman, 2005). The question remains; if children are seeing their health care providers on a regular basis will this influence health behaviors related to obesity?

To develop guidance for healthcare providers, an expert committee—consisting of members from the American Medical Association, American Academy of Pediatrics, Department of Health and Human Services Health Resources and Services Administration, and the Center for Disease Control and Prevention - convened. The committee defined childhood obesity and made recommendations for healthcare providers to effectively respond to obesity (Hassink, 2010). According to this committee, overweight and obesity are based on Body Mass Index (BMI) measurements. BMI is a number calculated from a child's weight and height, and is a reliable indicator of body fatness for most children and teens. Though BMI does not measure body fat directly, it is an inexpensive and easy-to-perform method of screening that correlates to direct measures of body fat, such as underwater weighing and dual energy x-ray absorptiometry (Dietz et al., 2002), and can be considered an alternative for direct measures of body fat.

Although the BMI number is calculated the same way for children and adults, the criteria used to interpret the meaning of the BMI number for children and teens are different from those used for adults. For children and teens, BMI age- and sex-specific percentiles are used for two reasons: (a) the amount of body fat changes with age; (b) the amount of body fat differs between girls and boys (CDC, 2008). In 2005, the committee identified overweight as a BMI $\geq 85^{th}$ percentile but $< 95^{th}$ percentile for age and sex, and obese is BMI $\geq 95^{th}$ percentile. The recommendations of the expert committee include yearly assessments on all children, with calculation of height and weight, BMI for age plotted on standard growth charts, waist circumference, pulse, blood pressure, and appropriate laboratory tests (Barlow, 2007). All children are then classified according to BMI—as underweight (BMI $< 5^{th}$ percentile), average

weight (BMI 5th – 84th percentile), overweight (BMI 85th – 94th percentile) or obese (BMI > 95th percentile)—and matched with appropriate prevention and intervention strategies depending on BMI results. Additionally, the recommendations suggest that all healthcare providers need to address weight management and lifestyle issues with all children and families regardless of presenting weight, as healthcare providers are important factors in patient health behavior (Knutson, Taber, Murray, Valles & Koeppl, 2009).

Prevention measures.

Prevention of obesity, of course, is the goal of pediatric healthcare and is characterized by the encouragement of healthy lifestyles, including physical activity, fitness and nutritional education, adequate and healthy diet, and parental involvement in their children's lives (Dehghan, Akhtar-Danesh & Merchant, 2005). Thorough assessments and evaluations of risk factors leading to childhood obesity are essential when designing health promotion and treatment programs (Harbaugh et al., 2007). The assessments and evaluations should include a medical history and physical, diagnostic tests as indicated, and nutritional and activity assessments (Harbaugh et al; NAPNAP, 2006). Prevention of obesity is recommended for children ages 2 – 18 years who fall in the "healthy" category with BMI at or above the 5th percentile and no greater than the 84th percentile. Health Promotion may be enhanced through healthcare provider interaction in the form of counseling, advocating, and supporting information and activities related to diet, exercise, and eating behaviors (Homer, 2009; Nawaz, 2001).

Treatment interventions.

Interventions should avoid the language of "overweight" and "obesity" since these terms may promote weight-based stigma (MacLean, et al., 2009). Several of the most effective interventions, in fact, have not focused on weight. Interventions should also focus on making

children's environments healthier rather than focusing solely on personal responsibility (Puhl & Latner, 2007). These include serving healthy meals, providing opportunities for fun physical activities, and positive parental role modeling. Treatment interventions are needed for children between the ages of 2 and 19 years who have a BMI at or above the 85th percentile. The expert committee, made up of members of the American Medical Association, in collaboration with the Department of Health and Human Services' Health Resources and Services Administration and the Centers for Disease Control and Prevention, recommends treatment interventions in a "staged" approach with three specific stages (Barlow, 2007). The stages are based upon the child's age, BMI, related co-morbidities, primary caregiver, and family involvement, and are described here.

The staged approach has three levels of interventions for children and their families to include; (a) stage one interventions for children who are classified as overweight focus on education by healthcare providers addressing dietary habits, physical activity, counseling, and follow-up of a minimum of monthly visits to a maximum of yearly visits; (b) stage two interventions for children who are classified as overweight with risk factors (family history) or obese include education by healthcare providers addressing dietary habits and physical activity behaviors as well as monthly follow-up; (c) stage three interventions are for children who are overweight or obese, yet are not responding to stage 1 or stage 2 intervention strategies and include a multidisciplinary care team which is created to work with the child and their family. The dietary and physical activity behavioral interventions for the child in stage 3 would be the same as for stage two. In this stage the child will receive structured behavioral modification programs, including food and activity monitoring and the development of short-term dietary and physical activity goals (Barlow, 2007).

Healthcare providers, allied healthcare professionals, and professional organizations should advocate for consistent interaction with children and their families annually. The consistent interactions are important in order to identify changes and follow up on a regular schedule to monitor progress and offer support as needed (Barlow, 2007, Knutson,Taber, Murray, Valles & Koeppl, 2009; NAPNAP, 2006; SPN, 2006). It is important that all healthcare professionals working with children and their families determine and follow a "gold standard" of care in order to provide consistent care and follow-up. The expert committee, consisting of members from several professional organizations, has researched and developed standard guidelines in a step by step approach for overweight and obese children that should be followed (Barlow, 2007). As parents have the potential to influence the promotion of health for their children, it is important to actively engage families in supporting obesity prevention and intervention programs in the clinic, school, and community settings, (Barlow, 2007; NASN, 2005).

Well-child visits.

Well-child visits are important for preventing many diseases, including obesity. Recommendations report that children should undergo annual evaluation of health to include height, weight, diet, activity and possible treatment if these are abnormal, including family-oriented stepwise improvements in activity and nutrition (Louthan et al., 2005). In order for an obesity prevention and intervention program to be effective, children need to interact with healthcare providers during AAP-recommended well-child visits, particularly past the age of 6, as this is when child obesity rates are likely to increase (Fowler-Brown, 2004).

The current healthcare system has no enforcement for mandating of well-child visits, and the adherence to childcare visits has been studied minimally (Hakim & Bye, 2001, Selden,

2006). Children from birth to age 6 have greater rates of compliance with scheduled well-child checks and immunizations as recommended by the American Academy of Pediatrics (AAP, 2001). However, there is no consistency and limited support for well-child visits past the age of 6, when scheduled immunizations are completed (Selden, 2006). Healthcare providers and professional organizations need to advocate for the enforcement of well-child visits as a requirement similar to that of immunizations. Researchers have found associations between increased well-child visits**,** improved immunizations, and improved child health (Selden, 2006).

Each child and family is unique; therefore, recommendations for preventive care through well-child visits should be designed for each child independently. However, the areas of competent parenting, health problems, and satisfactory growth and development should be covered during these visits as appropriate for the child and family. Additional visits should be scheduled if circumstances suggest that there are variations from acceptable ranges (Palfrey, et al., 2005). Developmental, psychological, and chronic disease issues may also require frequent assessments separate from well-child visits. The AAP continues to emphasize the great importance of continuity and unique care for each child in an effort to prevent chronic health problems (AAP, 2008).

Summary of state of the science.

Socio-Ecological Models are behavioral models that address multiple levels of behavior influence, leading to a more comprehensive approach to the promotion of good health. The major hypothesis behind socio-ecological models is that child development/behaviors takes place through processes of progressively more complex interaction between an active child and the persons, objects, and symbols in his or her immediate environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. If this is true, then

interactions, if happening on a regular basis, between healthcare providers, parents, and children, are they influencing the health behaviors of children in relation to obesity? More specifically if children are attending healthcare visits regularly, are the interactions with the healthcare providers affecting the obesity rates? This information is not clear in the literature.

While health care providers are better at dealing with obesity-related health issues once they occur, it is still more effective to prevent the development of obesity (Hernandez, Uphold, Graham & Singer, 2005; Strauss, 2002). It is important for health care providers to focus on the facts related to obesity and provide information on prevention for children and families. The literature does not reflect information on appropriate and consistent prevention measures that healthcare providers are providing to obese children (based on BMI measurement) and their families, specifically during well child healthcare visits.

At present, approximately 9 million children over 6 years of age are considered obese (Institute of Medicine [IOM], 20011). The overall obesity statistics during the past 20 years have revealed an increase in obesity in the United States, with only four states having a prevalence of obesity less than 20%, and those trends are likely to continue (CDC, 2007). With obesity rates continuing to rise, understanding of effective prevention measures and implementing interventions is needed to combat the problem before it arises, especially in the 6-11 year age group as this is where the largest increase of obesity is occurring (NHANES III, 2004). Information on consistent intervention measures, to include a definition of interventions, for obesity in children by healthcare providers is an area not well studied.

Obesity care at all levels requires lifestyle behaviors changes in the two main areas of nutrition and physical activity to improve health. Nutrition and physical activity can be positively impacted by appropriate screening, diagnosing, initiation of prevention or intervention measures,

and consistent follow-up. Provision of education, strategies, and resources to families for increased physical activity and healthy diet are imperative to improve the health of children (Gyovai et al., 2003). Are obese children receiving appropriate screening, diagnosis, and intervention measures, based on evidenced based practice recommendations? This specific information is not well researched in the literature.

Summary

Childhood obesity is a growing topic that threatens the immediate health of our children and youth as well as their prospects of growing up as healthy adults. During the past 30 years, obesity in the United States has more than doubled among children aged 2 to 5 years and adolescents aged 12 to 19 years, and it has more than tripled among children aged 6 to 11 years (CDC, 2007). Currently, more than 9 million children and youth over the age of 6 years are obese. The sequelae caused by obesity among children and youth are on the rise and include an increased risk of type 2 diabetes, hypertension, metabolic syndrome, and asthma, as well as the social and psychological effects of low self-esteem and depression (AHA, 2008; Anderson & Butcher, 2006; Harbaugh et al., 2007).

The changes needed to reverse the obesity trend must be robust enough to counteract the underlying factors that lead to this trend in the first place. Effective change requires a population-based prevention approach and a comprehensive response from multiple stakeholders. At the individual level, this involves attaining a balance that equalizes energy consumption, or food, with energy expenditure through regular physical activity in order to achieve a healthy weight and maintain good nutrition (Barlow, 2007; NAPNAP, 2006; SPN, 2006). Yet this issue is not the responsibility of individuals alone, especially in the case of children who have limited control over the social and environmental factors that influence their dietary intake and physical activity

levels. Society shares a collective responsibility to effectively address the obesity trend, and a clear focus of prevention and intervention efforts should involve the public and private sectors in the communities that affect the daily lives of our children and youth.

Weight must be handled as carefully as any other individually identifiable health information. Anticipatory guidance, the process by which healthcare providers counsel parents about their child's development and health, has been regarded as an important component of child health supervision and disease prevention (Goldstein, Dworkin, & Bernstein, 1999). According to Kogan, et al. (2004), the quality of the child's environment, especially the quality of care-giving relationships, influences the development of young children and their long-term health outcomes. The assessment of children makes it possible to identify and treat diseases, including obesity, at the earliest point possible (Halfon et al., 2004; Kaufman & Reich, 1999). Further development and testing of the Socio-Ecological Model related to obesity is warranted due to the increasing needs created by obesity-related problems.

The ideal intervention is an integrated approach that addresses risk factors for the spectrum of weight-related problems. The interventions include screening for unhealthy weight control behaviors and promote protective behaviors, such as decreasing dieting, increasing balanced nutrition, encouraging mindful eating, increasing activity, promoting positive body image, and decreasing weight-related teasing and harassment (Berg, 2001). Interventions should honor the role of parents in promoting children's health and help them support and model healthy behaviors at home without overemphasizing weight. Interventions should provide diversity training for parents, teachers and school staff for the purpose of recognizing and addressing weight-related stigma and harassment and constructing a size-friendly environment in and out of school (Cohen & Garcia, 2005). Interventions should be created and led by qualified

health care providers who acknowledge the importance of a health focus over a weight focus when targeting lifestyle and weight concerns in youth (Goldschmidt, Apsen, Sinton, Tanofsky-Kraff & Wilfley, 2008).

Figure 3 Ranking Systems for the Hierarchy of Evidence (AHRQ, 2002)

Rank:	Methodology	Description
1	Systematic reviews and meta-analyses	Systematic review: review of a body of data that uses explicit methods to locate primary studies, and explicit criteria to assess their quality. Meta-analysis: A statistical analysis that combines or integrates the results of several independent clinical trials considered by the analyst to be "combinable" usually to the level of re-analyzing the original data, also sometimes called “pooling,” or “quantitative synthesis.” Both are sometimes called "overviews."
2	Randomized controlled trials (finer distinctions may be drawn within this group based on statistical parameters like the confidence intervals)	Individuals are randomly allocated to a control group and a group who receive a specific intervention. Otherwise the two groups are identical for any significant variables. They are followed up for specific end points.
3	Cohort studies	Groups of people are selected on the basis of their exposure to a particular agent and followed up for specific outcomes.

4	Case-control studies	"Cases" with the condition are matched with "controls" without, and a retrospective analysis used to look for differences between the two groups.
5	Cross sectional surveys	Survey, questionnaire, or interview of a sample of the population of interest at one point in time
6	Case reports	A report based on a single patient or subject; sometimes collected together into a short series
7	Expert opinion	A consensus of experience from the good and the great.
8	Anecdotal	Something a bloke told you after a meeting.

Note: This ranking has an evolutionary order, moving from simple observational methods at the bottom through to increasingly sophisticated and statistically refined methodologies

Appendix A

Evidentiary

Authors	Subjects(n)	Purpose of Study	Variables	Measures and instrument	Findings	Quality of Science
Boney, (2005).	N=106 AGA and LGA children of mothers with GDM	LGA children are at increased risk of metabolic syndrome	Child: birth weight, gender, ethnicity Mother: weight, socioeconomic status	Biometric &and anthropometric measurements: B/P, height, weight, glucose, insulin, and lipid levels	LGA offspring of diabetic mothers are at significant risk for the development of metabolic syndrome	Level 4
Huettig, (2005).	N=76 parents served by WIC with children up to age 5. mothers: 74 father: 1 grandmother: 1 Hispanic: 66 Black: 7, White: 3	There is significant information for future intervention programs about parent's perceptions regarding 1) child's current health status, 2) relationship between obesity and current and future health risks,3) play opportunities and preference, and 4) family lifestyle patterns regarding activity levels.	child weight, health, play activity	Open ended question interview	Parents perceive their child as healthy even though the child exceeded 95% of weight for height.	Level 3
Swallen, et al., (2005).	N=4743 adolescents, grade 7 to 12.	Weight has an effect on Health Related Quality of Life.	BMI, age, gender, race, family structure, income, parent's education	BMI, Pediatric Quality of Life Inventory (PedsQL), General Health: single question, Emotional Health: Epidemiologic Studies Depression Scale (CESD), and	There is not a relationship between BMI and psychosocial HRQOL.	Level 5

				Rosenberg's Self-Esteem Scale, School Functioning: 9 item questionnaires created.		

Beech, et al., (2004).	N=210 African American girls, age 8 to 10.	There is an association between parental cultural perspectives with diet, physical activity, and weight concerns of prepubertal African American girls.	Parents: age, education, income, marital status Girls: age, accelerometer counts, total energy intake, fat intake	Acculturation and cultural identity: African American Acculturation Scale (AAAS), Multigroup Ethnic Identity Scale (MEIS). Weight concerns: McKnight Risk Factory Survey (MRFS), Body Size: line drawings, Physical Activity: Actigraph Accelometer, Diet Intake: 24 our diet recall, Social Desirability: Lie Scale.	Overall parental culture and ethnicity were unrelated to girls' physical activity and diet.	Level 5
Burdette, (2004).	N=250 preschool aged (mean age 44 months) children free from chronic medical conditions, 87.7% White, 12.3% Black.	Parental reports are accurate measures of physical activity of children.	season, gender, physical activity (accelerometer)	Children activity: accelerometer, Parental report of playtime: 2 question checklists for outdoor activity and 2 question checklists to recall outdoor activity.	The 2 parental checklists were significantly correlated with actual accelerometer measures of activity in preschool children.	Level 3
Del Rio-Navarro, et al., (2004).	N=7862boys, 8947girls, age10 to 17, Mexican	Mexican children have a high prevalence of obesity according to CDC and IOTF.	age, gender, BMI	Demographic info, height and weight measurements, calculated BMI.	CDC criteria overweight: 10-16% boys and 14-19% girls, obesity: 9-15% boys and 7-11% girls. IOTF criteria overweight: 15-19% boys and 18-22% girls obesity: 6-9% boys and 6-8% girls	Level 4

Faith, (2004).	N=57 families, children age 5 and 7 years, all White	1.) Parental feeding attitudes and styles would be stable for 2 years 2.) Increased parental restriction of child eating, reduced parental pressure to eat, and increased concerns about child weight would be associated cross sectional and prospectively with increased child weight status 3.) any prospective influence of parental feeding attitudes or styles on child BMI scores would be attenuated when controlling for child's prior BMI score.	age, gender, obesity risk status, parent feeding attitudes and styles	Child Demographics: Age and Gender Obesity Risk Status: BMI Parental Feeding Attitudes & Styles: Child Feeding Questionnaire (CFQ)	Parental feeding attitudes and styles were stable for children age 5 to 7 yrs. Feeding attitudes: perceived responsibility at age 5 predicted reduced BMI at age 7 in low-risk families while weight concern predicted increased BMI in increased-risk families. Feeding styles: monitoring reduced BMI scores in low-risk families while restriction predicted higher BMI scores and pressure reduced BMI scores in high-risk families.	Level 5
Golan, (2004).	Various studies including children form age ranges to include age 4 to 19.	Parent's play a role in modifying obesogenic factors in childrens' weight related problems.	parent knowledge, eating patterns, activity, parenting styles.	Literature Review	Parents provide the child's contextual environment	Level 1

Lumeng et al., (2004).	N=1244 US children, age 6 to 12.	There is a relationship between center-based childcare attendance from age's 3to5 years and overweight at ages 6 to12 years.	gender, race, age, poverty status, birth weight, hours of TV	Child Care: Parent report, BMI, Behaviors: Behavior Problems Index, Environment: Home Observation for Measurement of the Environment -Short Form (HOME-SF)	Race, home environment, and age significantly affected the relationship between child care attendance and overweight.	Level 5
Whitaker, (2004).	N=8494 low income children	Newborns whose mothers are obese in the first trimester of pregnancy are at an increased risk of being obese at 2 to 4 years of age.	Child: gender, birth weight Mother: BMI, race, parity, smoking status, education, marital status, marital age	Anthropometric measurement, BMI	There is a strong association between mother's BMI in the first trimester and child's obesity at preschool age.	Level 3
Green, et al., (2003).	N=160, 8 families, 47 children age 5 to 15, 29 parents, 42 grandparents. Turkish, Greek, Indian, Chinese families.	There are social and cultural influences on food habits and physical activity of children and adolescents from families with backgrounds of migration.	grandparents: age, migration, education parents: gender, spouse, education child: age, birthplace	Semi-structured Interviews	Evidence of 2-way influences on eating across the span of 3 generations was evident, generational differences in the level of physical activity were evident	Level 3

Harrell, et al. (2003).	N=1211 6th, 7th, and 8th graders, mean age 12.2, girls (52.5%), boys(47.5%), White, African American.	Average Metabolic Equivalent (MET) of 6th, 7th, and 8th graders differ by grade, gender, race, and socioeconomic status (SES).	Activities, gender, grade, race, SES	Activities: Physical Activity Checklist Demographics: Parental Questionnaire	There were significant differences in MET by gender and grade (between 6th and 8th graders). There were no significant differences by race or SES.	Level 5
Maynard, et al., (2003).	N=5500 children, age 2 to 11, White, Black, Mexican American.	Maternal perceptions of child's weight is inappropriate	age, weight, stature, BMI, maternal BMI	Household survey with home interview, Physical exam of child	66.7% of mothers correctly classified child as overweight and 32.1% classified overweight child as about the right weight. Girls 3 times as likely as boys to be classified as overweight, race/ethnicity had no impact on perceptions.	Level 5
O'Dea, (2003).	N=213, ages 7 to 17, grade 2 to 11, 51% female, 49% male	There are specific reasons why children eat healthy foods and participate in physical activity.	gender, grade, ethnicity	20 to 30 minute focus groups	Children were able to identify 5 consistent themes related to benefits of healthy eating and physical performance.	Level 3

Pangrazi , et al., (2003).	N=606 (315 girls, 291 boys) 4th grade students, mean age 9.8 yrs.	The PLAY intervention would have a positive impact on BMI measures.	gender, BMI, physical activity	physical activity: Yamax pedometer, BMI: height and weight	Students participating in PLAY accumulated more steps, specifically girls, no significant change in BMI.	Level 2
Ransdell, et al., (2003).	N=34 mother (age 31 to 60) daughter (age 14 to 17) pairs	Home-and University- based interventions are effective in facilitating increased physical activity participation among mother-daughter relations.	age, ethnicity, marital status, household income, education level, smoking status, overall health, activity	Activity: Physical Activity Questionnaire Relationship: Parental Bonding Instrument Family Activity: Family and Physical Activity Participation Scale	Interventions facilitated increased physical activity in mothers and daughters and increased support for physical activity. No difference between university-or home-based programs.	Level 5
Fisher, et al., (2002).	N=191 non-Hispanic 5-year-old girls and parents	Parents own fruit and vegetable intake would encourage similar consumption patterns among their daughters, but pressure to eat would discourage fruit and vegetable intake.	Parents; gender, employment status, age, income	Pressure to Eat: Child Feeding Questionnaire (Pressure to Eat Subscale) Dietary Intake: 24 hour recall	There were statistically significant correlations between parent's fruit and vegetable intake and child intake and parent's intake were negatively correlated to pressure in child feeding.	Level 5

Gonzales, et al., (2002).	N=325 5th graders	Children living with single parents and large households would have higher saturated fat intake and the families would have low income and less education.	gender, reduced lunch, county, number of people in house, care provider, eating environment, number of meals away from home, nutrition knowledge	Fat consumption: Youth Adolescent Food Frequency Questionnaire (YAQ), Nutrition knowledge: Modified questions from the Child and Adolescent Trial for Cardio Health (CATCH).	There were no significant differences between size of household and fat intake. Children living with only mothers consumed the largest amount of saturated fat.	Level 5
Myers & Vargas, (2000).	N=200 parents with children between age 2 and 5	Parents have specific perceptions and beliefs about childhood obesity.	Ethnicity, age, perception of obesity	Parent Questionnaire	Parents thoughts about child's obesity has a strong impact on nutrition practices and exercise activities	Level 5
Cameron, (1999).	N=109 obese children (44 boys and 65 girls), age 10 to15, Caucasian, African American, Latino, Asian, American Indian.	There are self-esteem changes in children enrolled in weight management programs.	self-esteem, BMI	Self Esteem: Children's Self Concept Scale, BMI (height and weight)	Significant changes in self-concept related to physical attributes and appearance for children in weight loss program.	Level 5

Fogelholm, et al., (1999).	N=129 obese children (67girls, 62 boys) N=142 normal weight children (81 boys, 61girls)	Parental activity and obesity are associated with activity and obesity in children.	Child: age, height, weight, number of siblings Parents: BMI, activity, sleeping hours	Present Physical Activity: 3-day physical activity journal Habitual Physical Activity: Netherlands Health Education Project Questionnaire (NHEPQ)	Parent inactivity is a strong predictor of child inactivity. Parent obesity was the strongest predictor of child obesity.	Level 5
Baughcum, et al., (1998).	N=15 WIC Dieticians, 14 Mothers (age 14 to 34) with children (age 12 to 36 months)	There are specific maternal beliefs and practices about child feeding that are associated with childhood obesity.	WIC dieticians, WIC mothers, Teenage WIC mothers	Focus groups	Mothers believed that a heavy infant meant a healthy infant, cereal and solids were introduced too early, food was used to shape behaviors.	Level 3
Golan (1998).	N=60 parents of obese children	There are certain factors that facilitate childhood obesity as well as environmental changes and family behaviors associated with weight loss.	activity level, stimulus exposure, eating related to hunger, eating style	Family Activity and Eating Habits Questionnaire (FAEHQ)	The Family Activity and Eating Habits Questionnaire are valid/reliable in monitoring environmental and family behavior factors associated with weight gain and weight loss in children.	Level 5

Martorell, et al., (1998).	N=16 data sets from Demographic and Health Surveys	Estimate the prevalence of obesity in women and children from Latin American countries	Children: height, weight,age Parents: height, weight,age, family, socioeconomic status, residence, education	Demographic and Health Data Surveys (DHS)	The prevalence of obesity in Latin American Countries (except Haiti) is 8% to 10%. The levels of overweight/obesity in Latin American children are lower than the US.	Level 5
Cohen, (1997).	N=240 children, grades 1,3,5, European and African American.	Impression formation in a child is influenced by body weight, sex, and behavioral information	age, ethnicity, weight, gender	Liking Question Analysis	Boys are more affected by body weight considerations than girls: trait attributions and behaviors.	Level 4

Chapter Three
Methods

Introduction

During healthcare visits children and their parents have the opportunity to receive prevention, intervention and anticipatory guidance information from their healthcare providers to improve the health the children. A retrospective exploratory design was used in this study to examine well-child visits and childhood obesity. The purpose of this study was to examine the number and describe the content of well-child visits in children ages 6 – 11 years and describe the difference in healthcare visits within a specific age range based on healthcare provider. The study investigated the following questions:

1) What were the frequencies of healthcare visits by child age?
2) What were the frequencies of obesity rates for children who attended healthcare visits?
3) What were the frequencies of secondary diagnosis (overweight or obesity), intervention, and follow-up for children who had an elevated BMI?
4) What were the frequencies of healthcare visits, secondary diagnosis, and intervention based on the healthcare provider caring for the child?
5) Were there any differences in the frequency of healthcare visits based on gender or ethnicity?

Questions

The Socio-Ecological Model is a comprehensive health promotion model that is multifaceted, concerned with environmental change, behavior, and policy that help individuals make healthy choices in their daily lives. The defining feature of the Socio-Ecological model is that it takes into account the physical environment and its influence on people at individual, interpersonal, organizational, and community levels. The philosophical underpinning is the concept that

behavior does not occur within a vacuum.

The Socio-Ecological Model was developed to explain how everything in a child and the child's environment affects how a child grows and develops. The Socio-Ecological Model has evolved over time and can be thought of as an onion, with one level wrapping around another. At the center of the model is the individual. At this level, we consider the internal determinants of behavior, such as knowledge, attitudes, beliefs, and skills. This is the foundational level, but the model recognizes that many external forces (interpersonal, organizational, community and public policy) influence these individual determinants. In order to facilitate behavior change it is important to address these external forces.

The major focus of this study are healthcare visits of children; the parents and healthcare providers (interpersonal) impact on the healthcare visits, and information/education given at the healthcare visits based on the current professional healthcare recommendations (organizational) will also be used. The major hypothesis behind the socio-ecological model is that child development/behaviors takes place through processes of progressively more complex interaction between an active child and the persons, objects, and symbols in his or her immediate environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. The specific research questions are described below (See Table 1) in relation to the Socio-ecological model.

Table 1: Research Questions and Socio-Ecological Model

Research Question #1: What were the frequencies of healthcare visits by child age?	Interpersonal/Individual: Bi-directional influences between the child and another individual. The frequency of parent's taking the child to a

	healthcare visit.
Research Question #2: What were the frequencies of obesity rates for children who attend well-child visits?	Interpersonal/Individual: Bi-directional influences between the child and another individual. Interactions with healthcare providers impacting frequency of increased weight.
Research Question #3: What were the frequencies of secondary diagnosis (overweight or obesity) and follow-up for children who had an elevated BMI?	Organizational: Connection that links the child with his or her immediate surroundings. Frequency of healthcare providers providing education and follow up to the parent and children with an elevated BMI based on current professional healthcare recommendations.
Research Question #4: What were the frequencies of healthcare visits, secondary diagnosis, and interventions for all children based on the healthcare provider caring for the child?	Organizational: Connection that links the child with his or her immediate surroundings. Frequency of education and follow up to the parent and child based on current professional healthcare recommendations for specific provider type.
Research Question #5: Were there any differences in the frequency of healthcare visits based on gender or ethnicity?	Interpersonal: Bi-directional influences between the child and another individual. The intention to comply with certain behavioral/cultural norms impacts the parent's

	taking the child to a healthcare visit.

Study design.

A retrospective exploratory design was used to describe well-child visits and childhood obesity. Data were accessed through medical records of two clinics in the rural Midwest that were chosen because they were geographically close with similar healthcare cultures, type of ethnicity, and healthcare provider type. A limited number of healthcare facilities are located on the border between Eastern Minnesota and Western Wisconsin. The rural Eastern Minnesota clinic was larger than the Western Wisconsin clinic and the site where Wisconsin residents received care if they desired the resources found in the larger healthcare facility. Physicians, nurse practitioners, and physician assistants, from both clinics provided children and adults preventative, acute, and chronic health care management. During the time of the data collection for this study, the Eastern Minnesota clinic employed practitioners that were mostly physicians, including Family Practice physicians (n = 6) and Pediatricians (n = 3), as well as Nurse Practitioners (n = 4), and Physician Assistants (n = 2). The healthcare providers in the Western Wisconsin clinic during the time of data collection for this study were comprised of Family Practice physicians (n = 2), Nurse Practitioner (n = 1) and Physician Assistant (n = 1). Data were accessed by: (a) acquiring permission from the facilities Chief Nursing Office; (b) acquiring facility IRB approval and (c) gaining access to the records through a specialized access code.

Sample.

The sample of healthcare visits was obtained from medical records, which included information on individual children's healthcare visits by age. A sample of 126 medical records met the incursion criteria and was used for the study. The medical records were then reviewed

for healthcare visits with a sample of (N = 365) used for the study.

The chart review included healthcare visit information in medical records of children who met the following criteria: (a) child in 2008 was 11- years of age; (b) clinic visits between 2000 and 2008 not for a chronic illness other than obesity; and (c) child resides in county of the healthcare facility since the age of 6 years. In order to look retrospectively at the 6 – 11 year age range, the medical records needed to include information on healthcare visits for a child who was 11 years of age at the time of data collection (2008). The medical records that included healthcare visits between 2000 and 2008 were chosen because in 2000 the new growth charts were implemented. The growth charts included weight for age, stature for age and BMI for age for use by healthcare providers to enable early identification of children who were risk for becoming overweight at older ages (CDC, 2000).

The healthcare visits of children who were seen for a chronic illness, other than obesity, were not included in the study. Chronic illness visits were excluded because the content of the healthcare visit would potentially be more focused on the chronic illness, and not contain the information expected during a well-child visit or physical. The child, whose healthcare visit information was used, needed to reside in the county of the healthcare facility since the age of 6 years to decrease the chance that the family lived in a different location giving them access to healthcare visits at other institutions which would not be found in the medical records being reviewed.

The primary diagnosis of well-child visits/healthcare visits was based on the following diagnostic codes from the *International Classification of Diseases, Ninth Revision* (ICD-9 codes), to include (a) V20.0 – Health supervision of infant or child; (b) V20.2 – Routine health or child health check; (c) V61.20 – Counseling of parent-child problem; (d) 995.52 – Child

neglect (nutritional); (e) V20.1 – Other healthy infant or child receiving care, and (f) V70.0 – Routine general medical exam at a healthcare facility. Exclusion criteria included the diagnosis of a chronic illness, other than obesity, that required regular visits. The secondary diagnosis of overweight or obesity was based on the diagnostic codes of: (a) 278.00 –Obesity unspecified, (b) 278.01 – Morbid obesity, (c) 278.02 – Overweight.

Instrument.

A two- part data collection tool containing a demographic sheet (Appendix B) and a chart review collection form (Appendix C) were developed for this investigation based on an in-depth review of the literature. The instruments' content validity was tested based on the judgment of two substantive experts in the pediatric health field. The experts were asked to evaluate individual items on the chart review collection form for relevance and appropriateness in terms of construct. They were independently given the objectives and items to be rated for relevance based on a 4-point rating scale: 1) not relevant 2) somewhat relevant 3) quite relevant 4) very relevant. The inter-rater agreement and content validity index (CVI) was measured across the experts ratings of each item's relevance with a computed CVI of 0.80 which indicates good content validity (Polit & Peck, 2004).

The demographic sheet contained the following information: (a) date of birth; (b) age of child at each visit; (c) gender; and (d) race/ethnicity. The information on the demographic sheet allowed for the collection of objective data from the total medical records (n = 126) of each child. The healthcare visits in the medical records were reviewed to identify the age of the child at each healthcare visit they attended, and included all ages prior to age 6 years (1,2,4,6,9,12,15,18,24 months and 3,4,5 years). The ages prior to 6 years were consistent with the timing of when recommended immunizations occur which may imply the children were

consistent in healthcare visits if there was an immunization due.

The healthcare visits of each medical record were categorized into age for earliest healthcare visits in the 6 – 11 years age range along with age for subsequent healthcare visits for that child between the ages of 6 to 11 years by looking at the DOB of the child and placing them in the category of the calculated age by years. If the child was 3 months or less from their next birthday at the date of the visit, then were placed in the next year age group. For example, if the date of birth was 12-16-1996 and the healthcare visit was 11-30-2006 their calculated age was 9 years, 11 months, and 14 days. Since this child was less than 3 months from their next birthday they were put in the 10 year age group instead of 9 year age group. For every healthcare visit that was checked in the 6 – 11 year age range a chart review data collection form was completed. For example if a child had a healthcare visit at age 6, 10, and 11 years then there would be a data collection form completed for each of the visits for a total of three.

The 10-item chart review data collection instrument included: (a) date of visit; (b) age at visit; (c) weight/BMI at visit; (d) provider; (e) documented anticipatory guidance; (f) referrals; (g) immunizations given; (h) recommended follow up; (i) insurance status; and (j) diagnosis was done for each healthcare visit (N = 365). The items on the chart review instrument enabled identification of information on healthcare visits from children between the ages of 6 and 11 years when they were seen by a healthcare provider. If the BMI was not recorded in the chart it was calculated using body weight in kilograms divided by the height in meters squared (CDC, 2007). The documented anticipatory guidance included information given on specific topic areas of (a) school activities (school problems, school performance, school activities, bullying); (b) developmental and mental health (independence, self-esteem, rules and consequences, temper, problem resolution, puberty) ; (c) nutrition and physical activity (healthy weight, appropriate

foods, water and soda intake, physical activity in sports and fun activities, screen time) ; (d) oral health (dental visits, daily brushing, fluoride); and (e) safety topics (friends, safety belts, helmets, sunscreen, smoking alcohol, guns, computer use of websites) which are important for the 6 – 11 year age range as recommended by AAP Bright Futures, 2008. The information on anticipatory guidance was abstracted from check-off forms that were used by the clinic or from information that was found in the narrative note written by the healthcare provider. The referrals were investigated for dietician or trainer and follow up for (a) 1 week; (b) 1 month; (c) 3 months; (d) 6 months; and (e) 12 months based on the expert committee recommendations for referral if elevated BMI (Selden, 2007).

The overall data that was obtained using the study developed instruments was important, as it helped to identify the health care visits which would be appropriate to include in the study. The information from the health care visits also provided the data for examining the questions for this investigation.

Data collection procedure.

As this study was a retrospective review of healthcare visits obtained from medical records, a protocol for expedited review was submitted to the IRB at the University of Wisconsin-Milwaukee and approval was obtained. Approval was also obtained from the healthcare facilities IRB where the data was accessed. Permission to access the medical records were obtained by initially contacting and receiving permission from the administrators or appropriate providers at each of the healthcare facilities. After obtaining IRB approval and permission to access participant medical records, data from the charts were gathered by the primary investigator. The data was obtained through abstraction of the Electronic Medical Record (EMR) via a specialized access code provided by the healthcare facility. The specialized

code allowed for tracking the data while ensuring patient confidentiality. The EMR was reviewed for features which included documentation of (a) the date of the healthcare visit; (b) age of the child at the visit; (c) weight and BMI of the child; (d) any anticipatory guidance; (e) referrals; (f) immunizations; (e) recommendations for follow-up; (g) insurance status; and (h) diagnosis.

The data was collected by the investigator over a 6 month period of time. The healthcare visits in the medical records which were reviewed for earliest age of healthcare visits and any other subsequent healthcare visits of the child that met the inclusion/exclusion criteria. The inclusion criteria (a) child in 2008 was at least 11 years of age, but not older than 14 years of age; (b) clinic visits between 2000 and 2008 that were not for a chronic illness other than obesity; and (c) child resided in the county of the healthcare facility since the age of 6 years. The inclusion criteria were given to personnel at the healthcare facilities and the personnel were able to input the inclusion criteria in the EMR system. This allowed all of the charts that met the inclusion criteria to be identified, and those charts were pulled and reviewed. The data were coded by assigning numbers to each chart as it was reviewed. Incomplete/missing chart documentation on anticipatory guidance, referral, immunization, or follow up (n = 20 charts), children that were seen for a chronic illness other than obesity (n = 13 charts), children that were too young or not at least 11 years old at the time of data collection (n = 10 charts), and children that did not live in county of healthcare facility since age of 6 years (n = 4 charts) were excluded from the study.

Analysis.

The data from the healthcare visits obtained from medical record reviews were entered into SPSS 18.0® for analysis of the age group for the earliest healthcare visit and subsequent healthcare

visits occurring between 6 – 11 years of age. Frequency counts and percentages were calculated and used to examine trends in healthcare visits for each age period in order to answer research question one with the variables of healthcare visits and age.

Frequency counts and percentages were used to examine trends in obesity rates for each age period who attended their earliest healthcare visits and any subsequent healthcare visits. This calculation was done to answer research question two with the variables of healthcare visits and elevated BMI measurement.

Frequencies between secondary diagnosis, intervention, and follow up for ages 6-11 years with an elevated BMI were calculated through cross tabulation. Research question three was answered with cross tabulation with the variables of secondary diagnosis, intervention, follow-up, and elevated BMI measurement.

Frequencies between healthcare visits, secondary diagnosis, and intervention by healthcare provider for all healthcare visits in the 6-11 years age group with an elevated BMI were calculated through cross tabulation. Research question four was answered with cross tabulation using the variables of healthcare visits, secondary diagnosis, intervention, and healthcare provider.

Finally, Independent T-tests were conducted to identify whether there were any differences between the gender of the child and the frequency of healthcare visits. An ANOVA was run to explore whether there were differences between the ethnicity of the children, and the frequency of healthcare visits. This information assisted in the identification of well-child visits attended at specific ages and whether those were in fact meeting the recommendations of the AAP.

Ethical considerations.

Based upon the details collected and the risks to the patient, a waiver from obtaining informed consent/authorization was requested and approved by from the IRB. All collected data was stored in a locked file cabinet at the home office of the PI and will be destroyed by shredding after dissemination of the study findings is complete.

Summary

Examining the frequency between well-child visits and childhood obesity may assist in developing effective prevention strategies for childhood obesity. This study increased the knowledge base of nursing science by utilizing theories to guide the study. This chapter presented the design and methodology of the study. Data analysis strategies were discussed and ethical considerations presented.

Appendix B

Demographic Data Sheet

Today's Date _____ Chart Review ID # _____

1. Date of Birth _____

2. Age of each visit

□ 1month □2months □ 4months □6months □9months □12months □15months □18months □24months □3years □4years □5years □6years □7years □8years □9years □10years □11years Other_____

3. Gender

□ Male □ Female

4. Race/Ethnicity:

□ White/Caucasian

□ Black/ African American

□ Asian or Pacific Islander

□ Hispanic

□ Native American

□ Other

□ Not documented

FOR EACH VISIT FILL OUT CHART REVIEW DATA COLLECTION FORM

Appendix C

Chart Review Data Collection Form

1. Date of visit _____

2. Age at visit_____

3. Weight at visit_____ BMI at visit_____

4. Provider _____

5. Documented Anticipatory Guidance
□ Car Seat/Seat Belt/Bike Helmet Use
□ Firearm Safety
□ Smoking/Substance Use
□ Weight
□ Physical Activity
□ Diet/Nutrition
□ Other_____

6. Referrals
□Dietician
□Trainer
□Other

7. Immunizations Given
□Yes □No

8. Recommended Follow Up Visit
□1week □ 1month □ 3months □6months □12months

9. Insurance Status
□ Private/Commercial Insurance
□ Medicare
□ Medicaid
□ Health Maintenance Organization / PPO
□ No insurance/self-payment

10. Diagnostic Codes (Include all available codes and descriptions.)
Primary Diagnosis _____
Secondary Diagnosis _____

Chapter Four

Results

Introduction

The purpose of this study was to examine the number and describe the content of well-child visits in children ages 6 – 11 years and describe the content of healthcare visits within a specific age range based on healthcare provider. The age ranges were specifically selected for the 6-11 year of age time frame as this is where the largest increase in the numbers of obese children was found in the NHANES III, 2004 with consist rates in NHANES, 2008. The study also examined provider reports of content given to children and their parents during healthcare visits and the frequency of the diagnosis of overweight/obesity reported for children. Overweight and obesity will always be referred to together in this study, unless specified differently as they are both labels for BMI ranges greater than what is generally considered normal. The terms overweight and obesity also identify ranges of weight that have been shown to increase the likelihood of certain diseases and other health problems. The content of the health care visits of children and their parents with providers were explored for information given during the visit because according to the American Academy of Pediatrics (2003) participating in individualized family care is important for prevention, early detection, and intervention with regard to diseases including obesity.

Because patients solicit and respect advice from primary care providers, information from the primary care provider has the potential for motivating patients to make healthy lifestyle changes that impact children (Blackburn & Waltman, 2005). The Nationwide Children's Hospital Center for Healthy Weight and Nutrition found that two-thirds of parents whose children receive care in a primary care practice felt the primary care providers' office was the

best place to address weight concerns (Eneli, 2007). If healthcare visits to healthcare providers are an important factor in addressing health and weight issues, then it is important to find out if children are attending healthcare visits, what is specifically occurring during the visits, and if overweight and obesity are being identified and addressed through a secondary diagnosis. A secondary diagnosis is a health concern of the child that is not the primary reason the child attended the healthcare visit. Five research questions were developed for this study:

1) What were the frequencies of healthcare visits by child age?
2) What were the frequencies of obesity rates for children who attended healthcare visits?
3) What were the frequencies of secondary diagnosis (obesity), intervention, and follow-up for children who had an elevated BMI?
4) What were the frequencies of healthcare visits, secondary diagnosis, and intervention based on the healthcare provider caring for the child?
5) Were there any differences in the frequency of healthcare visits based on gender or ethnicity?

This chapter provides a description of the study sample and research findings are presented in relation to the research questions. Data analysis included descriptive statistics, T-test, and analysis of variance (ANOVA).

Description of Sample.

The sample of healthcare visits was obtained from medical records, which included information on individual children's healthcare visits by age. The medical records were from two healthcare facilities, including one in Eastern Minnesota and one in Western Wisconsin. Healthcare visits were chosen from medical records of children who were 11 years of age at the time of data collection to review healthcare visits retrospectively to the age of six (2008). Healthcare visits of children were reviewed to identify whether they were seen in the clinic for a reason other than a chronic illness, except for the chronic condition of obesity. This was done to ensure that the health care visit was for a well-child visit or physical and met the criteria for inclusion in the study. The healthcare visits of children whose medical records were reviewed resided in the county of the healthcare facility since the age of 6 years in order to allow for some assurance that they were at the same healthcare facility during the 6 – 11 year age range.

A total of 173 medical records were reviewed to obtain the sample of healthcare visits. After conducting a full chart review on each of the 173 medical records, the researcher excluded healthcare visits of children where the visits did not meet inclusion criteria (n = 47 medical records). Additionally, medical records were excluded from the study for the following reasons:

1. Incomplete chart documentation on anticipatory guidance, referral, immunization, follow up, or insurance (n = 20 medical records)
2. Subject seen for chronic illness other than obesity (n = 13 medical records)
3. Subject too young or not at least 11 years old at time of data collection (n = 10 medical records)
4. Subject did not live in county of healthcare facility since age of 6 years (n = 4 medical records)

The healthcare visits were collected from 126 medical records of children, from August to October 2010 by the principal investigator and were included in the analyses. A total of 365 healthcare visits were collected which included information on individual children's healthcare visits by age. There were slightly more female children (n = 68 medical records) represented than male children (n = 58 medical records). Therefore, the numbers of medical records were approximately equivalent for females (54%) and males (46%). The charts were predominately from white children (n = 64 medical records), followed by Hispanic children (n = 36 medical records) with the remaining children (n = 26 medical records) reporting from four other ethnic groups which were categorically combined for analysis (See Table 2).

Healthcare visits were reviewed from medical records of children in the age range of 6 to 11 years; the largest number of earliest healthcare visits were in the 6-year-old age category (n = 51 healthcare visits), followed by earliest healthcare visits in the 7-year-old category (n = 29 healthcare visits). There was a decreasing number of healthcare visits for each increasing age range beginning at age eight: 8-year old earliest healthcare visits (n = 14 healthcare visits); 9-year-old earliest healthcare visits (n = 12 healthcare visits) and 10-year-old earliest healthcare visits (n = 5 healthcare visits), followed by an increase in the numbers of earliest healthcare visits in the 11-year-old age group (n = 15 medical records).

Table 1

Demographic Differences by Chart (n=126)

Classification	*Minnesota*		*Wisconsin*		*Totals*	
	n	*(%)*	*n*	*(%)*	*n*	*(%)*
Site						
Clinic	95	(75%)	31	(25%)	126	(100%)
*Age						
6	41	(33%)	10	(8%)	51	(40%)
7	24	(19%)	5	(4%)	29	(23%)
8	10	(8%)	4	(3%)	14	(11%)
9	6	(5%)	6	(5%)	12	(10%)
10	5	(4%)	0	(0%)	5	(4%)
11	9	(7%)	6	(5%)	15	(12%)
*Age for earliest healthcare visit						
Gender						
Male	50	(40%)	8	(6%)	58	(46%)
Female	55	(44%)	13	(10%)	68	(54%)

Table cont’d

Ethnicity			
White/Caucasian	50 (40%)	14 (11%)	64 (51%)
Black/African American	8 (6%)	4 (3%)	12 (10%)
Asian or Pacific Islander	6 (5%)	1 (1%)	7 (6%)
Hispanic	25 (20%)	11 (9%)	36 (29%)
Native American	5 (4%)	0 (0%)	5 (4%)
Other	0 (0%)	0 (0%)	0 (0%)
Not Documented	1 (1%)	1 (1%)	1 (1%)

The total number of healthcare visits (N = 365) of children in the 6 – 11 year age range were reviewed for BMI, insurance type, type of healthcare visit, secondary diagnosis, and type of healthcare provider. The majority of the healthcare visits (n = 196) reported the children as having a BMI in the overweight or obese category (See Table 3) while only 162 healthcare visits recorded that the children were in the normal weight category according to the CDC guidelines.

Table 3

BMI Classification for Healthcare Visits Age 6 - 11 Years Age Range (N=365)

BMI	n	%
Underweight	7	(<1%)
Normal	162	(45%)
Overweight	92	(25%)
Obese	104	(30%)

The review of total healthcare visits (N = 365) demonstrated that the majority (n = 314) of the visits for the children were covered by private insurance (See Table 4). The remaining 51 healthcare visits for the children were covered by one of four other insurance types.

Table 4

Insurance (Payer Source) for Healthcare Visits Age 6 - 11 Years Age Range (N=365)

Insurance	n	%
Private	314	(86%)
Medicaid	33	(9%)
HMO/PPO	6	(2%)
Unknown	8	(2%)
No Insurance	4	(1%)

Total healthcare visits (N = 365) were classified in three main categories: well-child; physical; and sports physical (See Table 5). The healthcare visits were classified in this manner to identify if there was a specific type of visit that occurred more frequently with a specific age. The types of healthcare visits and the content of the visits were consistent between the two healthcare facilities. The most frequently classified healthcare visit (by ICD 9 code) was well-child (n = 235), which included a complete physical examination to include (a) height; (b) weight; (c) blood pressure; (d) hearing; (e) vision; and (g) other lab tests as needed. During these same healthcare visits, boxes were checked in the chart that indicated information given and reviewed with parents about a variety of topics including (a) normal development; (b) nutrition; (c) sleep; (d) safety; (e) infectious diseases; and (f) other important topics.

The second classification of healthcare visit was a "general" physical (n = 100) which was comprised of an evaluation of the body and its functions. The health assessment included gathering information about the children's medical history and lifestyle, laboratory tests, and screening for disease, which was more general and less comprehensive than the well-child visits.

The lowest number of health care visits were identified as sports physicals (n = 30). The sports physicals were comprised of a medical exam and history designed to detect any conditions that might be associated with increased risk of injury when playing sports. The main goals of the sports physical, according to what was written in the healthcare visit report, were to: (a) assess overall health; (b) detect conditions that might be associated with increased risk of injury; (c) qualify or disqualify children for playing certain sports; and (d) assess the fitness of the children for the chosen sport.

Table 5

Type of Healthcare Visits Age 6 - 11 Years Age Range (N=365*)*

Diagnosis	n	%
Well-child visit	235	(64%)
Physical	100	(27%)
Sports Physical	30	(9%)

The healthcare visits (N = 365) had documentation indicating an elevated BMI for a majority of the healthcare visits (n = 196) for children (See Table 3). There were only a small number of healthcare visits that identified children as having an elevated BMI (n = 18) by the healthcare provider as recorded in a secondary diagnosis of overweight or obese consistent with the elevated BMI (See Table 6).

Table 6

Secondary Diagnosis for Healthcare Visits Age 6 - 11 Years Age Range (N=365*)*

Secondary Diagnosis	n	%
Obesity	18	(5%)
None	347	(95%)

The majority of the healthcare visits (See Table 7) were conducted by physicians who were identified as pediatricians (n = 159), followed by family practice physicians (n = 141). A smaller number of healthcare visits were conducted by the nurse practitioner (n = 57) with the remaining eight of the healthcare visits conducted by a physician assistant. There was no way from the charts to tell whether the providers who conducted the healthcare visits were their "primary providers" or just available at the time of the healthcare visit.

Table 7

Provider for Healthcare Visits Age 6 - 11 Years Age Range (N=365)

Provider	n	%
Pediatrician	159	(44%)
Family Practice	141	(39%)
Nurse Practitioner	57	(16%)
Physician Assistant	8	(1%)

Findings Related to Research Questions

Research question one.

Description of research question one:

What were the frequencies of healthcare visits by child age?

The first research question was addressed using the data that explored the frequency of earliest healthcare visits by age for the 6 – 11 years age range, and were analyzed utilizing frequency distributions. A total of 365 healthcare visits were included in this study. The healthcare visits were comprised of the well-child, physical or sports physical of the children between 6 to 11 years of age. The descriptions that follow report on the healthcare visits of the children beginning with the age of their first healthcare visit to the age of their last healthcare visit between the years of 2000 to 2008.

Earliest healthcare visit 6 – 11 age range: age 6 years

There were a total 365 healthcare visits that were included in the study with 51 of the earliest healthcare visits consisting of children at the age of six years (See Table 8). Of these 51 healthcare visits, 43 were documented specifically as well-child visits (See Table 9). Only 23 of the 51 earliest healthcare visits of children at the age of 6 returned for a healthcare visit at 7 years of age, at which time 18 of those healthcare visits were documented as well-child visits. When examining the same group of children who had their earliest healthcare visits at the age of 6 years until the age of 11, the data reflect that the number of healthcare visits this group of children attended stayed fairly consistent at the return visits at 8 years of age (n = 24 healthcare visits); 9 years of age (n = 28 healthcare visits); 10 years of age (n = 34 healthcare visits); and 11 years of age (n = 27 healthcare visits). There were 51 first health care visits by children at age 6 years in the 6 – 11 year age range, and by the time of the 11 year age healthcare visit only 27

were attended.

Earliest healthcare visit 6-11 age range: 7 years old

Of the total 365 healthcare visits, 29 revealed the earliest healthcare visit was at the age of 7 (See Table 6). Thirteen of these healthcare visits were documented as well-child visits, while sixteen were identified as physicals (See Table 7). Approximately half (n = 15) of the 29 earliest healthcare visits attended by children at the age of seven were documented as returning at the age of 8 for a healthcare visit, and ten of those return healthcare visits (n = 15) were specifically well-child visits. Thirteen of the original 29 earliest healthcare visits of children at age 7 years attended a 9 year old healthcare visit, and nine of the 9-year old healthcare visits (n = 13) were specifically well-child visits. Of the original 29 healthcare visits in this group of earliest healthcare visit at age seven years, 15 children had return healthcare visits at the age of 10 and thirteen of those 10-year old return healthcare visits were identified as well-child visits. The number of children who had their earliest healthcare visits at the age of seven and returned at the age of 11for a healthcare visits was 18, with seven documented as a well-child visit, two for a physical, and nine for a sports physical. There were 29 first health care visits at age of 7 years in the 6 – 11 year age range and by the time the 11 year age healthcare visits were due, 18 healthcare visits were attended.

Earliest healthcare visit 6-11 age range: 8 years old

Of the 14 earliest healthcare visits for the 8 years of age (See Table 8), nine were cited as well-child visits (See Table 9). At the return healthcare visits at the ages of 9-and 10 years old (n= 8), five of the healthcare visits were documented as well-child for both age groups. The documented healthcare visit type for the ten children healthcare visits for 11 years of age varied, with five of the visits documented as sports physicals, four for a well-child visit, and one as a

physical. There were 14 first healthcare visits at age 8 years in the 6 – 11 year age range, and by the time the 11 year healthcare visit was due, 10 healthcare visits were attended.

Earliest healthcare visit 6-11 age range: 9 years old

There were 12 earliest healthcare visits at the age of 9 (See Table 8); three of these visits were documented as well-child visits and nine were identified as physical exams (See Table 9). Of this group of 12 initial healthcare visits at age 9 years, there were six healthcare visits at the 10 year age range; of these 6 healthcare visits, two were well-child visits and four physicals. Healthcare visits at 11 years of age (n = 8) were reported as physicals for three of the visits and one sports physical. The other four were well-child visits. There were 12 initial healthcare visits at age of 9 years in the 6 – 11 year age range, and by the 11 year old healthcare visit, eight were attended.

Earliest healthcare visit 6-11 age range: 10 years old

A small group (n = 5) of earliest healthcare visits were at 10 years of age (See Table 8), with all of these healthcare visits documented as well child visits (See Table 9). There were two return healthcare visits at 11 years of age, both of which were documented as well child visits. There were five earliest healthcare visits at age 10 years in the 6 – 11 year age range and by the time of the 11 year healthcare visit, two were still attended.

Earliest healthcare visit 6-11 age range: 11 years old

There were fifteen earliest healthcare visits at 11 years of age based on the documentation in the records (See Table 8) in which two were cited as well-child, four as physicals, and nine as sports physicals (See Table 9).

The majority (n = 51) of earliest healthcare visits were at the age of 6 years. As the ages went up there was a steady decline in the numbers of healthcare visits by age: (a) 7 years earliest

healthcare visit (n = 29); (b) 8 years earliest healthcare visit (n = 14); 9 years earliest healthcare visit (n = 12); 10 years earliest healthcare visit (n = 5). This changed at age 11 when there was an increase in the number of earliest healthcare visit (n = 15).

In the 6 – 11 year age range the average number of healthcare visits recorded for children was 3.45 visits over a 6 year span. The number of healthcare visits for the children is approximately half (50%) of the American Academy of Pediatrics recommended number of healthcare visits. Not only were the number of healthcare visits examined, but also the type of healthcare visits (well-child, physical or sports physical) was reviewed. The well child visit was highest at age 6 (n = 43 health care visits) and lowest at age 11 (n = 2 healthcare visits). The inverse relationship was true for the sports physical classification as the lowest number of sports physicals was at age 6 (n = 0 healthcare visits) and the highest at age 11(n = 9 healthcare visits).

Table 8

Number of Healthcare Visits by Age 6 – 11 Years (N = 365)

		Visits children made by age					
Age of children at earliest visit (6 – 11 year age range)	Number of children attending earliest visit by age group (n=126) n %	6	7	8	9	10	11
6	51 (40%)	51	23	24	28	34	27
7	29 (23%)		29	15	13	15	18
8	14 (11%)			14	8	8	10
9	12(10%)				12	6	8
10	5(4%)					5	2
11	15(12%)						15
Totals	Number of total visits by age group (N=365)	51	52	53	61	68	80

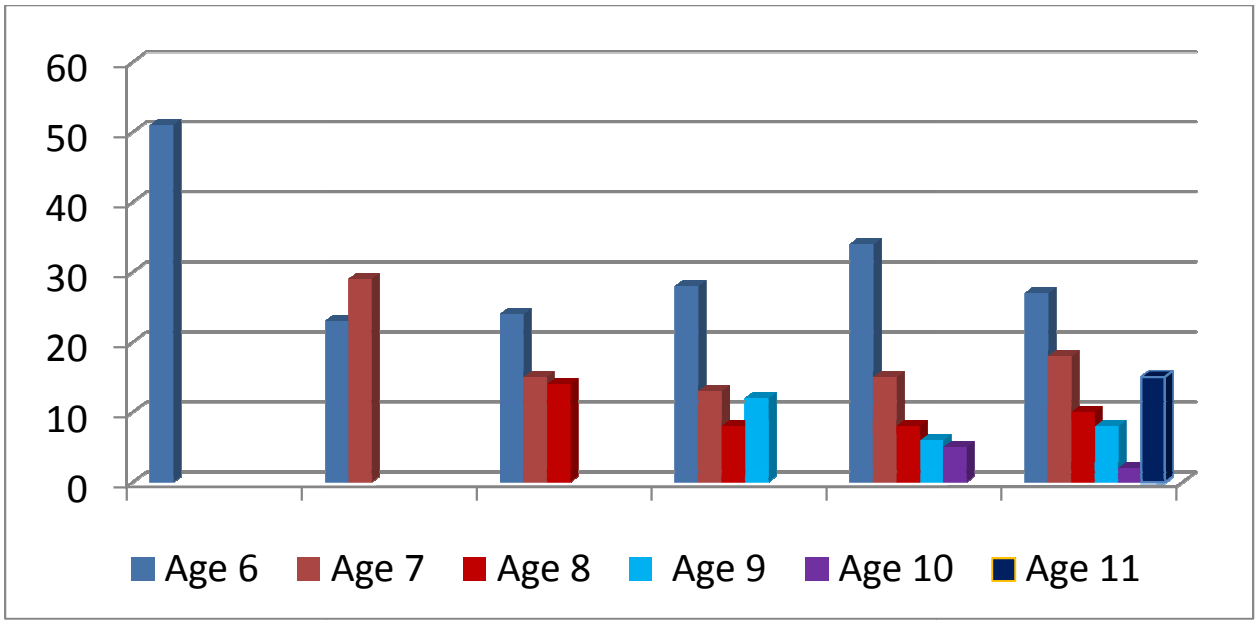
Table 9

Number of Type of Healthcare Visits for Total Healthcare Visits Age 6 - 11 Years Age Range (N=365)

	Visits of each age					
Type of healthcare visit	6	7	8	9	10	11
Physical	8	5	6	9	7	6
Sports PE	0	0	0	0	0	4
Well Child	43	18	18	19	24	17
Physical		16	5	4	0	2
Sports PE		0	0	0	2	9
Well Child		13	10	9	13	7
Physical			5	3	3	1
Sports PE			0	0	0	5
Well Child			9	5	5	4
Physical				9	4	3
Sports PE				0	0	1
Well Child				3	2	4
Physical					0	0
Sports PE					0	0
Well Child					5	2
Physical						4
Sports PE						9
Well Child						2
Total Healthcare Visits	51	52	53	61	65	80

Figure 4

Frequency of Healthcare Visits by Age Group (N=365)



Research question two.

Description of research question two:

What were the frequencies of obesity rates for children who attended healthcare visits?

The data obtained to address the second research question and examine frequencies in obesity rates of children who attended healthcare visits by age in the 6 – 11 years age range, were analyzed using frequency distributions. The classification of BMI measurement for the total healthcare visits (N=365) was revealed as overweight or obese for the majority (n = 196) of the total healthcare visits (see table 10).

Earliest healthcare visit 6-11 age range: 6 years old

Weight categories for the healthcare visits of children in the 6-year-old earliest healthcare visit (n = 51) identified 20 healthcare visits in the overweight category and 13 healthcare visits documented in the obese category (see Table 11). Weight categories were also identified from the 6-year-old group of earliest healthcare visits of children who returned for a 7-year-old healthcare visit (n = 23). Among this group of 23 healthcare visits in the 7-year-old age group, six healthcare visits documented children in the overweight category and four healthcare visits documented children as being in the obese category. Twenty-four healthcare visits were reported for the 8-year-old healthcare visit of the original group of 6-year-old earliest healthcare visit group who returned for the 8-year-old visit and there were increased rates in the overweight category (n = 7) and obese category (n = 6) even though the total number of returning healthcare visits stayed consistent between 7 years of age (n = 23) and 8 years of age (n = 24). Of the returning healthcare visits of children in the 9-year-old category (n = 28), 10-year-old category (n = 34), and 11- year old category (n = 27) for healthcare visits, the rates of BMI in the overweight and obesity categories increased from 13 to 17 for 9 and 10-year-old categories, then decreased to 13 for the 11-year-old category.

Earliest healthcare visit 6-11 age range: 7 years old

Twenty-nine earliest healthcare visits for children were at seven years of age and of that group of healthcare visits, it was documented that 5 of the healthcare visits of children were in the overweight category and it was documented that 6 of the healthcare visits were in the obese category (See Table 11). Approximately half (n = 15) of the 29 seven-year-old group of earliest healthcare visits for children at the age of seven returned for an 8-year-old healthcare visit. Of those 15 healthcare visits, four healthcare visits documented children with BMI levels that were in the overweight category and three healthcare visits documented children had BMI levels that were in the obese category. Of the returning 9 years of age healthcare visits (n = 9), the number of healthcare visits which documented children whose BMI was in the overweight category was zero, while the number whose healthcare visits documented children with a BMI in the obese category was two. There was an increase in the number of 10 years of age healthcare visits (n = 17) that documented three for overweight and five for obese according to BMI weight categories. The eighteen returning healthcare visits of children 11 years of age showed documentation of one healthcare visit BMI documented in the overweight category and three for the obese category.

Earliest healthcare visit 6-11 age range: 8 years old

The number of earliest healthcare visits in the 8-year-old age group for children decreased to 14 from the 29 that presented for the 7 year age group earliest healthcare visit. Of these fourteen healthcare visits, four were documented as a BMI being in the overweight category and five in the obese category (See Table 11). Of the 14 original earliest visits at 8 years of age, eight return healthcare visits of children were in the 9 years of age group. For this group of children (n = 8), the BMI calculations of the healthcare visits revealed an increase of

three in the overweight category and four for the obese category. There was a decrease in the overweight (n = 2) and obesity (n = 1) categories for the eight 10 years of age healthcare visits (n = 8). The number of healthcare visit at 11 years old (n = 10) revealed an increase in the category of overweight to four and the obese category increased to three.

Earliest healthcare visit 6-11 age range: 9 years old

There were only 12 earliest healthcare visits at 9 years old for children and of these; three were calculated to have a BMI in the overweight category and seven in the obese category (See Table 11). Of these 12 original 9-year age group of earliest healthcare visit, there were only half (n = 6) with a 10 years of age healthcare visit with an increase in BMI of two healthcare visits in the overweight category and four in the obese category. Of the original 12 earliest healthcare visits at 9-years of age, eight return healthcare visits were noted t at 11 years old. The return healthcare visit in the 11-year-old age group (n = 8) revealed an increase in the overweight category (n = 3) and a decrease in obese category (n = 2).

Earliest healthcare visit 6-11 age range: 10 years old

The earliest healthcare visit at 10 years of age (n = 5), had calculated BMI that were in the overweight category (n = 2) and one in the obese category (See Table 11). At the 11-years of age healthcare visit, there were five healthcare visits with zero having a BMI in the overweight or obese category.

Earliest healthcare visit 6-11 age range: 11 years old

Of the 15 healthcare visits for children at 11 years of age in the 6-11 age range, two had calculated BMIs that were in the overweight category and six were in the obese category (See Table 11).

Of all the healthcare visits whose BMI was reviewed for this study, regardless of age of

earliest healthcare visit, or number of healthcare visits, over half (n = 194) of all healthcare visit weight categories for children were classified as overweight or obese. As the number of healthcare visits decreased in the 7 – 10 year age group the number of overweight/obese children increased in the same age group.

Table 10

Recorded BMI's for Healthcare Visits Age 6 - 11 Years Age Range (N=365)

BMI	n	%
Underweight	7	(<1%)
Normal	162	(45%)
Overweight	92	(25%)
Obese	104	(30%)

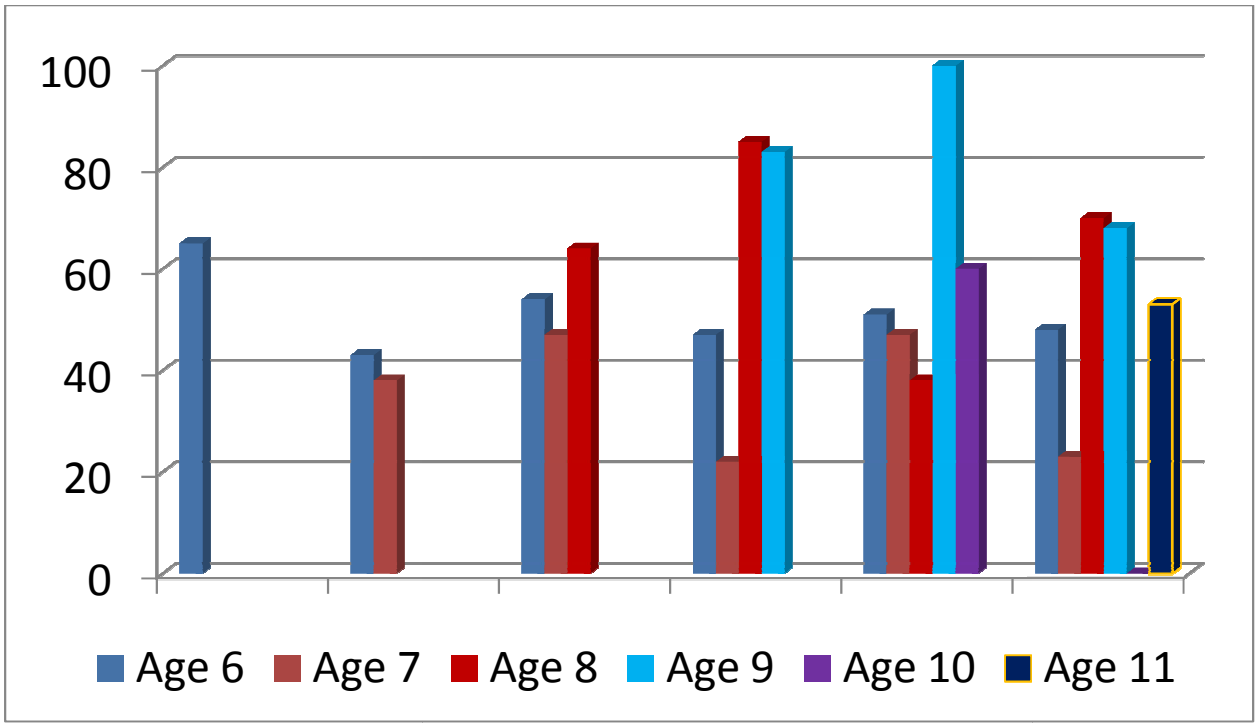
Table 11

Frequencies and Percentages of Obesity and Overweight Combined by Age 6 – 11 Years at Healthcare Visit (N = 365)

		Visits of each age					
Age earliest visit	Number attending earliest visit each age group (n=126)	6	7	8	9	10	11
6	51 (40%)	33 (65%) n=51	10 (43%) n= 23	13 (54%) n=24	13 (47%) n=28	18 (51%) n=34	11 (48%) n=27
7	29 (23%)		11 (38%) n=29	7 (47%) n=15	4 (22%) n=13	8 (47%) n=15	4 (23%) n=18
8	14 (11%)			9 (64%) n=14	7 (85%) n=8	4 (38%) n=8	7 (70%) n=10
9	12(10%)				11 (83%) n=12	6 (100%) n=6	6 (68%) n=8
10	5(4%)					3 (60%) n=5	0 (0%) n=2
11	15(12%)						8 (53%) n=15
Totals	Overweight and obese for total visits each age group (N=365)	33(65%) n=51	22 (41%) n=52	29 (55%) n=53	35 (57%) n=61	39 (57%) n=68	36 (45%) n=80

Figure 5

Frequencies of Obesity Rates for Children who attended Well-child Visits by Age (N=365)



Research question three.

Description of research question three:

What were the frequencies of appropriate secondary diagnosis (obesity), intervention, and follow-up for children who had an elevated BMI?

The data gathered for the third research question examined the frequencies in the rates of appropriate secondary diagnosis, intervention, and follow up for children with an elevated BMI, and were analyzed using descriptive cross tabulations. The classification of BMI measurement for the total healthcare visits (N = 365) was revealed as overweight or obese for the majority (n = 194) of the total healthcare visits. Of these healthcare visits that had children identified to have an elevated BMI, the rates of secondary diagnosis of overweight or obesity, intervention of education on weight, activity, or nutrition, and referral to a dietician or fitness specialist, and follow up recommendation for another healthcare visit for children were analyzed. The health record format reported the information in the following way; diagnosis was listed per visit as primary and/or secondary, the interventions were listed as education, anticipatory guidance, and/or referral, and the follow up was listed as follow up and/or next appointment.

<u>All healthcare visits children: 6 years old</u>

Data extracted from the medical record review revealed of 6-year-old healthcare visits (n = 51) 33 were reported to have an elevated BMI; none had a documented secondary diagnosis of overweight or obesity to reflect an elevated BMI. Of the 33 healthcare visits documented with an elevated BMI, over half had documentation of education on activity (n = 21) and nutrition (n = 23), but only two had information about weight and only one had a referral to a dietician or fitness specialist. Data on the follow- up of the 33 healthcare visits documented with an elevated BMI in the six-year-old category, whether overweight or obese, revealed that 22 of them had documentation recommending follow up for the next healthcare visit in 12 months, two had recommendations to follow up in more than 1 year, nine had no documentation of a

recommendation for follow up at all for a return healthcare visit. None of the healthcare visits had a recommended follow up of less than one year as advised by the expert committee for healthcare visits identifying children who are overweight or obese (See Table 12).

All healthcare visits children: 7 years old

Examination of the total healthcare visits in the7-years of age category (n = 52), found that 12 were documented as categorically overweight and 10 were obese according to BMI calculation, with only one of these 22 revealing an obesity diagnosis. Information on activity (n = 27) and nutrition (n = 35) was recorded during the visit, with only one visit having information on weight. None had a record of a referral to a dietician or fitness specialist. The recommendation for healthcare follow-up visits for these 22 healthcare visits was for 11 of them to return in 12 months. For the remaining 10 healthcare visits, no follow-up was recorded as a recommendation. None had a recommended follow up of less than one year (See Table 12).

All healthcare visits children: 8 years old

At the healthcare visits for the 8-years of age, 53 healthcare visits were evaluated and their calculated BMI indicated that 29 of the 53 healthcare visits were in the overweight or obese category; only three in the overweight or obese category contained a secondary diagnosis of obesity. Healthcare visits in the overweight or obese category documented an increased amount of education in the areas of activity (n = 36) and nutrition (n = 39) with nine educated on weight and four referred to a dietician. A recommendation for follow-up care was documented for 18 of the healthcare visits whose BMI was in the overweight or obese category longer than one year, while 12 of the healthcare visits had no recommendation for follow-up recorded, and no healthcare visits had a recommended follow up of less than one year (See Table 12).

All healthcare visits children: 9 years old

Of the healthcare visits at the age of 9 category (n = 61), fifteen had a documented elevated BMI in the overweight category and twenty had an elevated BMI in the obese category. Two revealed an obesity diagnosis to reflect the elevated BMI. Information on activity and nutrition was given to 21 of the children with an elevated BMI, while nine of the children in the overweight or obese weight category received consultations about weight. Only two had documentation of a referral to a dietician or fitness specialist. At the healthcare visits for the children 9-years of age, nineteen of the 35 healthcare visits with elevated BMI were documented to return in 12 months. Sixteen had no documentation reflecting a recommendation for a return visit. None had a recommended follow up of less than one year (See Table 12).

All healthcare visits children: 10 years old

Data from the healthcare visits of the 10 years of age group (n = 68), indicate that over half (n = 40) of the visits documented overweight and obese according to BMI calculations with 5 of those receiving an obesity diagnosis. The healthcare visits with elevated BMIs had interventions of activity (n = 26) and nutrition (n = 30) education as recorded during the visits, while weight education was the intervention recorded for thirteen of the healthcare visits and referral to a dietician or fitness specialist was documented 6 times during healthcare visits. Of the 10-year age group of healthcare visits who were in the overweight or obese category (n=40), twenty-four were documented to return for a healthcare visit in 12 months, twelve were not documented to have a follow-up, and three were recommended to have a follow-up after more than 1 year. None had a recommended follow up of less than one year (See Table 12).

All healthcare visits children: 11 years old

The healthcare visits of the 11 years of age group (n = 80) revealed that 35 of the

healthcare visits reported a BMI documented as being in the overweight or obese category. Of the 35 healthcare visits where an elevated BMI was reported, eight visits also documented a secondary diagnosis of overweight or obesity. Information on activity and nutrition was given for 18 healthcare visits with a documented elevated BMI, while seven where a BMI was documented in the overweight or obese weight category reported consultations about weight. Recommendations for follow-up in one year were given for 16 healthcare visits where the BMI was documented in the overweight or obese weight category, while in three healthcare visits it was recommended that the child be followed up in more than one year; the remaining 16 healthcare visits where there was a documented elevated BMI, no recommendation was documented for follow-up. None had a recommended follow up of less than one year (See Table 12).

Overall, this study revealed that 194 of the total number of healthcare visits (N = 365) documented the children as overweight or obese as indicated by BMI measurement and classification; however the secondary diagnosis of overweight or obese to reflect the elevated BMI was given for 91 of the 194 healthcare visits that had an elevated BMI. Since the number of overweight/obese children increased in the 7 – 10 year old age group, this would be an important time to implement interventions to be most effective.

Table 12

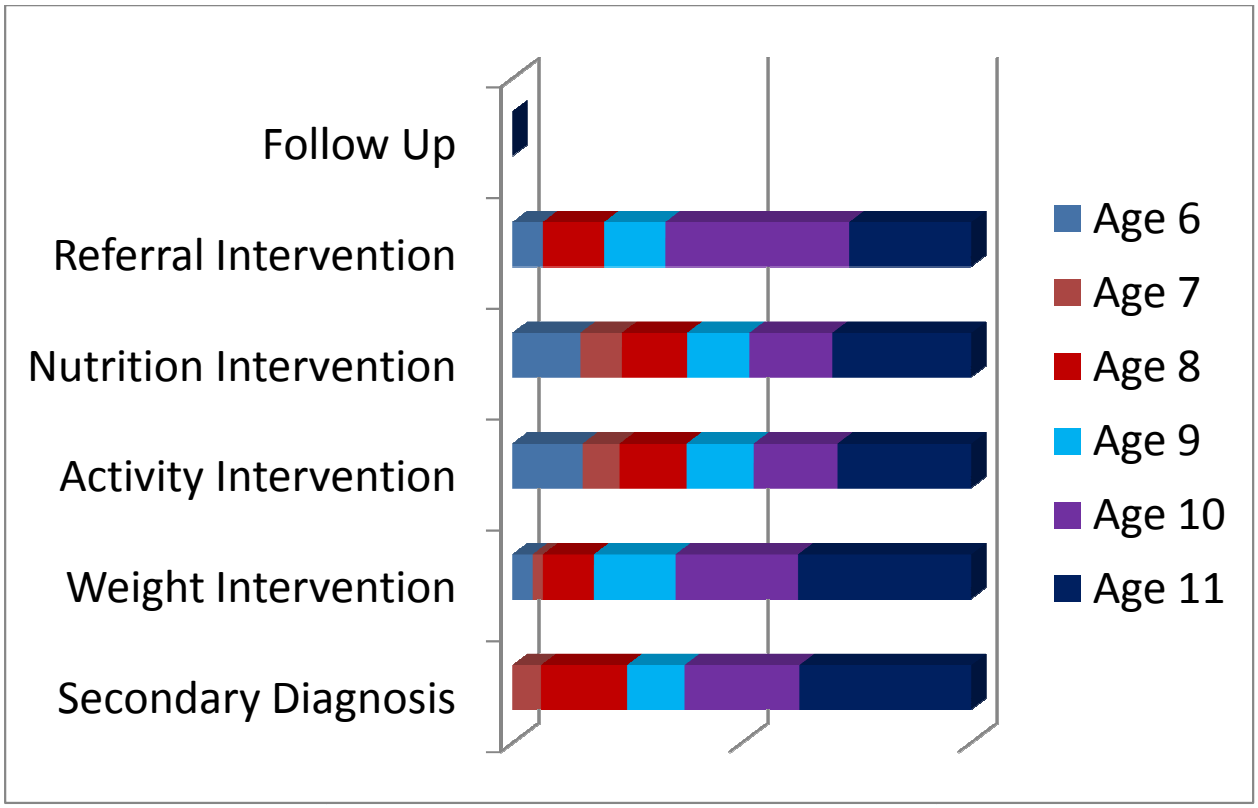
Frequency and Percentage of Secondary Diagnosis, Interventions, and Follow- Up for Children with an

Elevated BMI (n = 194)

Age	Elevated BMI	Secondary Diagnosis	Intervention (W, A, N, R)				Follow up
			(W)Weight	(A)Activity	(N)Nutrition	(R)Referral	
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
6	n=33	0 (0%)	2 (6%)	21 (64%)	23 (70%)	1 (3%)	0 (0%)
7	n=22	1 (10%)	1 (5%)	11 (52%)	14 (67%)	0 (0%)	0 (0%)
8	n=29	3 (20%)	5 (17%)	20 (67%)	22 (73%)	2 (7%)	0 (0%)
9	n=35	2 (11%)	8 (25%)	20 (63%)	21 (66%)	2 (6%)	0 (0%)
10	n=40	4 (20%)	12 (32%)	25 (66%)	28 (74%)	6 (16%)	0 (0%)
11	n=35	6 (23%)	17 (21%)	40 (50%)	47 (59%)	4 (5%)	0 (0%)
Totals		16 (8%)	45 (23%)	137 (71%)	155 (80%)	15 (8%)	0 (0%)

Figure 6

Frequencies of Appropriate Secondary Diagnosis, Intervention, and Follow-Up for Healthcare Visits of Children with an Elevated BMI by Age Group (n=194)



Research question four.

Description of research question four:

What were the frequencies of healthcare visits, secondary diagnosis, and intervention

based on the healthcare provider caring for the child?

The data obtained for the fourth research question that examined the rates of healthcare visits, secondary diagnosis and intervention based on type of healthcare provider, were calculated using cross tabulations. Of the total healthcare visits (N = 365), the rates of healthcare provider by classification were analyzed including pediatrician, family practice, nurse practitioner, and physician assistant. The secondary diagnosis of overweight and obesity, and intervention of education on weight, activity, or nutrition, and referral to a dietician or fitness specialist were also analyzed by each provider classification.

All healthcare visits children: 6 years old

Differences among healthcare providers revealed that of all the healthcare visits of the 6-years of age group (n = 51), almost half (n = 24) of the healthcare visits were identified to be done by a pediatrician and fewer than half (n = 22) were completed by a family practice physician. The remaining five healthcare visits were from a nurse practitioner (See Table 13). None of the healthcare visits, regardless of provider, had a documented secondary diagnosis of obesity (See Table 14).

All healthcare visits children: 7 years old

The healthcare visits of all age 7-years (n = 52), revealed that 24 of the healthcare visits were conducted by a pediatrician who gave only one secondary diagnosis of obesity. Twenty of the 7-year-old age group healthcare visits were completed by family practice physicians and 7 by a nurse practitioner and neither healthcare provider type documented a diagnosis of obesity (See Tables 13 and 14).

All healthcare visits children: 8 years old

The total healthcare visits for the 8-years of age group (n = 53), revealed that25 of the

healthcare visits were completed by a pediatrician, 18 were by family practice providers, and eight were by nurse practitioners (See Table 13), with the pediatrician giving the secondary diagnosis of obesity only three times (See Table 14). None of the healthcare visits by family practice or nurse practitioner were diagnosed as being overweight or obese even though there was a documented elevated BMI.

All healthcare visits children: 9 years old

Of the healthcare visits at the age of 9 group (n = 61), the visits conducted by pediatricians declined to 27 (See Table 13) with the number of healthcare visits having a diagnosis as obese decreasing (n = 2). The healthcare visits by family practice (n = 24) and nurse practitioners (n = 10) increased though there were diagnoses of overweight or obese by either of these practitioners (See Table 14).

All healthcare visits children: 10 years old

Of the 10-year-old age group, there was an increase in the numbers of healthcare visits (n = 68) and obesity diagnosis (3) by pediatricians. The pediatricians conducted the majority (n = 38) of the visits. There was a decrease in numbers of healthcare visits who were from family practice providers (n = 20) and nurse practitioners (n = 8) (See Table 13). None of these healthcare visits were reported to have a secondary diagnosis to reflect overweight or obesity (See Table 14).

All healthcare visits children: 11 years old

In the 11-year-old age group of the total eighty healthcare visits, there were 22 seen by pediatricians, and the numbers receiving a diagnosis as obese by pediatricians was five out of five. There was an increase in the number of healthcare visits made with family practice providers (n = 35) and nurse practitioners (n = 19). The family practice provider diagnosed

obesity in one visit. None of the nurse practitioners diagnosed a healthcare visit categorically obese even though based on BMI, to be obese (See Table 14).

Table 13

Frequencies and Percentages of Healthcare Visit by Provider

Age in Years	Total # of Healthcare Visits	Healthcare Provider			
		Pediatrician n (%)	Family Practice n (%)	Nurse Practitioner n (%)	Physician Assistant n (%)
6	n=51	24 (47%)	22 (43%)	5 (9%)	0 (0%)
7	n=52	24 (46%)	20 (38%)	7 (13%)	1 (<1%)
8	n=53	25 (47%)	18 (34%)	8 (15%)	2 (<1%)
9	n=61	27 (44%)	24 (39%)	10 (16%)	0 (0%)
10	n=68	37 (56%)	20 (30%)	8 (12%)	3 (<1%)
11	n=80	22 (28%)	35 (44%)	19 (24%)	4 (<1%)
Totals	N=365	n=159(44%)	n=139(38%)	n=57(16%)	n=10(2%)

Table 14

Frequencies of Secondary Diagnosis of Overweight or Obesity by Provider

Age	Total elevated BMI for each age	Healthcare Provider			
		Pediatrician	Family Practice	Nurse Practitioner	Physician Assistant
6	n=33	0	0	0	0
7	n=22	1	0	0	0
8	n=29	3	0	0	0
9	n=35	2	0	0	0
10	n=40	3	0	0	0
11	n=35	5	1	0	0
Totals	n=194	n=14	n=1	n=0	n=0

All healthcare visits children: 6-11 years old

The interventions, as reported in Table 13, refer to the information/education given by healthcare providers to children and their families during the healthcare visits to include education on weight, activity (physical), nutrition, and referral to dietician or fitness specialist. Interventions provided during the healthcare visits to parents and their children with an elevated BMI revealed pediatricians (n = 159 healthcare visits) were consistent in providing education during healthcare visits on activity (n = 62 healthcare visits) and nutrition (n= 66 healthcare visits), though they provided less information on weight education (n = 17 healthcare visits) and referrals (n = 14 healthcare visits).

The family practice providers (n = 141 healthcare visits) consistently reported providing education on activity (n = 45 healthcare visits) and nutrition (n = 48) during healthcare visits when there was an elevated BMI documented, but reported it at a lower rate than pediatricians. Compared to the pediatricians, the family practice providers reported less weight education (n = 14 healthcare visits) when there was an elevated BMI as well as a decrease in referrals (n = 1 healthcare visits) to the dietician and/or a fitness specialist for weight management.

When compared to healthcare visits to pediatricians or family practice physicians, the nurse practitioners (n = 57 healthcare visits) reported the fewest numbers of interventions provided during healthcare visits when there was documented overweight or obesity. Nutrition education (n = 14 healthcare visits) was the intervention most frequently reported by nurse practitioners, followed by education on activity levels (n = 6 healthcare visits), with weight education (n = 3 healthcare visits) decreasing significantly. The nurse practitioners made no referrals, though it is well within their scope of practice (See Table 15).

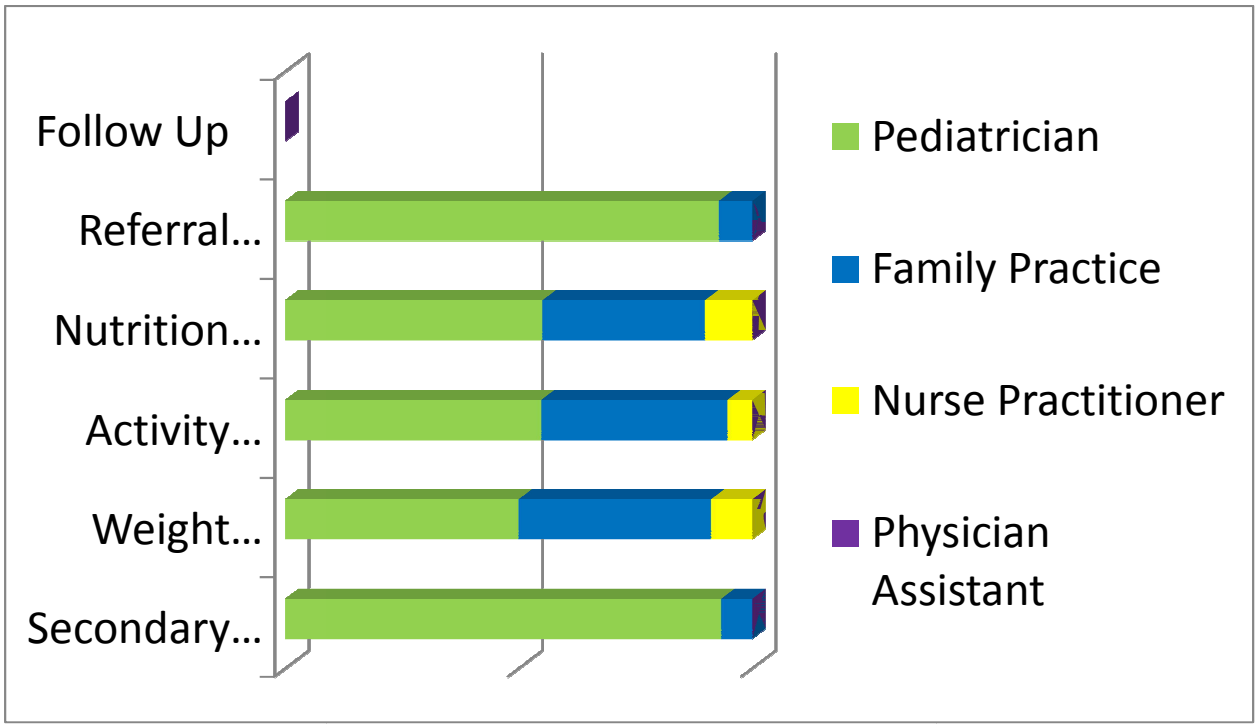
Table 15

Frequencies of Interventions [Weight (W), Activity (A), Nutrition (N), and Referral to Dietician or Fitness Specialist (R)] by Provider

Age	Healthcare Provider											
	Pediatrician				Family Practice				Nurse Practitioner			
	W	A	N	R	W	A	N	R	W	A	N	R
6	0 (0%)	12 (50%)	12 (50%)	1 (4%)	2 (9%)	9 (40%)	9 (40%)	0 (0%)	0 (0%)	0 (0%)	2 (40%)	0 (0%)
	n=24	n=24	n=24	n=24	n=22	n=22	n=22	n=22	n=5	n=5	n=5	n=5
7	1 (4%)	8 (30%)	9 (38%)	0 (0%)	0 (0%)	3 (15%)	3 (15%)	0 (0%)	0 (0%)	0 (0%)	2 (29%)	0 (0%)
	n=24	n=24	n=24	n=24	n=20	n=20	n=20	n=20	n=7	n=7	n=7	n=7
8	3 (12%)	12 (48%)	12 (48%)	2 (8%)	2 (11%)	8 (44%)	9 (50%)	0 (0%)	0 (0%)	0 (0%)	1 (13%)	0 (0%)
	n=25	n=25	n=25	n=25	n=18	n=18	n=18	n=18	n=8	n=8	n=8	n=8
9	4 (15%)	10 (37%)	10 (37%)	2 (7%)	3 (13%)	9 (38%)	9 (38%)	0 (0%)	1 (10%)	1 (10%)	2 (20%)	0 (0%)
	n=27	n=27	n=27	n=27	n=24	n=24	n=24	n=24	n=10	n=10	n=10	n=10
10	6 (16%)	12 (32%)	14 (38%)	5 (14%)	3 (15%)	9 (45%)	10 (50%)	1 (5%)	2 (25%)	3 (38%)	3 (38%)	0 (0%)
	n=37	n=37	n=37	n=37	n=20	n=20	n=20	n=20	n=8	n=8	n=8	n=8
11	3 (14%)	8 (36%)	9 (41%)	4 (18%)	4 (11%)	7 (20%)	8 (23%)	0 (0%)	0 (0%)	2 (11%)	4 (21%)	0 (0%)
	n=22	n=22	n=22	n=22	n=35	n=35	n=35	n=35	n=19	n=19	n=19	n=819
	n=159	n=159	n=159	n=159	n=139	n=139	n=139	n=139	n=57	n=57	n=57	n=57

Figure 7

Frequencies of Appropriate Secondary Diagnosis, Intervention, and Follow-Up for Healthcare Visits of Children with an Elevated BMI by Provider (n=194)



Research question five.

Description of research question five:

Examine the difference in gender or ethnicity on the frequency of earliest healthcare visits?

Differences among means for number of earliest healthcare visits for male and female children were assessed by Independent t-tests (See Table 16). There was no significant differences in the child's gender (t (124) = -1.90, p = .059) for the number of the child's earliest healthcare visits.

Differences in the number of earliest healthcare visits based on ethnicity were performed using an Analysis of Variance (ANOVA) (See Table 17). There was no significant differences in ethnicity (*F* (2, 122) = -2.443, p = .091) for number of earliest healthcare visits.

Table 16

Number of Earliest Healthcare Visits by Gender

	Male (n= 58)		Female (n= 68)			
Number of healthcare visits	M	SD	M	SD	t(124)	*p*
	2.69	1.314	3.13	1.292	-1.902	.059

Table 17

Number of Earliest Healthcare Visits by Ethnicity

	White		Hispanic		Other		ANOVA	
Number of	(n=64)		(n=36)		(n=25)			
healthcare visits	M	SD	M	SD	M	SD	*F* (2, 122)	*p*
	2.7	1.365	3.28	1.186	3.08	1.309	2.443	.091

Summary

The data from medical records consisted of a sample of 365 healthcare visits for children in clinics that were used to explore the numbers of earliest and total healthcare visits that children in each age category attended. Additional information abstracted from the health record included the number of visits per child, education on health behaviors of nutrition and activity, and type of practitioner who provided the care.

The results from this study demonstrated that age and ethnicity, originally reported in Table 1, were not related to frequency of healthcare visits. However, there was an increase in frequency of healthcare visits for the children cared for by pediatricians during the eight year time frame. For the children with an elevated BMI by category, there was inconsistency of providers who documented a secondary diagnosis of overweight or obese. There was consistency in the frequency of the interventions of education on activity and nutrition, but inconsistency in education on weight and referral to nutritionist and one month follow-up even though this is the recommendation by the expert committee of the AAP. The inconsistency of healthcare visits and interactions between healthcare providers and children/parents impacts the knowledge shared by the healthcare providers related to health behaviors possible impacting the child's growth and development.

The screening of children needs to be consistent between all healthcare providers and done according to standard of practice. This will ensure that all children/parents are getting consistent information and interventions regardless of what type of healthcare provider they chose to see.

Chapter Five

Discussion, Conclusion, and Recommendations

Introduction

This chapter includes a discussion of the findings, strengths, and limitations of the study, and the extent to which the original study objectives have been met. Conclusions and recommendations will then be presented for nursing practice. Finally, contributions to theory and future research plans are presented.

According to Bronfenbrenner (1989), the most important environment for a young child is the family, as children spend the majority of their time within the familial environment. In contrast (Berk, 2007), reported that children's development is influenced by their experience in their external environments and the amount of time they spend in each setting (Berk, 2007). An example of environmental factors may include activities and interactions with family members as well as healthcare providers during healthcare visits. According to Bronfenbrenner's theory linking families, children, and the health system, the primary link between the health and child care is the child and family, rather than the child alone (Crowley, 2001). The growth and development of the child and family is influenced by the quality of relationships and the immediate settings they encounter (Puhl & Lattner, 2007).

As children and their families move from the healthcare system to the child care system, they are making an ecological transition. Development is promoted by the degree of mutual trust, positive orientation, and goal consensus among these systems. Therefore, if childcare, teachers, and healthcare providers are in agreement in their approach to families, they can serve as supportive links for families (Crowley, 2001). One issue that is not clear is whether the number of healthcare visits and the interactions with the healthcare provider influences health behaviors.

The healthcare visits and interactions may be a supportive link to impact children's behaviors related to nutrition and activity and weight category.

The purpose of this study was to examine the number and content of well-child visits and describe the difference in attendance and content of the healthcare visit based on type of provider. The findings from this current study revealed that there was a decrease in frequency of well-child visits from age six until age eleven. There were also different types of healthcare providers caring for the children during the healthcare visits, and the content of the healthcare visit varied not meeting AAP recommendations.

Discussion of Findings

Research question one.

What is the frequency of healthcare visits by age?

The frequency of healthcare visits by child age revealed that the majority of children in the 6-11 year old age range attended their first healthcare visit at the age of 6. The majority of healthcare visits were documented as well-child visits. The healthcare visits declined between the ages of 7 to 10 until the children once again begin to attended regular healthcare visits documented as sports physicals at the age of 11 when students typically begins sports activities and when a scheduled immunization is due. The findings from the current study appear to be consistent with previous research which found that children had a higher number of healthcare visits during 4-6 years of age, 11-12 years of age , and 15years of age that are the ages when immunizations are recommended (AAP, 2001; Dempsey & Freed, 2009, 2004; Selden, 2006).

Children from birth to age 6 have greater rates of compliance with scheduled well-child checks as immunizations are needed for school entrance (AAP, 2001). However, there is no consistency and limited compliance for well-child visits past the age of 6, when scheduled

immunizations are completed, until the age of 11 when the next scheduled immunization is due as well as sports physicals for school related athletics (Selden, 2006).

The health records indicate that as children increased in age, the number of healthcare visits decreased, similar to the findings of other studies (Dempsey & Freed, 2009; Selden, 2006). According to Dempsey and Freed (2009), a sample of 718,847 adolescents were included in their study, less than fifty percent had greater than one Health Maintenance Exam (HME) visit within any 2-year time period and substantially fewer (<75%) had annual HMEs. Immunization-focused visits to healthcare providers were significantly associated with age of the child, and increased as the participants became adolescents.

Interestingly, Selden (2006) reported that past the age of 6 there was no consistent rate of healthcare visits for children; however, Selden did identify immunizations as strongly related to children's healthcare visits in that particular study. The findings from the current study suggest that a greater understanding of why children attend healthcare visits at different ages would be helpful to support health promotion education with children and parents.

Bronfenbrenner (1989) developed the Socio-Ecological Systems Theory in an effort to discuss and explain child development. According to Bronfenbrenner, there are many influential components in a child's environment including the nuclear family and members of their extended family. Additionally, external to the family the child's environment may include early childcare and educational programs, health care settings, community neighborhoods, libraries, playgrounds, government and laws which are influential. Children's development is influenced by what they experience in these environments and the amount of time they spend in any particular setting (Berk, 2007).

Internal and/or intrapersonal factors, such as an individual's attitudes, knowledge, and

skills related to nutrition and physical activity can influence their weight (Eneli, 2007). The Socio-Ecological Systems model at the outer most levels addresses positive and negative external factors that are not under the direct control of the individual. However, these external factors, such as public policy, have been shown to influence health behaviors and outcomes. Policy mandates at the local, state, and national level may have the potential to influence attitudes, beliefs, and actions regarding health (Berk, 2007). An example would be related to mandated immunizations that children are required to obtain for school entry. Children from birth to age 6 are more likely to be seen consistently for scheduled well-child checks and immunizations as set forth by the AAP (2001), due to daycare and school policy requirements for immunizations as demonstrated in this study.

Research question two.

What is the frequency of obesity rates for children who attended healthcare visits?

The health records of the children examined for this study indicated that the frequency of obesity rates for children who attended healthcare visits did not follow a specific pattern. One thing that was identified was that as the number of healthcare visits decreased in the 7 – 10 year age group, the number of overweight/obese children increased in the same age group. If the same healthcare participant (child) would have been followed over time, then the data may have been more reflective of obesity frequencies. Differences were found in the health records based on the provider who conducted the healthcare visit for, the content of the healthcare visit and other variables of the visit. It is not possible with the data in this study to identify how the well child visits impacted the rates of obesity for children. However, there was a decrease in the number of well child visits until the age of 11 when the number of healthcare visits again started to increase as sports physicals. The study did not reveal information about whether the children were

consistently seen by the same established healthcare provider on subsequent visits.

Healthcare providers were surveyed by Tataw, Bazargan-Hejazi, and James (2011) who reported that over a 2 year time period there was a 50% increase in the number of well-child and primary care visits children attended if the child/family had established a primary care provider. The type of primary care provider (Pediatrician, Family Practice, Nurse Practitioner, and Physician Assistant) had no reported correlation to the number of visits. However, there was a correlation with the content of the healthcare visit between the child/family and the primary care provider who provided the care.

Research question three.

What were the frequencies of secondary diagnosis, intervention, and follow-up for children who had an elevated BMI*?*

The results of this study were varied when exploring the health records of children who had an elevated BMI with the frequencies of appropriate diagnosis, intervention, and follow-up. In this study fewer than 25% of the healthcare providers documented a diagnosis of overweight or obesity for children with an elevated BMI. Over 50% of the healthcare providers documented detailed interventions in the children's healthcare records that included information given on activity and nutrition, and 35% included information on weight. However fewer than15% of healthcare providers referred the children to a dietician or fitness specialist.

A variety of follow-up recommendations were made for the children who were identified by BMI as categorically overweight or obese. Follow-up recommendations had varying time frames ranging from 'no follow up' to '3 years' to return for a healthcare visit. In order to provide consistent care to children, the AAP (2007) recommended that children with an elevated BMI have a follow-up appointment in less than one year from diagnosis. However the findings

of this study demonstrated that none of the healthcare providers instituted this recommendation. This is an area for future research as there is minimal information in the literature related to well child visit follow-up and recommendations when children with an elevated BMI have been classified as overweight or obese.

The results of this study demonstrated that children with an elevated BMI were generally not classified by providers as overweight or obese. Though BMI does not measure body fat directly, it is an alternative method of screening that correlates to direct measures of body fat such as underwater weighing and dual energy x-ray absorptiometry which are not financially feasible or practical for routine healthcare visits (CDC, 2009). The BMI is not an "exact" or perfect measurement of body fat, but it is the most used and reliable correlation measurement to body fat today and interventions/recommendations are made in accordance with this measurement.

Additionally, the BMI is calculated the same way for children and adults, but the criteria used to interpret the meaning of the BMI for children and teens are different. The difference in criteria is to take into account the differences in body fat because of age and the differences in body fat because of gender (CDC, 2009). Additionally, there was very little documentation in the charts that children with elevated BMI's and their parents received education in the form of anticipatory guidance. Anticipatory guidance is beneficial as it is a process by which healthcare providers counsel parents about what to anticipate from their children as they grow and develop, including activity, nutrition, and weight.

According to the AAP (2009) topics that were included as anticipatory guidance should include 1) bicycle helmets 2) media 3) risk for obesity 4) tobacco 5) weight maintenance and weight loss to include nutrition and activity. In this study the topics that are recommended by the

AAP were not reported as being consistently reviewed with parents. Also, information on how anticipatory guidance topics, specifically diet and activity, were delivered at varied time and did not reflect AAP recommendations for education among overweight and obese children.

According to the AAP expert committee (2009), dietary habit and physical activity counseling should include recommendations for children to have (a) five or more servings of fruits and vegetables per day, (b) elimination of sugar-sweetened beverages, (c) 2 or fewer hours of screen time per day, (d) no television in the room or space where the child sleeps, and (e) 1 hour or more of daily physical activity. Additionally, when focusing on eating behaviors, the recommendation is that the healthcare provider encourage the child to: (a) eat breakfast every morning, (b) limit meals eaten outside the home, and (c) schedule family meals (in the home at the table) 5 – 6 times per week. Behavioral recommendations for the children and family need to encourage self-regulation at meals on the part of the child in order to avoid the parents instituting overly restrictive control of behaviors.

It is important to counsel parents as well as children to ensure that they are receiving the same information as mothers and fathers can positively influence each other (Paquette & Ryan, 2001). Berk (2007) noted that as parents are role models for their children, there must be mutual support between parents and child regarding the child's dietary intake in order to be effective. If parents are not following the same dietary recommendations as the children, then the likelihood of the children following the recommendations are minimal.

Prevention of obesity is a goal of pediatric healthcare and an important public health concern (Resnicow, 2006). Prevention measures are characterized by the encouragement of healthy lifestyles, including: (a) physical activity, (b) fitness and nutritional education, (c) adequate and healthy diet, and (d) parental involvement in their children's lives (Dehghan,

Akhtar-Danesh & Merchant, 2005).

Similarly, other researchers have reported finding that the content of activity, nutrition, and weight provided during healthcare visits were inconsistent (Magar, Dabova-Missova, Gjerdingen, 2006; Schor, 2004; Young & Boltri, 2005). Magar et al. (2006) further explored educational content and anticipatory guidance during well child visits using an experimental control study design to survey 137 parents and 31 physicians. In the study Magar, et al. compared the responses of physician-provided education information based on the parents' documented concerns related to targeted anticipatory guidance versus usual standard physician instructions on parenting, safety, activity, and nutritional topics of anticipatory guidance. The number of anticipatory guidance topics covered in the group based on parent's documented concerns of (a) diet; (b) activity; (c) weight; and (d) safety was less than half the number of topics covered in the group that covered standard topics. The researchers found a consistently limited amount of standard anticipatory guidance content, including nutrition and activity, was covered in the healthcare visits with the parents and children, (Magar et al., 2006) similar to the results of the current study.

Limited anticipatory guidance education for children and their parents was also reported by Schor (2004), using data from the National Survey on Early Childhood. Schor explored healthcare visits by primary care providers and the satisfaction of parents with the content and education covered during the healthcare visit. According to Schor in this study well-child care visits accounted for 22 percent of the average pediatrician's patient contacts. Parents expressed several concerns related to their child's visits to primary care providers which included: limited parenting guidance, education, or healthcare screening for their child during the visits.

The frequency of anticipatory guidance provided by primary care providers to children

and their parents was also explored by Young and Boltri (2005) who mailed questionnaires to family physicians. The healthcare providers were asked to rate the frequency of use for anticipatory guidance methods, including use of forms or guidance prompts, visit frequency for total, well-child, and other pediatric visits, and demographic information. Questionnaires were returned by 495 family physicians who responded that they generally provided more anticipatory guidance verbally rather than by written material. Physicians who were utilizing well visit forms when seeing children more commonly initiated anticipatory guidance discussions, addressed parental concerns, and provided the parents with handouts. Limited anticipatory guidance and documentation of education was provided by physicians who did not use a well-child visit form as a guide during a healthcare visit (Young & Boltri, 2005).

Not using a well-child visit form during the healthcare visit could be one potential explanation for the limited anticipatory guidance by healthcare providers in the current study. A variety of documentation was provided in the children's health records reviewed for this investigation, yet no specific well-child visit form was found. However, it was not possible to actually identify whether a well-child visit form was used by the healthcare provider during the healthcare visits, or whether that impacted the anticipatory guidance that was provided. The use of a standardized process including standard forms for providers to implement during well-child visits could increase the consistency in the type of anticipatory guidance that is provided, and would allow the care between providers to be more fully explored in an effort to improve care.

Of concern is what happens, especially related to long-term health outcomes, if the childhood obesity issue is not addressed by healthcare providers? One major concern has been that childhood obesity leads to the development of additional health problems. The high prevalence of childhood obesity is associated with increasing rates of health conditions, such as

type 2 diabetes and hypertension, that until recently were found exclusively in adults. Obesity in childhood detrimentally impacts long-term physical and psychological health, leading to the potential for financial strain (Cook et al., 2005).

One way that not addressing childhood obesity impacts the health of children is observed in the increased chronic medical conditions in children including (a) cardiac (hypertension, hyperlipidemia, and dyslipidemia); (b) endocrine (Type 2 diabetes, menstrual irregularity, and insulin resistance); (c) gastrointestinal (fatty liver); (d) pulmonary (obstructive sleep apnea); and (e) skeletal disorders (abnormal bone growth) secondary to obesity of children (American Heart Association [AHA], 2008; Anderson & Butcher, 2006; Harbaugh, Jordan-Welch, Bounds, Blom & Fisher, 2007).

Psychological problems in addition to physical problems are also cited as the most common short-term consequences related to childhood obesity. The emotional cost for overweight children described as changes in well-being for children who do not receive early intervention (Cohen & Budesheim, 1997 [Appendix A]; Tiggemann, 2005).

Finally, the magnitude of the obesity problem is also reflected in costs, as obesity-associated diseases and complications have increased the cost of raising children (Harper, 2006). Of all economic issues related to obesity, this one might be the most important. Obesity-attributable medical costs among children in the United States in 2003 were estimated at $15 billion when early identification and intervention were not implemented (Hedley, et al., 2004).

Research question four.

What are the frequencies of healthcare visits, secondary diagnosis, and interventions for all children based on the healthcare provider caring for the child?

There were differences noted in this study that were based on the healthcare provider that

cared for the child related to frequency of healthcare visits, secondary diagnosis, and interventions provided for the child. Pediatricians were identified in the healthcare records as the provider that most consistently had the (a) highest number of healthcare visits, (b) a secondary diagnosis related to an elevated BMI, (c) interventions of education, (d) referral to dieticians, and (e) recommended number or timing of follow-up appointments. Family Practice physicians provided: (a) fewer healthcare visits, (b) secondary diagnosis for an elevated BMI, and (c) follow-up appointments. The least number of healthcare visits were provided by the nurse practitioners, who provided very few secondary diagnoses to children with an elevated BMI, and fewer follow-up appointments

Health care given by providers in the form of assessment, education, information, etc. may vary across disciplines. Differences in level of education and the type of health care model used for education of healthcare providers are; medical, primary health, nursing, etc. impacts the typed of healthcare provided to patients (McElmurry, 2002). The healthcare providers from this study were fairly consistent in the type of education they reported providing to children and their families that included nutrition and physical activity. However, pediatricians reported specifically addressing weight education more frequently. Pediatricians more frequently identified children with an elevated BMI to have a secondary diagnosis for overweight or obese and combined it with a referral to a dietitian. The family practice physicians who saw children with an elevated BMI rarely provided a secondary diagnosis of overweight or obese, and addressed weight education less frequently. The nurse practitioners providing healthcare for children in this study never identified children with an elevated BMI as having a secondary diagnosis of overweight or obese. However, it is important to note that family practice physicians

and nurse practitioners did not have the volume of healthcare visits that were handled by the pediatricians.

In this study the role of each type of healthcare provider also differed based on their discipline as seen by the assessment, intervention, and follow-up recommendations. According to Nohle (2010) pediatricians have a specific role in well-child visits and provide more consistent information to children and parents than other providers. Nohle revealed that once a child reaches school age, his or her yearly check- ups are less about vaccinations and more an opportunity to communicate with the pediatrician to provide anticipatory guidance. It is important to note that for pediatricians the well child visit consists of more than weighing, measuring and listening to the heart, it is an opportunity to evaluate the child's social, emotional and physical development. Pediatricians identify the well child visit as a chance for the parent and the child to have a two-way conversation with the physician and an opportunity for parents to get validation around the child's behavioral, cognitive and physical norms (Davis, 2007). In the current study, the chart review did not provide documentation of two-way conversations, behavioral or cognitive norms, or the child's social environment in identifying areas that could be addressed in the future.

Well-child visits were also explored by Cohen (2010), using the National Ambulatory Medical Care Survey, including well-child visits made to family physicians and pediatricians between 1995 and 2007. There were a total of 4,999 visits, and represented 213 million well-child visits at the national level. Compared with visits to pediatricians, visits to family physicians were associated with higher rates of Medicaid insurance, were more likely to have a shorter visit, and were more likely to occur in non-metropolitan locations and in the Midwest and West geographic regions.

Family physicians in the current study did conduct healthcare visits, but the time spent in the visits was not noted. The current study was also conducted in non-metropolitan locations the Midwest and the majority (86%) of the healthcare visits were covered by private insurance rather than Medicaid as identified in the above study. The findings in the Cohen (2010) study are similar to the results of this study as the family practice physicians addressed specific anticipatory topics less often then pediatricians.

Interventions should be a goal if children are already overweight or obese as reflected in this study, and healthcare providers should avoid the language of "overweight" and "obesity" since these terms may promote weight-based stigma (MacLean, 2009). Several of the most effective interventions, in fact, have not focused on weight (Miller, 2002; Wing, 2003). Interventions would be beneficial if focused on making children's environments healthier rather than focusing solely on personal responsibility (Puhl, 2009). An example would be within the media, who frequently represent overweight and obesity as a failure of will power and rarely point out the complexity of the problem, such as the environment, genetics, social class, etc (Bougneres, 2002). Changes in the environment include serving healthy school lunches, mandating physical education in the schools, ensuring advertising that does not focus on high calorie items during cartoon viewing times, and insurance coverage for follow up with healthcare providers based on elevated weight categories (Rome, 2011). However, once healthcare providers recognize that the identification of overweight or obesity needs to be the first step of healthcare providers so appropriate interventions and follow up can occur.

In the chart review for this study, data was available that indicated that children and their parents received information and/or anticipatory guidance in the form of education on physical activity and healthy nutrition during a majority (68%) of the well child visits. However, it was

not clear how these interventions were introduced and the specific details that were covered were not evident in the charts. The recommendations for follow-up for overweight and obese participants was not correctly recommended or documented that they were completed in the data available for this study. Limited recommendations may have been related to the under identification of overweight and obesity by secondary diagnosis (<25%), or insufficient documentation of recommendations.

In a study by LeBaron, Rodewald and Humiston (1999) the investigators reviewed 164 well-child visits and compared the use of time by both physicians and nurse practitioners. The use of time was broken down by the following categories as: (a) vaccination discussion, (b) other health care discussion, (c) physical examination, and (d) vaccine administration. For each well child visit the practice type (public or private), primary care provider type (physician or nurse practitioner), vaccination information, solicited questions, and the number and type of vaccinations were also documented. LeBaron et al. found that the majority of the visits were conducted by physicians (71%), the nurse practitioners spent on average 3 more minutes with each visit than the physicians, yet the physicians spent more time on the physical exam and discussing healthcare issues. In the current study physicians conducted the majority of the healthcare visits, which could be related to the fact that the Nurse Practitioners and Physician Assistants also provided care to adult patients, potentially decreasing the number of children that they were able to see. Also, in the current study the Eastern Minnesota clinic employed mainly physicians including: Family Practice (n = 6) and Pediatricians (n = 3), followed by Nurse Practitioners (n = 4), and Physician Assistants (n = 2). The Western Wisconsin clinic employed practitioners that were more evenly distributed between Family Practice (n = 2), Physician

Assistant (n = 1) and Nurse Practitioner (n = 1). Additionally, the physicians reported discussing more healthcare issues in the areas of weight, activity, and nutrition.

Many factors may explain the differences reported between the healthcare providers caring for the child and the frequency rates of healthcare visits, secondary diagnosis, and interventions. In this study none of the healthcare providers, regardless of the differences in type of provider, met the AAP recommendations set forth for healthcare visits and interventions. In order to improve the health of children, it is important that healthcare providers consistently meet the standards for care as identified by policy for practice. Differences could be related to the providers comfort level with the topic of childhood obesity, or the provider's educational level on the current recommendations; however data was not available to fully explore this in the current study. As information on healthcare visits by provider is limited in the literature, this is an area to potentially explore further in future research.

Research question five.

Does gender or ethnicity predict the frequency of healthcare visits for all children?

Unlike other studies in the literature which explored factors associated with patients keeping or not keeping appointments or attending healthcare visits in general (Cohen, et al., 2006; Jhanjee, Saxeena, Arora & Gjerdingen, 2004), in this study there were no statistically significant differences between the gender or ethnicity of the children related to the frequency of healthcare visits. In the study by Cohen, et al. (2006) higher rates of health-care utilization in primary care clinics were reported for children who were African American or Hispanic than children who were white. It is important to note that in this study, the majority of the healthcare visits were by white children, with very few visits reported for children who were African

American or Hispanic. The findings might have looked different if there was greater diversity among the population at the site where the data on healthcare visits were obtained.

According to Jhanjee, et al. (2004) factors that have been associated with noncompliance with healthcare visits include gender, younger age, and embarrassment or fear of being labeled overweight or obese by medical personnel. These factors have the potential to impact the health of children if they limit children from receiving appropriate healthcare services. These findings are inconsistent with the current study which found little variation in frequency of healthcare visits related to gender.

Strengths of the Study

An important strength of this study is that this is one of the few studies to collect data on the content of healthcare visits of children. Specifically, this study explored health information topics reported to be discussed with the child and parent during the well child visit in relation to obesity. The charts used for gathering data were narrowed to children ages 6-11 years of age, which is the age at which there has been the highest reported increase in obesity over the past five years (CDC, 2007). The charts were chosen from two different types of facilities; one for-profit and the other not-for-profit. The two facilities employed a combination of healthcare providers; though one had a larger number of physicians and the other had a balanced combination of physician (n = 2), physician assistant (n = 1), and nurse practitioner (n = 1).

In this study the frequency of healthcare visits by child age revealed that the majority of children in the 6-11 year old age range attended their first healthcare visit at the age of 6. The healthcare visits declined between the ages of 6 to 10 until the children once again begin to attended regular healthcare visits documented as sports physicals at the age of 11 and had documented immunizations. This information on healthcare visit frequency confirms information

in the literature stating that children attending healthcare visits decline in the 6 to 10 age range when the rates of obesity are highest.

This study revealed important information about healthcare providers and practice behaviors that have not been revealed in other studies. In this study less than 25% of the healthcare providers documented a diagnosis of overweight or obesity for children with an elevated BMI. Over 50% of the healthcare providers documented detailed interventions in the children's healthcare records that included information given on activity and nutrition, and 35% included information on weight. However fewer than15% of healthcare providers referred the children to a dietician or fitness specialist. None of the healthcare providers recommended a follow-up of less than one year and some no follow up was recommended at all.

Pediatricians more frequently identified children with an elevated BMI to have a secondary diagnosis of overweight or obese and combined it with a referral to a dietitian. The family practice physicians who saw children with an elevated BMI rarely identified a secondary diagnosis of overweight or obese, and addressed weight education less frequently. The nurse practitioners providing healthcare for children in this study never identified children with an elevated BMI as having a secondary diagnosis of overweight or obese.

As provider documentation was varied within the charts, it was not possible within this study to obtain consistent information from the charts. It would be beneficial to have consistency not only in the forms of documentation by healthcare providers, but in the types of information that is documented. This would enable the collection of data to identify the effectiveness of care provided, as well as areas in which improvement in care is needed. Consistency would also assist in standardizing information that is available to be shared with children and families.

There are clear recommendations developed by the expert committee (Barlow, 2007) for

assessment, intervention, and treatment for children who are overweight or obese However, the findings from this study suggests that healthcare providers are not following standard care guidelines for caring for children who are overweight or obese .

Limitations of the Study

A limitation to this study was that this research used a convenience sample of health care records from healthcare clinics and did not include free clinics or hospitals of patients who were underinsured or who had no health insurance. Data was abstracted from the records and not directly drawn from the actual visits themselves, which limited some of the data that the investigator was able to obtain. If the same healthcare participant (child) would have been followed over time, then the data may have been more reflective of obesity trends by child. However due to the type of data that was collected (retrospective chart review), it was not possible with the data available to obtain this information. The study did not reveal information about whether the children were consistently seen by the same established healthcare provider on subsequent visits as the data did not include this information.

Inconsistent information was available from the charts as provider documentation was varied due to not using standard forms for visits. Generalizability of the study may be limited to rural towns in the Midwest such as those from which the sample was drawn. There was a wide variety of codes (*International Classification of Diseases, Ninth Revision* (ICD-9) for healthcare visits for children which may have impacted the content of the visit to include V20.0 – Health supervision of infant or child, V20.2 – Routine health or child health check, V61.20 – Counseling of parent-child problem, 995.52 – Child neglect (nutritional), V20.1 – Other healthy infant or child receiving care, and V70.0 – Routine general medical exam at a healthcare facility.

Contribution to Theory

The Socio-Ecological Systems Theory, developed by Bronfenbrenner (1989), was presented in Chapter Two as the theoretical framework guiding this descriptive study. The theoretical model that was derived from this theory is comprehensive in focus and presents the relationships between the environment of a child and the influence that environment has on how a child grows and develops. The defining feature of the ecological model is that it takes into account the psychosocial physical environment and its relationship to people at individual, interpersonal, organizational, community and public policy levels.

Several insights have been revealed through this study with the utilization of the Socio-Ecological Systems model related to the healthcare environment. Included in the healthcare environment are the provider interactions with children and parents that may influence the frequency and content of healthcare visits. In the current study children and parents that interacted with pediatricians had a higher rate of healthcare visits and obtained more anticipatory guidance information as identified in the chart review.

According to Bronfenbrenner's theory, the amount of time spent in an environment can impact a child's development. In this study as the children increase in age, the number and type of healthcare visits which they had with their healthcare providers decreased. Following these same children over time may be reflective of time spent with healthcare providers in the form of healthcare visits and the health behaviors in relation to obesity. In the current study, information was shared by the healthcare providers with children and their parents in the form of anticipatory guidance on activity and nutrition 50% of the time. It would be helpful in the future to explore any variations on health within the 50% of children and parents who did not receive anticipatory guidance, as this was not able to be determined in the current study.

According to Bronfenbrenner, if one is interested in facilitating the behavior change of a

child, it is important to address not just the child, but the external factors that influence the child. Additionally, Eneli (2007) stated external factors that may influence children's behaviors include parental role modeling of physical activity and parent's attitudes regarding nutrition and weight. However, there were no data from this study to address parental role modeling, something that it would be important to evaluate in the future. Also, other external factors related to the model such as school immunization policy, community requirements for sports physicals, etc. are important motivators for parents to seek health care for their children and should be researched in the future.

Paquette and Ryan (2001) stated that relationships between parents and children are bidirectional, meaning that both parent and child have influence on each other's behavior and weight. In the current study, of the children with an elevated BMI less than 25% of them received a secondary diagnosis of overweight or obese. Currently, the BMI is the most used and reliable correlation measurement to body fat, and the results of the BMI demonstrate that many children are overweight or obese. This finding needs to be consistently addressed by health care providers, so the children can be assisted in healthy lifestyle behaviors as they grow and develop. Again, it would be helpful to have additional information on whether parents asked about the elevated BMI, if they had concerns related to weight, and if the parents were overweight or obese themselves. However, it was not possible with the data available to clearly identify the parent and child's influence on each other's behavior.

Berk (2007) noted that individuals in the microsystem may influence the quality of the child-parent relationship, such as support between two parents in the child-rearing and the roles each of them plays. An example of this might be the parent's agreement or disagreement about dietary intake for the child. Learning about appropriate dietary intake begins at birth and

increases when the child starts to consume “table” foods and emulates parental eating behaviors in amount and types of foods. Research indicates that many parents do not realize that infants and young children, who are overweight, are at greater risk of becoming obese (Birch, 2010). Healthcare providers need to measure infants’ weight and length and calculate toddlers’ body mass index (BMI) as a standard part of routine well-child visits to monitor their growth and development (Tanski & Garfunkel, 2008). This will help them identify children at risk for obesity and alert parents to this risk, and recommend steps they can take.

However, monitoring growth and development is not sufficient to change behaviors because children learn by observing the parents (Faith et al., 2004; Sigman-Grant, 1992). Thus; healthcare providers need to collect information about how parents conduct their own diet and activity. Knowledge about parent nutrition and activity behavior is important as it provides information on what would be most effective for the child and their parents when developing interventions related to diet and exercise. One of the challenges of healthcare providers when discussing sensitive topics like obesity is how children and parents will receive the healthcare providers input. The way in which health care providers share information is important to explore further, as it can potentially influence children’s and parents’ behaviors related to nutrition and physical activity for children.

According to Black (2005), adults and children have a need to feel that their perspectives are heard in relation to their environments and experiences related to weight. As Black described, the more healthcare providers know about a patient's thoughts, feelings, and opinions related to a topic, the more fully they can engage the clients in creating strategies to successfully bring about desired change in behaviors. Parents solicit and respect advice from their primary care clinicians, which can motivate them to make healthy lifestyle changes themselves, which impact their

children (Blackburn & Waltman, 2005; Munson, 2007).

It was not possible in this study to identify a relationship between the type of healthcare provider and the child's frequency and type of healthcare visits. However, strategies to improve the healthcare of children could be developed and strengthened if additional research was conducted using the ecological model to identify whether there is a relationship and/or association between obesity and the frequency and type of healthcare visits. Healthcare visits need to be further researched for the content of the healthcare visit as well as the structure and process of the visit as identified by the AAP (2006) in an effort to determine the impact on childhood health behaviors.

In future research, it might be beneficial to explore other practice models to improve healthcare practice and behavior changes. The Quality Enhancement Research Initiative (QUERI) is a program designed to systematically translate research findings into better health care practices, and thus better health outcomes. Integrating provider behavior research considerations and findings into the QUERI process will enhance the effectiveness of the initiative (Rubenstein, Mittman, Yano, & Milrow, 2000).

The core QUERI approach includes researchers who directly and systematically promote guideline-based practice to reduce the gaps between routine practice and the best available evidence. Through QUERI, there is a proactive, interactive and multi-faceted implementation role for health services researchers in the context of close collaboration between research, quality improvement (QI) and clinical leadership.

The QUERI approach includes monitoring, understanding, evaluating, and acting upon both emerging clinical research findings and implementation research findings that provide strategies for improving their target populations' care and outcomes. Therefore, QUERI

researchers are involved in both investigating a broad spectrum of implementation issues and, simultaneously, pursuing significant improvements within healthcare settings, specifically healthcare provider behaviors (McQueen, 2004).

Another model that may be investigated is Generic Health Behavior Change: a Comprehensive Competency Framework (GHBC-CF). The GHBC-CF describes a comprehensive list of competences required by workers delivering health behavior change across different health behaviors and to different clients and client groups (Dixon & Johnson, 2010).

The GHBC-CF competencies within the framework are organized into three levels characterized by the intensity of the health behavior change interventions to include low, medium and high. For example the low intensity interventions would be delivered following a script with restricted flexibility in delivery methods by the practitioner. The medium intensity interventions would allow the practitioner some flexibility in intervention delivery methods, such as longer duration of a healthcare visits, multiple visits, etc. The high intensity intervention would be delivered by the practitioner in a way that meets the specific needs of the client and may include referral to other healthcare team members (Dixon & Johnson, 2010). These leveled interventions are consistent with the step approach interventions that are recommended by the expert committee (Barlow, 2007). The competency hierarchy may be used to develop training health professional in health behavior change interventions for different levels improving health of clients, specifically children and their families.

Implications for Practice

A large percentage of children attend healthcare facilities, however it is unknown how many parents actually take their children for well-child visits according to AAP recommendations (Selden, 2006). The well child visits are an opportune time to educate children

and their families on health, specifically diet and exercise. Further examination of the content of healthcare visits, more specifically the physical exam and education provided is important. It would be beneficial to healthcare providers and patient if consistent evidenced based forms were used to prompt healthcare providers on the appropriate content of the healthcare visit based on the child's age to ensure a comprehensive visit. It would provide researchers and healthcare provider's greater insight into potential opportunities to develop strategies for health promotion and interventions that address the outcomes of overweight and obesity. Two ways of examining the process and content of healthcare visits would be through observation and interviews.

Interventions including types of education on anticipatory guidance topics and the physical exam during healthcare visits which may help influence the health of children, should be researched. According to Barlow (2007), interventions for overweight and obesity during healthcare visits should include education by healthcare providers on dietary habits and physical activity, counseling, and follow-up to parents and children. Dietary habit and physical activity interventions should encourage children to have the following: five or more servings of fruits and vegetables per day, no sugar-sweetened beverages, two or fewer hours of screen time per day, no television where the child sleeps, and one hour or more of daily physical activity.

Difficulties sometimes emerge when health care providers communicate to parents that a child's weight is above the normal range, as the label of 'overweight' or 'obese' has been reported to cause negative feelings from the parents (Mikhailovich & Morrison, 2007; Rhee, De Lago, Aercott-Mills, Mehta, & Krysko, 2005). Therefore, if the provider is to address a sensitive subject, such as 'overweight' or 'obesity', and achieve success in addressing the issue (e.g. decreasing weight, improving health of child) it is important for providers to develop an effective working relationship with the parents (Kuhl, Clifford & Stark 2011). An effective relationship

can developed more readily if providers take the time to answer parent and children's questions and concerns as well as providing information on requested topics (Mikhailovich & Morrison, 2007). Black (2005) states that the more knowledge healthcare providers have about their patients and families, the more fully they can provide individualized client care in creating strategies to successfully bring about desired change without causing negative feelings. Caregivers should be conscious of the possible negative feelings and should encourage parents and children to express their wishes regarding care. Nursing staff may assist in communicating with the parents of children who are considered overweight or obese and establish that positive engaging relationship.

Healthcare providers should keep in mind the suggestion by Chomitz, et al (2003) that focusing on health, not weight, may be key to avoiding harm to body image and eating behaviors. Another important factor for healthcare providers to avoid future harm is to promote self-esteem and a healthy lifestyle in youth (Neumark-Sztainer, 2005). Possibly the most important factor for providers to keep in mind is that changing behavior, not weight per se, is the main focus of health for the entire family (Neumark-Sztainer, 2005). All healthcare providers must also reinforce recommendations for children based on current professional practice.

This study was not able to fully explore whether the content of healthcare visits, specifically recommendations for follow-up, were consistent. Establishing more consistent follow-up visits may lead to improved health maintenance. Having no suggested follow-up diminishes the potential for healthcare visits, which could lead to developing weight related conditions (Blackburn & Waltman, 2005). Healthcare visits need to be standardized in content and follow-up in order to provide a consistent holistic approach to healthcare. The healthcare visits should follow the expert committee recommendations for assessment, intervention, and

follow-up or treatment as this is evidenced based information meant to be a guide for primary care teams to successfully develop obesity care strategies. If consistent strategies are implemented across healthcare, then children and families will be assured a more meaningful and successful outcome to obesity with improved health (Barlow, 2007).

Nurses in the advanced practice role, or advanced practice nurses (APN) may help to provide cost-effective, quality patient care for critically and chronically ill children. With advanced training in highly specialized areas, advanced practice nurses are able to care for patients with complex conditions who have under gone sensitive and highly technical procedures. A nurse practitioner provides direct care to a specific population of patients. These groups of people may be adults, seniors, children or neonates. Nurse practitioners diagnose and manage common acute and stable chronic health problem, including obesity. In addition to their traditional registered nursing skills, nurse practitioners can perform comprehensive physical examinations, order and interpret diagnostic tests, request specialty consultations, perform and prescribe therapeutic measures and furnish medications. A nurse practitioner may be involved with health promotion and disease prevention as well as patient and family education making them an effective provider for obese children and their families. Nurse practitioners are individually accountable for their practice, but they collaborate closely with physicians (Newhouse, et al., 2011).

The foundation of advanced practice nurse in this role incorporates the general role expectations of advanced nursing preparation, including case management, clinical pathway development, consultation and education, research, and collaboration, with the specific knowledge and skills of the pediatric nurse practitioner to function effectively with children in several healthcare areas (Teicher, Crawford, Williams, Nelson & Andrew, 2001). The APN

working with other healthcare providers would be able to establish a team based approach based on expert committee recommendations in order to provide standard care for overweight and obese children.

Furthermore, nurses may be able to interview parents and children who are overweight or obese to learn their level of understanding of how behaviors, such as overeating or sedentary patterns relate to health and possible long-term health outcomes. The APN is educated in a holistic based care model and possesses the ability to look at the numerous influences as revealed in the socio-ecological model to that impact the behaviors of children and family in relation to obesity. This information could prove to be useful when recommending prevention and intervention strategies as well as determining follow up for healthcare visit (Hopkins & Lin, 2004).

Recommendations for Future Research

Cross-sectional studies have been performed on obese children, yet there are limited longitudinal and experimental studies reported. Following the same healthcare participant (child) over time would allow the data to be more reflective on obesity frequencies. While following the same participant it would be important to know if the child was consistently seen by the same established healthcare provider on subsequent visits.

Studies are also needed focusing on relationships within the Socio Ecological model addressing how multiple environmental factors, intrapersonal, interpersonal, organizational, and community, could be incorporated into the development of appropriate interventions for overweight and obese children. Considerations of environmental factors could then be used to guide the development of prevention and intervention strategies for children.

This study could be expanded to examine child and parent internal and/or intrapersonal factors, such as attitudes, knowledge, and skills to identify the differences between these factors and their current behaviors in relation to physical activity and nutrition. Also, minimal studies have been conducted that researched the external factors associated with behaviors in children who are overweight or obese. Exploration of internal and external factors contributing to overweight and childhood obesity may offer valuable information for healthcare providers in an attempt to uncover further interventions for effectively managing childhood obesity as these were not able to be uncovered in the current study.

Parents are reportedly the main source of children's health care information and can play an important role in reinforcing positive influences and filtering out negative influences on their children in relation to attitudes and behaviors (Ackard, 2001; Neumark-Sztainer, 2005). In particular, mothers typically are the primary source of health-related information and have a strong influence on attitudes toward weight and behaviors related to nutrition and activity (Farhana, 2010). Therefore, future research focused on parents attitudes related to nutrition, activity, and overall health and their relationship to children's attitudes on these areas should be investigated.

Gathering further information about effective ways to improve well-child healthcare visits, including promoting healthy behaviors of nutrition and physical activity, could be valuable for health care providers. It would also be valuable to further explore additional factors, other than lack of insurance, for why children are not attending AAP recommended well-child visits. Currently, it is not clear based on the data available for this study, whether primary care providers consistently followed the AAP guidelines for well-child visits.

Primary health care providers participating in individualized family care are important for prevention, early detection, and intervention with regard to diseases and healthcare issues (AAP, 2003). Patients solicit and respect advice from their primary care clinicians, which can motivate patients to make healthy lifestyle changes (Blackburn & Waltman, 2005; Munson, 2007). There was a decline between the ages of 7 to 10 in healthcare visits attended until the children once again begin to attended regular healthcare visits at the age of 11 documented as sports physicals and documented immunizations. Since the largest increase in the rates of obesity are in the 6 – 11 year age range and research reveals that healthcare providers are important for prevention, early detection, and intervention of diseases to include obesity, then research needs to be conducted to find out why healthcare visits are not taking place at the ages of 7, 8, 9, and 10 years of age.

Recommendations for Policy

The findings from the current study are consistent with previous research which found that children had a higher number of healthcare visits during 4-6 years of age, 11-12 years of age , and 15years of age that are the ages when immunizations are recommended (AAP, 2001; Dempsey & Freed, 2009, 2004; Selden, 2006). The majority of healthcare visits were documented as well-child visits. The healthcare visits then declined between the ages of 6 to 10 until the children once again begin to attended regular healthcare visits documented as sports physicals at the age of 11 and had documented immunizations. Because of the methodology of this study, the frequency of healthcare visits by child age revealed that the majority of children in the 6-11 year old age range attended their first healthcare visit at the age of 6.

Policy mandates related to immunizations has had a positive impact, as it has led to successfully increasing the numbers of children in the U. S. who have been immunized. Policy could also be effectively utilized to assist in getting children to attend well child or healthcare

visits. Therefore, investigation into the potential for policy changes to encourage well-child visits could be one effective strategy for increasing the overall rates of well child visits. Research states that primary health care providers participating in individualized family care are important for prevention, early detection, and intervention with regard to diseases (AAP, 2003). Patients solicit and respect advice from their primary care clinicians; this advice can motivate patients to make healthy lifestyle changes (Blackburn & Waltman, 2005). The Nationwide Children's Hospital Center for Healthy Weight and Nutrition found that two-thirds of parents in a primary care practice felt the primary care providers' office was the best place to address weight concerns (Eneli, 2007).

Many initiatives at the federal, state, and local levels all support the need to routinely (at least annually) have physical examinations by a healthcare provider, yet there is a lack of direction, surveillance, and support for such initiatives.

Summary

Knowledge of the content of healthcare visits for both overweight and obese children is useful in providing appropriate healthcare recommendations. Specific traits have been identified that may consistently change (sedentary lifestyle and nutrition) as well as others that are relatively stable (genetics and environment). These traits may provide a foundation of information for appropriate healthcare recommendations to be addressed during the healthcare visit which may impact the health of children in relation to weight (Gable & Lutz, 2000; Golan, 2001; Gyovai, Gonzales, Ferran & Wolff, 2003; Saelens, Sallis, & Frank, 2003; Sallis & Glanz, 2006; Sallis, Prochaska, & Wendel, 2000).

Many authors suggested that there is a connection between obesity and unhealthy behaviors (Bunker, 2001; Domitrovich, 2004; Hogg, 2008; Lee, Kiyu, Milman, & Jimenez,

2007; Ryan, Riley, Kang, & Starfield, 2000 Rutter, 2006; Tolan, 2005) and that children with positive reinforcement through consistent visits with healthcare providers may improve health. Therefore it is important to ensure consistent recommended follow-ups of healthcare visits are provided (Donald, 2006; Fowler-Brown & Kahwati, 2004; Swallen, Reither, Haas & Meier, 2005; Williams, Wake, Hesketh, Maher, & Waters, 2005).

Conclusions

As our younger population continues to be heavier, childhood overweight and obesity can be expected to account for increasing rates of morbidity and mortality. According to the theoretical evidence (Adams, 2009; Berg, 2001; Burgeson, 2001)), individuals with appropriate interventions have a greater chance to attain a healthy lifestyle. It is important that healthcare providers learn about the lives of their patients and families in order to provide appropriate care and follow up for clients. Healthcare providers need to be proactive in actively engaging children and their parents in preventive and health promoting behaviors to prevent long term health deficits secondary to elevated weight.

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Appendix D

CURRICULUM VITAE

Nancee Croatt Wozney

Place of Birth: Sibley, Iowa

Education
Master of Science, Winona State University, May 2004
Major: Nursing Education

Bachelor of Science, Nursing, South Dakota State University, May 1997.
Major: Nursing

Dissertation Title: Childhood Obesity and the Relationship to Well-Child Visits

Academic/Teaching Experience
Dean/Director of Nursing**,** Minnesota State College- Southeast Technical, ADN & PN Nursing Programs, Winona, MN, 2008 - current
Assistant Professor, Winona State University – Winona, MN, Nursing Department, Winona, MN, 2006 – 2008
Instructor & Department Chair, Minnesota State College – Southeast Technical, Nursing Department, Winona, MN 2002 – 2006

Clinical Experience
Clinician
Staff Nurse, Rural Health Nursing, Franciscan Skemp Healthcare Center, Arcadia, Wisconsin, 08/2001 – 12/2004
Staff Nurse, Labor Delivery, ICU, MSP, Austin Medical Center, Austin, Minnesota , 05/1997 - 08/2001
Consultant
Franciscan Skemp Healthcare – Diabetes Protocol in Long-term care facility.

Academic Honors and Awards
Nominated for Professor of the Year, Winona State University, 2007.

Grants
Total grants exceed $100,000
NFCoP, $5,000
CIHSEP - $95,000
DOL - $50,000

Research Interests
Pediatrics
Obstetrics
Childhood Obesity
Clinical Education

Service-Professional
Sigma Theta Tau
Minnesota Nurses Association
Wisconsin Nurses Association
Midwest Nursing Research Association

Service - University
Member, Curriculum Development
Member, Faculty Development
Member, Sigma Theta Tau
Member, Nursing Scholarship Committee
Member, Nursing Research Interest Group