



5-2008

Comprehensive Weight Management in Overweight Adolescents

Mis M. Kozojed

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COMPREHENSIVE WEIGHT MANAGEMENT IN OVERWEIGHT ADOLESCENTS

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By

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Bachelor of Science in Nursing, North Dakota State University, 2004

An Independent Study
Submitted to the Graduate Faculty
Of the

University of North Dakota

In partial fulfillment of the requirements

For the degree of

Master's of Nursing
Family Nurse Practitioner

Grand Forks, North Dakota

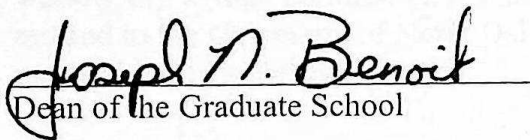
May
2008

This independent project, submitted by Mia M. Kozojed in partial fulfillment of the requirements for the Degree of Master of Nursing, Family Nurse Practitioner from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

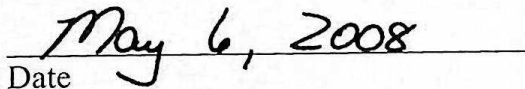


Chairperson

This independent project meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.



Dean of the Graduate School



Date

PERMISSION

Title Comprehensive Weight Management in Overweight Adolescents
Department Nursing
Degree Master of Nursing

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ABSTRACT

Obesity has become a world-wide health epidemic. Of specific concern are the rates of childhood obesity. Since 1980, in the United States, obesity rates have tripled with an estimated 17% of adolescents being considered overweight. Adolescent obesity is important to address because the probability of an overweight young person developing into an obese adult increases from approximately twenty percent at age four, to eighty percent by adolescence.

It has been found that individuals who are obese have a ten to fifty percent increased risk of death from all causes, compared with healthy weight individuals. This statistic is in part due to the preventable diseases directly related to obesity such as hypertension, hyperlipidemia, heart disease, diabetes mellitus (Type II), and certain cancers that adolescents are now experiencing when previously these were only adult conditions. Primary care providers need the tools and knowledge to provide safe and efficacious comprehensive weight management for this population to avoid the costly effects of obesity and its many devastating co-morbid conditions.

This independent study consisted of an extensive literature review with a poster presentation about adolescent weight management including the topics of behavioral therapy, pharmacological treatment, and bariatric surgical options. Family-based behavioral adolescent obesity treatment programs have been in use for over 25 years with both short- and long-term results supporting their efficacy. Pharmacologically,

Sibutramine and Orlistat, prescribed for obesity for 16 and 12 years respectively, are the only options approved for use in this population, both with unique adverse reactions and clinical study outcomes. Studies have shown bariatric surgery to be the most effective therapy for morbid obesity; however, little is known about the long-term effects in this population due to lack of clinical studies and time. Overall, all options should be carefully considered between patients, families, and their healthcare provider, while keeping in mind the health and uniqueness of the adolescent.

The results of this independent study were many. While completing an extensive literature review about adolescent obesity, I was able to educate myself in various areas of the topic. I was able to further advance my knowledge through my clinical experiences as a Family Nurse Practitioner Student (FNP-S) working with families and overweight youth. During my time as a student I have been also been able to discuss adolescent obesity issues with nurses, physicians, patients, and parents to gain their perspective and personal experiences of the complex topic. It has been my hope that by raising awareness of the multifaceted issues of adolescent obesity and by providing knowledge about the assessment and management of health issues related to obese youth, area health professionals will use evidence-based practices in their comprehensive care against obesity and related illness. Overall, the indirect ultimate recipient of this project has been area youth who may benefit from their health care providers having greater knowledge of adolescent obesity issues.

INTRODUCTION

Introduction

Obesity has become a world wide health epidemic. Among the developed nations the United States has recorded the highest prevalence of obesity. Of specific concern are the rates of childhood obesity. Since 1980, in the United States, obesity rates have tripled with an estimated 17% of adolescents being considered overweight (United States Department of Health and Human Services, 2007). Collectively, there are approximately twelve and a half million overweight children between the ages of two and nineteen in this country. Adolescent obesity is important to address because the probability of an overweight young person developing into an obese adult increases from approximately twenty percent at age four, to eighty percent by adolescence (Better School Food, 2008).

The US surgeon General once warned American that a failure to address obesity “could wipe out some of the gains we’ve made in areas such as heart disease, several forms of cancer, and other chronic health problems” (Fontaine, Redden, Wang, Westfall, & Allison, 2003, p187) To address this issue, Healthy People 2010 has included overweight and obesity as one of its leading health indicators. Their goal is to reduce childhood obesity rates to 11%, similar to the recorded rates of 1988-1994 National Health and Nutrition Examination Survey (NHANES) (United States Department of

Health and Human Services, 2007). Unfortunately, data estimates show that obesity rates are only increasing.

With the current trends of obesity and its associated serious health consequences, clinicians are unable to ignore this public health crisis. Current knowledge of assessment and treatment options for the management of obesity in this special population is crucial in our success as clinicians and for the health of our patients.

Statement of the Problem

Throughout time, healthcare technology has improved and many medical advances have been made; however, for the first time in over one-hundred years, children living today are expected to have a shorter life expectancy than their parents (PE4Life, 2004, pg3). It has been found that obese individuals have a 50 % to 100% increased risk of death from all causes, compared with healthy weight individuals, which may explain the decrease in life expectancy (Warman, 2005). Specifically, a twofold increased risk of mortality for obese youth has been detected as early as in the fourth decade of life (Inge, 2006). A large Norwegian cohort study found that adolescents with a high or very high Body Mass Index (BMI) had a higher mortality than those with a median BMI with a mean age at death of 46.2 years in men and 46.5 in women (Warman, 2005). These statistics are very concerning and indicate that obesity is a major healthcare issue that needs to be addressed and properly managed by healthcare providers to avoid early morbidity and mortality.

A second problem with adolescent obesity is the early morbidity directly associated with being overweight. Unfortunately, adolescents are now facing consequences from their weight that were once only encountered by adults. These consequences include

heart disease, obstructive sleep apnea (OSA), hypertension, pseudotumor cerebri, dyslipidemia, and type 2 diabetes mellitus, all which have significant and well-documented cardiac, renal, and ophthalmic complication for young adults (Inge et al., 2004). It has also been found that 60% of obese adolescents will have at least one additional cardiovascular risk factor; and more than 25% will have two additional risk factors (Harden, Cowan, Velasquez-Mieyer, & Patton, 2007). Additionally, a positive correlation between the duration of obesity and the risk for developing diabetes has been reported (American Society for Bariatric Surgery, 2001). Higher rates of depression have been recorded in obese youth with the severity equal to that of children with cancer whom are undergoing chemotherapy, a group of individuals with the lowest Health-related quality of life scores of all chronic disease patients (Schwimmer, Burwinkle, Varni, 2003). Other problems encountered in obese adolescents are orthopedic problems such as arthritis, nonalcoholic hepatic steatosis, cholelithiasis, and gastroesophageal reflux disease (GERD) (Inge, et al., 2004). Overall, these comorbid conditions are noteworthy because while obesity is a risk factor for early mortality, most mortality and morbidity is associated with co-morbid conditions gained from obesity itself (American Society for Bariatric Surgery, 2003).

Purpose of the Project

The purpose of this independent study was to in-depthly review current literature addressing adolescent comprehensive weight management. By thoroughly reviewing current assessment and treatment options in this special population, a greater understanding of effective obesity management for adolescents was reached. Overall, it is important that health professionals who work with this age group are aware of safe,

efficacious, and appropriate assessment and management techniques for adolescent obesity.

Conceptual/Theoretical Framework

In 1979, a psychologist by the name of James O. Prochaska published his concepts and ideas about the phenomenon of change as a theory, titled the Transtheoretical Model of Change (Cancer Prevention Research Center, 2004). This theory, serves as an interactive model used to describe how individuals make decisions and accomplish change over time. It also seeks to explain how emotions, cognition, and external variables affect intentional choices differently per individual. Prochaska divided his theory into five stages to further explain change as a constant process over time. The stages are:

- Precontemplation include those who are not intending to take action in the foreseeable future, usually measured as the next six months.
- Contemplation: Include individuals who are intending to change in the next six months. They are more aware of the pros of changing but are also acutely aware of the cons.
- Preparation stage is defined when people are intending to take action in the immediate future, usually measured as the next month. They have typically taken some significant action in the past year. These individuals have a plan of action, such as joining a health education class, consulting a counselor, talking to their physician, buying a self-help book or relying on a self-change approach.

- Action is the stage in which people have made specific overt modifications in their life-styles within the past six months. The Action stage is also the stage where vigilance against relapse is critical.
- Maintenance is the stage in which people are working to prevent relapse but they do not apply change processes as frequently as do people in action. They are less tempted to relapse and increasingly more confident that they can continue their change. (Cancer Prevention Research Center, 2004).

Individuals have their own unique experience with the model, encountered by regression, progression, or relapse at any time. There also is no defined amount of time for each stage; an individual may remain in any stage briefly or indefinitely.

Understanding Prochaska's Transtheoretical Model of Change is important when working with obesity management because it emphasizes continuous assessment during times of change. Assessment should first begin with a detailed history which is essential in understanding the uniqueness of each patient and their readiness to change. By understanding which level of change an individual is in for each lifestyle habit, tailoring a successful management program will be much easier. As an example, prescribing an intense weight management program to an individual in the precontemplation will exhaust the patient and provider, because they are not ready to make a change. However, an individual in the same stage will likely benefit more from the provider educating them about the negative consequences of their weight and the importance of a healthy lifestyle to possibly move them into the next stage. Overall, adolescent obesity treatment and management should be tailored by an assessment of the patient's readiness and ability to

change target behaviors, based upon the transtheoretical model of behavior change for optimal outcomes.

Definitions

For purposes of independent study, the following terms are defined:

Bariatric: relating to obesity

Body Mass Index (BMI): A mathematical formula used to evaluate patient's weight in relation to height. This number is calculated by dividing an individual's weight in kilograms divided by their height in meters squared.

Childhood obesity: Based on current recommendations of expert committees, children with BMI values at or above the 95th percentile of the sex-specific BMI growth charts are categorized as overweight (Department of Health and Human Services, 2008).

Significance of the Project

As a Family Nurse Practitioner (FNP) my scope of practice includes working with adolescents and their families. With obesity rates cited at record highs, obese adolescent clientele are unavoidable. Evidence based practice is the basis for management of all chronic medical conditions such as obesity (Torpy, 2006). It is within the FNP scope to consider multiple options and function collaboratively with other health care professionals for the best patient outcomes. Having knowledge about practices used in obesity management will assist all providers to function collaboratively with their clients, families, and other health care professionals effectively. Overall, adolescent obesity treatment requires comprehensive knowledge for optimal management.

Assumptions/Limitations

Reviewing current literature related to pediatric obesity has been limited due to many factors. The first limitation is the complete lack of literature. Obesity statistics have been monitored and published by the United States Department of Health and Human Services; however, there is a lack of a governing body for treatment and management of the obesity epidemic. Many individuals and organizations have published information regarding the sensitive topic but there is a lack of a highly trusted professional organization to step forward and publish evidence based guidelines and information for providers to turn to. Another limitation is the lack of long-term studies with follow-up. This may be due to the only recent rise of obesity creating a lack of time to document long-term information. Another potential pitfall of the published literature regarding adolescent obesity is assumptions that have been made from adult outcomes due to the lack of adolescent subjects. An example of this is bariatric surgery. At this time the LAP-BAND is FDA approved for adults and in clinical trials for adolescents. It cannot be safely assumed that the results that adults experience will be the same for adolescents, as their biology may differ. Overall, there are many barriers and limitations of literature addressing the health epidemic of adolescent obesity.

Chapter Summary

Obesity rates are at their all time high, with childhood obesity rates climbing the quickest. Primary care providers, physicians, and nurse practitioners, are searching for the best treatment options to prescribe to morbidly obese adolescents. This independent study's purpose was to review current obesity assessment and management options in

order to become knowledgeable about practices supported by evidence in the adolescent population.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Due to the alarming rates of pediatric obesity, the United States is faced with a major public health crisis. In response to this current trend; healthcare professionals, researchers, patients and families alike are all searching for interventions with supported data of safety and efficacy. The obesity interventions reviewed in this project can be categorized under three groups: behavioral, pharmacological, and surgical. It is important to note that these options can be used individually or in combination of one another.

Assessment

Prior to treatment a thorough assessment of the adolescent must be completed. The criteria that defines an adolescent as obese has been established by the Center for Disease Control and Prevention (CDC). Assessing for obesity is done by determining a child's Body Mass Index (BMI), in which the child's height and weight is recorded and placed into a formula. After BMI is calculated for children and teens, the BMI number is plotted on the CDC BMI-for-age growth charts (specific for either girls or boys) to obtain a percentile ranking. The percentile indicates the relative position of the child's BMI number among children of the same sex and age. The growth charts show the weight status categories used with children and teens. Children in the 85-95% category are

considered at risk of overweight, and those adolescents greater than 95% being considered overweight (Center for Disease Control & Prevention, 2007). This technique is unique to children as it adjusts for age and sex. It has been recommended by the CDC and the American Academy of Pediatrics (AAP) that at every visit all children over the age of two be assessed for growth and plotted on the CDC's BMI-for-age growth charts (Center for Disease Control & Prevention, 2007).

Complications of Adolescent Obesity

Unfortunately, adolescents are now facing health consequences from obesity that were once only encountered by adults. Type II diabetes, once termed "adult diabetes" has hit America's youth with statistics showing that one in three children born after 2000 will become diabetic (PE4LIFE, 2004). Additionally, a positive correlation between the duration of obesity and the risk for developing diabetes has been reported (American Society for Bariatric Surgery, 2001). In terms of cardiovascular, it has been found that 60% of obese adolescents will have at least one additional cardiovascular risk factor; and more than 25% will have two additional risk factors due to obesity (Harden, Cowan, Velasquez-Mieyer, & Patton, 2007). Additional comorbid conditions associated with obesity that adolescents are now experiencing are obstructive sleep apnea (OSA), hypertension, dyslipidemia, arthritis, gastroesophageal reflux disease (GERD), nonalcoholic hepatic steatosis and pseudotumor cerebri (Inge et al., 2004). The severity of depression in overweight adolescents has also been reported as a health problem. A study has been completed comparing Health Related Quality of Life (QOL) scores of various groups of adolescents. Schwimmer, Burwinke, et Varni (2003) recorded in their study that severely obese children and adolescents have lower health-related QOL than

children and adolescents who are healthy and similar QOL as those diagnosed as having cancer and undergoing chemotherapy (p.1813). Obesity in adolescents has recorded many health concerning comorbid conditions that are threatening the quality of life of these young individuals. Health care providers need to be aware of the presence and affects that these comorbid conditions are having on adolescents. This can be done with the proper assessment and management of obesity.

Treatment/Management of Adolescent Obesity

Behavioral Therapy

Behavioral counseling is an intervention that is currently being used for obesity treatment. It is a form of psychotherapy that uses basic learning techniques to modify maladaptive behavior patterns by substituting new responses to given stimuli for undesirable ones (Answers Corporation, 2008). This type of therapy is very labor intensive and requires participation of the entire family, not just the overweight adolescent. This requirement is based on the assumption that the family provides the main social learning environment for children, through modeling, feedback, and instruction on appropriate eating and physical activity habits (Plourde, 2006). Overall, behavioral treatments typically involve:

- (1) Identification of behaviors to be modified such as physical activity,
- (2) Goal specificity, example: increase physical activity to 60 minutes on most days of the week,
- (3) Use of behavioral and cognitive strategies such as contingent reinforcement, stimulus control, and

- (4) Systematic evaluation of and feedback about progress, example: self-monitoring of physical activity (Saelens & Daniels, 2003, p.4).

While this therapy has been utilized alone, due to the complexity of obesity, it has been prescribed in combination with pharmacologic and surgical treatment of obesity in all age groups.

Family-based behavioral pediatric obesity treatment programs were developed over 25 years ago, with both short- and long-term results supporting their efficacy (Epstein, Pauluch, Roemmich, & Beecher, 2007). Since 1978, Epstein et al. (2007) have published eight studies that included 437 overweight children and their families.

Throughout all eight separate studies over the years, many variables were kept constant:

- a parent was treated along with a child,
- All families had a weigh-in and individual meeting with a therapist, followed by separate parent and child groups. The number of sessions was also kept similar and ranged from 14 to 20 and,
- All study participants were provided treatment manuals that included information on dietary changes, a physical activity program, and information on parenting (Epstein et al., 2007).

Long-term efficacy of behavioral therapy was proven with a ten year outcome study led by the same group of researchers in 1994 and completed in two US locations; Pittsburgh, Pennsylvania and Buffalo, New York. At the time of their follow-up they were able to retrieve data from 85% of their original participants (158 of 185) from four separate studies. It was found that 30% of study participants were no longer obese, when at the study's beginning all were 20-100% overweight (Epstein, Valoski, Wing, &

McCuley, 1994). Also, 34% of participants had decreased their percentage of overweight by 20% (Epstein et al., 1994). Behavioral therapy can be a big commitment with session numbers varying from 14-20 sessions such as in these particular studies, but its safety is well established with lack of serious or adverse reactions.

Following the completion of four more studies, Epstein performed a meta-analysis in 2007 of eight behavioral pediatric obesity treatment programs he had completed with colleges since 1978. Collectively the eight studies showed reductions of 1.46 and 1.08 BMI units at 6 and 12 months respectively for children less than or equal to the age of 10.33 (Epstein et al., 2007). In children older than 10.33 years mean BMI units decreased 1.14 and .86 at both 6 and 12 month intervals (Epstien et al., 2007).

Summarizing, behavioral therapy in all eight studies was shown to be effective in short-term adolescent weight loss without any adverse affects or complications. Also, although the prevalence and severity of obesity has increased over the years, behavioral therapy as an obesity treatment has produced similar positive results now as it did over two decades ago (Epstein et al., 2007).

Pharmacological options

Due to the alarming rates of pediatric obesity today, primary care providers, pediatricians, and pharmaceutical companies are searching for pharmacologic options for use in pediatric practice. Obesity medications are a rapidly developing class of pharmacotherapy and currently there are many therapies in clinical development such as: centrally acting appetite suppressants, agents that affect the leptin/insulin/central nervous system pathway, gastrointestinal-neural pathway agents, those that increase the metabolic rate, among many others (Molnár, 2005). Although there are many medications currently

being studied for label against obesity, at present there are only a few options labeled and approved by the Federal Drug Administration (FDA) for use in this special population.

In 2003 Orlistat was approved by the FDA for use in children over the age of 12. Orlistat works by inhibiting gastric and pancreatic carboxylester lipases, which decreases the hydrolysis of ingested triglycerides (Molnár, 2005, pg 63). Overall it prevents approximately 30% of dietary fat from being absorbed (Roche Pharmaceuticals, 2007). A recommendation for Orlistat is that it be prescribed three times daily with meals at a dose of 120mg. As Orlistat is absorbed only in the gastrointestinal tract its side effects are localized to that area. The medication prevents the absorption of dietary fats which may cause steatorrhea, increased flatulence, loose and frequent stools, and possibly fecal incontinence (Roche Pharmaceuticals, 2007). It is recommended to follow a low-fat diet when using his medication by limiting fat consumption to 15 grams per meal, which will decrease adverse reactions and further promote weight loss (Roche Pharmaceuticals, 2007). Also, because Orlistat may also interfere with the absorption of fat-soluble vitamins (A, D, E, and K), it is recommended that a daily multivitamin supplement be taken either 2 hours before or after Orlistat is taken (Kirk, Scott, & Daniels, 2005).

Orlistat was approved by the FDA in 2003 following a 54 week (August 2000 through October 2002) randomized, controlled, double-blind study of 539 obese adolescents (aged 12-16 years; body mass index 2 units above the 95th percentile) at 32 centers in the United States and Canada (Chanoine, Hampl, Jensen, Boldrin, & Hauptman, 2005). By the end of the study, mean BMI of participants treated with Orlistat had decreased from baseline by 0.55 and increased by 0.31 in the placebo group (Chanoine et al., 2005). Also, compared with 15.7% of the placebo group, 26.5% of

Orlistat treated participants had a 5% or higher decrease in BMI and 4.5% of the placebo group and 13.3% of the Orlistat group had a 10% or higher decrease in BMI (Chanoine et al.). In this one year trial, the adverse event profiles, except for gastrointestinal tract adverse events, were similar between the Orlistat and placebo groups (Chanoine et al.). Following this study the FDA granted Orlistat approval for use in overweight children above the age of 12. However, due to Orlistat's embarrassing and unattractive gastrointestinal adverse effects, although not medically serious, its wide-spread use and adherence has been limited.

Sibutramine is another FDA approved medication utilized for pediatric obesity in patients over the age of sixteen. The drug is in a different class of obesity medications, as Sibutramine works as an appetite suppressant by inhibiting the reuptake of serotonin and noradrenalin. It is dosed once daily, at 5, 10, or a maximum of 15 mg orally. It's most concerning adverse reaction is an increase of blood pressure and heart rate. Studies have shown that a 1-3mm raise in blood pressure, and 4-5 beats per minute increase in heart rate, with some patients experiencing a much higher increase, has been reported in clinical trials (Abbott Laboratories, 2006). Due to this potential side effect a full cardiovascular workup must be complete prior to prescribing the medication and monitoring and dose adjustment completed throughout therapy. The medication is contraindicated in those patients with a previous history of coronary disease, arrhythmias, and must be closely monitored in those patients with hypertension.

Abbott Laboratories, the maker of Sibutramine, has published data about their product's efficacy in the products insert. According to the product insert patients who lose at least four pounds in the first four weeks of therapy with a given dose of

Sibutramine are most likely to achieve significant long-term weight loss on that dose of Sibutramine (Abbott Laboratories, 2006). Conversely, of those patients on a given dose of Sibutramine who did not lose at least four pounds in the first four weeks of therapy, approximately 80% did not go on to achieve a placebo subtracted weight loss of $\geq 5\%$ of their initial body weight on that dose by month six (Abbott Laboratories, 2006). This information is useful for future plans and treatment strategy during the one month follow-up appointment in determining patients' response to medication, for future plans and treatment strategy to be made.

Between the time frame of March 1999 and August 2002, The Weight and Eating Disorder Unit in Philadelphia completed a randomized, double blind, placebo controlled study using behavior therapy and placebo as their control while testing the efficacy of Sibutramine and behavior therapy (Berkowitz, Wadden, Tershakovec, Cronquist, 2003). Included in the study were boys and postmenarcheal girls between the ages of 13-17 with a BMI of 32-44. All participants received the same family based behavioral weight loss program, encouraging a diet of 1200-1500 calories and 120 minutes of exercise per week. Following six months the group also being treated with Sibutramine lost a mean of 7.8 kg with a mean reduction of BMI of 8.5% (Berkowitz et al., 2003). In contrast, the control group who was treated with behavioral therapy and placebo lost only an average of 3.2 kg, or average BMI reduction of 4% (Berkowitz et al.). Using a cross-over design after six months, the control group also began use of Sibutramine. At the end of six months, twelve total, this group now treated with Sibutramine lost 1.3kg on average (Berkowitz et al.). The group who had been medicated the entire 12 months gained on average 0.8kg during months 7-12 (Berkowitz et al.). At the conclusion of the study, 12 months, the

group treated with 12 months of Sibutramine the average weight loss was 7 kg equal to a decrease of 8.6% of initial BMI (Berkowitz et al.). In the group who was treated with behavioral therapy for 12 months and Sibutramine during months 7-12 the weight loss average was 4.5kg, a 6.4% reduction in BMI (Berkowitz et al., p.1808). Side effects reported during the study were an increase in blood pressure and heart rate, which was managed by dose adjustment. Overall, this study showed that addition of Sibutramine to behavioral therapy has the potential to increase weight loss above that of placebo.

Surgical options

Bariatric surgery is a broad term encasing multiple surgical procedures that can be used as a treatment option for morbid obesity. Surgery is an option only in select patients who meet very specific criteria. The National Guideline Clearinghouse (Inge, Krebs, et al., 2004, p. 219) published these guidelines of recommendations for adolescents who should be considered for bariatric surgery:

- Have failed ≥ 6 months of available, organized attempts at weight management, as determined with the assistance of their primary care provider
- Have attained or nearly attained physiologic maturity
- Be very severely obese ($\text{BMI} \geq 40 \text{ kg/m}^2$) with serious obesity-related comorbidities or have a BMI of $\geq 50 \text{ kg/m}^2$ with less severe comorbidities
- Demonstrate commitment to comprehensive medical and psychological evaluations both before and after surgery
- Agree to avoid pregnancy for at least 1 year postoperatively
- Be capable of and willing to adhere to nutritional guidelines postoperatively
- Provide informed assent to surgical treatment
- Demonstrate decisional capacity
- Have a supportive family environment

Following referral to an accredited bariatric surgical center, it is recommended that patients be vigorously screened for the appropriate surgical procedure. The type of bariatric surgical procedure chosen is a decision made between the patient and surgeon,

as there are no clear published criteria for each procedure. Some things considered are patient's BMI, the patient's ability and willingness to follow-up as recommended and the surgeon's skill for a certain procedure (Korenkov, Sauerland, & Junginger, 2005).

There are two more common procedures being utilized in adolescents worldwide. Gastric bypass, or the Roux en-Y procedure, is the most commonly performed bariatric surgery in the United States accounting for approximately 90% of all surgical cases (Adams et al., 2007). The Roux en-Y procedure is termed a restrictive-malabsorptive procedure which means it restricts stomach size and also bypasses a portion of the small intestine which in turn causes weight loss. Gastric bypass can be performed laparoscopically or open and has been referred to as the "gold standard" for effectiveness with which all other bariatric procedures are compared (Inge, Zeller, Lawson, & Daniels, 2005). Excess weight loss after two years is reported at 80% with 60-70% of patients maintaining their weight loss for 10 years (United States Department of Health and Human Services, 2004).

The newest surgical option, used worldwide, is laparoscopic adjustable gastric banding (AGB). AGB is purely a restrictive surgical option. A prosthetic band with an adjustable inner band is placed around the proximal stomach, thus forming a small gastric pouch. This band is connected to a subcutaneous port which can be accessed at any time to be filled or removed of saline. This procedure is less invasive than the other procedures and is reversible. An additional benefit of AGB is that it requires follow-up for band adjustment, which may enhance patient compliance and increase weight loss results (Inge, Zeller, Lawson, & Daniels, 2005). At this time, this procedure is only

approved by the FDA for adults, and is in clinical trials for adolescents in the United States.

Bariatric surgery is not a new treatment, having been utilized in obese adults since the 1970s, it is however; a newer and less utilized option for adolescents. Due to the lack of adolescent subject, little is known about their unique response to a very major intervention. It has been questioned and hypothesized that adolescents may receive similar results from bariatric surgery that adults have encountered. Exploring this hypothesis, a recent study was completed using the University HealthSystem Consortium database, including 309 morbidly obese adolescents and 55,192 adults. Data regarding safety and surgical outcomes between both groups was reviewed from January 1, 2002 to December 31, 2006. Overall, the mean hospital stay and 30 day readmission rate was comparable between the two groups, but 14% of the adult group required intensive care unit stay compared to 7% of adolescents (Varela, Hinojosa, & Nguyen, 2007). Of significance was the adult thirty day morbidity rate at 9.8% compared to only 5.5% in the younger group (Varela et al, 2007). To note, morbidity rates were highest with the open gastric bypass procedure for both groups (adults 11.1, adolescents 7.6). Procedure wise, the laparoscopic gastric banding produced the lowest morbidity rates with none for adolescents and 2.5% in adults (Varela et al). Overall this short-term study produced safety information that showed bariatric surgery in adolescents is as safe as that in adults which is important due to the lack of adolescent data.

The Roux-en Y procedure, gastric bypass, is being studied in adolescents to determine its effectiveness against obesity in this population. In the longest follow-up study to date; Sugerman, H., Sugerman, E., DeMaria, Kellum, Kennedy, & Mowery, et

al. (2003) completed a systematic review from 33 adolescents between 1981-January 2002 who had undergone bariatric surgery. Preoperative BMI was 52 (range 38-91) correlating to weights between 100-303 kg (Sugerman et al., 2003). Follow-up was completed at 1,5,10 and 14 years. Mean BMI recorded at those times were 36, 33, 34, and 38 respectively; this equaled % excess weight loss of 58, 63, 56, and 33% (Sugerman, Sugerman, et al.). After fourteen years all but five patients had lost weight and kept it off. In this study population there were no operative deaths, early complications included one pulmonary embolism, one major wound infection, four minor wound infections, three stomal stenosis (endoscopically dilated), and four marginal ulcers (medically treated) (Sugerman, Sugerman, et al., 2003). Upon completion of this study, the authors concluded with recommendations that bariatric surgery can be performed safely in severely obese adolescents (Sugerman, Sugerman, et al.).

Another recent study published one year outcomes of thirty-nine Roux-en-Y gastric bypass patients from 3 pediatric surgical centers cooperatively participating in the Pediatric Bariatric Study Group between May 2001 and October 2003. (Lawson et al., 2006). The control group included twelve adolescent patients with a BMI of 40 or greater who participated for at least 1 year in a pediatric weight management program (Lawson et al., 2006). Preoperatively the surgical group had a mean BMI of 56.4 (Range 41.9-95.5) and the nonsurgical group of 47.2 (Range 41-62.1). After 1 year, the mean BMI in the surgical group decreased to 35.8 (Range 26.7-52) and in the nonsurgical group the mean BMI slightly decreased to 46 (Range 38.7-64.7). Surgically, 22 patients had no complications. Fifteen patients (39%) experienced complications of varying degrees: 9 patients had a minor complication with no long-term sequelae, 4 patients had

at least 1 moderate complication with sequelae for more than 7 days, and 2 patients had 1 severe complication with long-term consequences of more than 30 days duration (Lawson et al., pg 140). This study is helpful at comparing surgery to a nonsurgical treatment modality as a one year follow-up displayed a much greater weight loss in those patients receiving gastric bypass than the nonsurgical treatment, but also exhibited complications that nonsurgical treatment did not.

Laparoscopic adjustable gastric banding (LAP-BAND®) is a procedure that has been used against morbid obesity in adults worldwide, adolescents internationally, and is currently under review for FDA approval in the United States for adolescents. The results of the LAP-BAND have been encouraging as an intervention against obesity in all age groups. For instance, in Italy a retrospective study was completed on patients operated on between January 1996 to December 2003, which included 58 patients under the age of 19 (1.5% of all lap-band patients) (Angrisani et al., 2005, pg 878). The preoperative mean BMI was 46.1 with a mean % excess weight of 86.4 (Angrisani et al, 2005, pg878). Postoperatively six patients, 10.3%, had complications including three band intragastric migration, two patients had gastric pouch dilation, and one patient had band slippage (Angrisani et al.) These patients underwent reoperation for repositioning of the band, removal, and one patient underwent gastric bypass, all further surgical cases were termed uneventful (Angrisani et al.). Very importantly mortality in this adolescent population was absent. This study followed up on patients at 1,3,5, and 7 years mean BMI was recorded at those times to be 35.9, 37.8, 34.9, and 29.7 respectively (Angrisani). Mean percent of excess weight loss was also recorded using the same intervals and was 45.6, 39.7, 43.7, and 55.6 respectively (Angrisani). Overall, the Italian

experience using adjustable gastric banding for overweight adolescents has shown positive outcomes with only minimal complications that can be repaired without further consequences.

Due to the overwhelming amount of overweight adolescents, the United States is responding with FDA supported trials of the LAP-BAND® for this special population. Data from the first FDA trial is now published which highlights the first nine months of follow-up from ten overweight girls, aged 15-17 years with a mean preoperative BMI of 50, mean excess weight 171 pounds (Holterman et al., 2007, pg467). Postoperative LAP-BAND complications included dehydration in two patients, flipped port, and pouch dilation; all of which had no further sequel following repair (Holterman et al.). Postoperative follow-up was completed at 3, 6, and 9 months with all patients losing weight with a mean BMI recorded at 44.6, 42.6, and 42 respectively correlating to mean percent excess weight loss of 22, 30, and 30 (Holterman et al.). Also important is the effect the LAP-BAND had on comorbid conditions. Following surgery resolution of comorbid conditions occurred for all six hypertensive adolescents, four with insulin resistance, five dyslipidemia patients, and all patients with depression (Holterman et al.). This group although small, demonstrated a large display of comorbid conditions such as hypertension (n=6), insulin resistance (n=9), dyslipidemia (n=7), fatty liver (n=9), depression (n=8), and metabolic syndrome (n=9) (Holterman et al.).

Overall we as health professionals are searching for effective obesity treatment options due to the mortality rates associated with obesity and its many comorbid conditions. Bariatric surgery has been said to be reserved for the severely obese who meet the criteria listed earlier due to the invasiveness of treatment. The question raised

is: Does bariatric surgery improve patient outcomes long-term? There was a study completed in adults in 1999 that found mortality after 9 years of observations was 28% in patients who did not undergo bariatric surgery, compared with 9% in those who underwent surgery (Sjostrom, Lissner, Wedel, & Sjostrom, 1999). In another study, surgical weight loss was found to reduce the mortality risk by 8-fold over five years for those adult patients who underwent surgery compared with those who did not (Christou et al., 2004). It is these findings that indicate the potential benefits of bariatric surgical procedures; however, it is still unclear if these statistics can be applied to an adolescent population.

Listed above are a few of the surgical procedures for weight loss and their data. It is clear that while weight loss results will vary from patient to patient, collectively, many studies have shown positive results between bariatric surgery and weight loss. Weight loss alone is a very beneficial to health; however, as mentioned earlier how excess weight manifests and affects the body in the presence of comorbid conditions is a greater determinant of overall health and predictor of mortality. Due to this, there have also been many studies published highlighting the effects of surgery on these comorbid conditions associated with being overweight.

Diabetes

Studies of surgical weight reduction have shown positive results on diabetes in many studies (Inge et al, 2005; Papadia, Adami, Marinari, Camerini, & Scopinaro, 2007; Holterman et al., 2007). Adult studies have reported 75% resolution of diabetes across all bariatric surgeries, defined as the ability to discontinue all diabetes-related medications and maintain blood glucose levels within the normal range, with 85%

experiencing significant improvement in disease burden (Inge et al., 2005). Specifically in adolescents, Sugerman's study found that two of the 33 patients who were considered diabetic pre-surgery were no longer diabetic after bariatric surgery (Sugerman, Sugerman et al., 2003). Similarly, in an Italian study of 70 adolescents who underwent biliopancreatic diversion between 1976 and 2006, all (n=2) patients who underwent surgery found resolution of their type II diabetes (Papadia, Adami, Marinari, Camerini, & Scopinaro, 2007). Also, the new FDA approved study utilizing the LAP-BAND in adolescents showed optimistic results after only a 9 month follow-up. In this particular study 9 of the 10 patients exhibited insulin resistance but within 3-6 months following surgery resolution of insulin resistance occurred in 4 patients and another 2 patients showed improvement (Holterman et al, 2007). These three studies using three different bariatric surgery techniques proved to be effective as a treatment for type II diabetes. Addressing the issue of when the best time to operate, another study found that the duration of diabetes significantly predicts poorer resolution after weight loss surgery (Inge et al., 2005). This information supports early surgical intervention to receive optimal diabetes results and possible resolution.

Obstructive Sleep Apnea

Obstructive sleep apnea is a condition commonly caused by obesity. Not only can obesity cause OSA but an increasing BMI can be linked with increasing severity of OSA (Haines, Nelson, Gonzalex, Torrella, Martin, Kandil, et al., 2006). In a study conducted at Cincinnati's Children's Hospital Medical Center between July 2001 and September 2004, 35 adolescents were evaluated for obstructive sleep apnea (OSA) prior and following bariatric surgery. Preoperatively, 25 patients had at least one hypopnea

episodes per hour of sleep with 19 (55%) having greater than five episodes per hour, the later indicating OSA. Following surgery with a mean decrease in BMI of 19 units over six months, ten patients were evaluated by polysomnography. It was found that all 10 subjects had a significant reduction in the severity of their OSA, and only one patient still met criteria for OSA and treatment. Also, baseline oxygen saturation increased from <90% at baseline to close to 92% after weight loss (Kalra, 2005). This particular study showed direct positive results from bariatric surgery on obstructive sleep apnea. Also, it is hoped that by reducing the severity of sleep apnea or eliminating it altogether the complications associated with OSA such as high blood pressure, cardiovascular disease, memory problems, impotency, and headaches will cease in this population as well.

Cardiovascular Risks

Hypertension and dyslipidemia are serious complications of obesity that have the potential to lead to further cardiovascular and microvascular disease. A recent study of fifty-five adults who had the Roux-en Y procedure showed positive improvements in their cardiovascular conditions following surgery (Huerta, Kohan, Siddiqui, Anthony & Livingston, 2007). Hypertension improved in 74% of patients and was eliminated in 15% of patients, resulting in a positive outcome for 89% of patients (Huerta et al., 2007). Also, dyslipidemia improved in 48% of patients and was eliminated in 32% of patients, resulting in a positive outcome for 80% of patients with this comorbid condition (Huerta et al, 2007). In another study, three months following surgery, 55% of adult patients were able to discontinue their hypertensive medication and 71% of patient's were able to discontinue dyslipidemia medication (Nguyen, Varela, Sabio, Naim, Stamos, & Wilson, 2006). In a third study at twelve months following surgery the discontinuation of

medication results included 81% of hypertension and 86% of dyslipidemia medication (Nguyen et al, 2006). This information is useful in determining risk/benefit ratio due to the fatal cardiovascular consequences often due to a patient's obesity; however, no one knows for sure if these adult statistics can be applied to an adolescent population.

Summary

Addressing adolescent obesity begins with proper assessment of all adolescents by obtaining their BMI and plotting it on the CDC's chart for age and sex. Once an adolescent has been identified as overweight or at risk for overweight, treatment and management strategies must be initiated. Obesity has been termed a chronic illness, with serious medical complications and detrimous health effects to those affected. Due to the alarming rates of overweight adolescents, and the impact it may have on their life, medical professionals and researchers are searching for effective management and treatment options for this delicate population. Currently, many interventions such as behavioral therapy, pharmacologic therapy, and bariatric surgery are being studied for safety and efficacy. All of these treatment options have published data and as a Family Practice medical provider, knowledge of the potential risks and benefits of these prescribed treatment options is vital for practice.

CHAPTER 3

METHODOLOGY OF THE INDEPENDENT STUDY

Introduction

It is known when entering graduate school that there is the academic requirement of completing an independent study. This to many, including myself is a task met with concern due to the known amount of hard work, time, and commitment required for the finished project. When met with this challenge I knew my professional and academic interest was bariatrics. Bariatrics is a large topic but through working with my advisor, Dr. Julie Anderson, we were able to determine the specific population of adolescents was an emerging health topic of great interest to me. In conjunction with my faculty advisor we collectively formatted a strategy to complete my independent study.

Procedures for Independent Study

Following the comprehensive review of the literature, an educational poster presentation was held in the Memorial Union Ballroom at the University of North Dakota Graduate School Forum on Monday, February 11 and Tuesday, February 12, 2008. My poster was available for viewing on Monday from 12 noon until 4 p.m., and again on Tuesday from 9 a.m. until 4 p.m. On Tuesday afternoon from 2-4p.m., I was in presence of my poster for questions, comments, and discussion. Included in my poster was a brief synopsis of my abstract, methods, nursing implications, and review of literature including pharmacological, behavioral therapy, and surgical treatment options for overweight

adolescents. Attendance was open to all University of North Dakota students and faculty interested and able to attend the Graduate Scholarly Forum.

Evaluation Plan for Independent Study

Creating a poster for display to address adolescent obesity I considered a huge task. I feel strongly that this is a major health issue for our youth and wanted to accurately display information for others to learn. I encountered difficulty in formatting my poster to properly highlight my independent project; there was so much information and only so much poster space. I was fortunate enough to receive input from my faculty advisor, Dr. Julie Anderson, and together my poster- Comprehensive Weight Management for Overweight Adolescents, was a great display. During the Scholarly Forum, I evaluated my poster again, this time next to my fellow classmates. Overall, I think it was a great visual display and provided valuable information of the topic. I was very pleased with my poster presentation.

Results of the Independent Study

The results of this independent study were many. While completing an extensive literature review about adolescent obesity, I was able to educate myself in various areas of the topic. I was able to further advance my knowledge through my clinical experiences as a Family Nurse Practitioner Student (FNP-S) working with families and overweight youth. During my time as a student I have been also been able to discuss adolescent obesity issues with nurses, physicians, patients, and parents to gain their perspective and personal experiences of the complex topic. It has been my hope that by raising awareness of the multifaceted issues of adolescent obesity and by providing knowledge about the assessment and management of health issues related to obese youth,

area health professionals will use evidence-based practices in their comprehensive care against obesity and related illness. Overall, the indirect ultimate recipient of this project has been area youth who may benefit from their health care providers having greater knowledge of adolescent obesity issues.

Summary

Comprehensive Weight Management for Overweight Adolescents began as only a topic to meet a graduate requirement but through my time spent working on my independent study it became a healthcare topic very important to me. In the nearly two years that I have spent working on my independent study, new information has emerged, further educating me about the current trends and treatments important for adolescents and healthcare professionals to be aware of. This independent study has not only been a project, but a process of growth and knowledge valuable to me as a healthcare provider. Evaluating the final results of the independent study have shown me that this is a topic gaining attention and concern not only in healthcare, but in the general public as well.

CHAPTER 4

EXPECTED IMPLICATION FOR NURSING: PRACTICE, RESEARCH, EDUCATION, AND POLICY

Introduction

Nursing is a very diverse role in which practice, research, education, and policy are all intertwined and have created a very dynamic professional. Using all of these domains of nursing I completed my poster, Comprehensive Management for Overweight Adolescents, and presented it at the Graduate Forum. Much of my time was spent completing a literature review regarding current research and policy and how it is affecting current obesity management in practice. Education was also a large portion of this project. Throughout my time spent working on this project I became more knowledgeable of the issue at hand. As my classmates and colleagues became aware of my project, I was able to share with them the emerging research, policy, and practice that encompasses adolescent obesity. I was also able to share the knowledge I have gained from my independent study with overweight adolescents and their families. Conclusively, practice, research, education, and policy all go hand in hand, creating the framework of a successful nursing profession.

My independent project fulfilled many of my inquires regarding adolescent obesity. Through practice I have encountered many obese adolescents, yet I did not have the tools to assist them with their struggle with obesity. Reviewing current literature of the topic was a very daunting task, as it has been only recently that the topic has been

brought to a head. Many of the works I read addressed adolescent obesity as a health epidemic that required intervention; however, many did not have an answer with how to intervene. It was challenging wading through all of the new information, and organizing my thoughts through the process. I attempted to sort through the information in sections of various treatment plans. The information I found was very beneficial, but very little of it had long term safety and efficacy reports, due to most studies only being completed now. Overall, I found great information supporting the use of behavioral therapy, pharmacological options, and surgical treatment for adolescent obesity. The challenge that now presents itself is the lack of resources for patients in this area. I have seen great data using bariatric surgery for severely overweight adolescents, but the closest program for patients in this area is in Minneapolis, over three hundred miles away. Behavioral therapy also has great results, but insurance coverage hasn't been substantial. Now that the research supports some of these interventions for adolescents, the resources will hopefully follow. I learned a great deal in completing this independent study. I have met specialists, read useful articles and studies, and have meet individuals in the struggle against adolescent obesity. It is my hope that I will be able to use the valuable tools I have learned through completing this independent study to assist patients and their families against the epidemic of adolescent obesity.

Practice

The first step in obesity treatment and management is addressing the issue. This can first be done by having all adolescents at every visit be measured for their height, weight, and BMI. This information should then be plotted on the Center for Disease and Control (CDC) growth charts. Regardless of chief complaint, providers should use every

opportunity to address the adolescents' current health status and weight. It must be thought that every encounter between a patient and provider is an opportunity to make positive strides against obesity and towards a healthier life. If health care providers address obesity with their adolescent patients at every visit, it will demonstrate the importance of obtaining and maintaining a healthy weight. Thus, health providers have the opportunity to facilitate conversation, provide education, and manage interventions to combat adolescent obesity.

Adolescent obesity is an issue that is becoming more and more prevalent in nursing practice. Not only is there an increasing number of obese adolescents but also an increase of the severity of obesity in these individuals. Presently, primary care providers are treating medically complex overweight adolescents within their setting without many additional resources. Healthcare facilities and their managers need to recognize the mismatch between patient care and needs, and begin to tailor services to meet the challenging needs of their customers, in this case, overweight adolescents. The establishment of Pediatric Weight Management/Treatment Centers staffed with providers highly trained in weight management and pediatrics would be an excellent resource for patients, their families, and healthcare providers. An obesity center could provide adequate specialists and resources to patients such as dietitians, psychologists, fitness trainers, and medical personal such as nurses, nurse practitioners, physician assistants, and physicians to manage and oversee each patient's journey. Specialty care centers could focus individually on the patient's obesity, comorbid conditions, treatment, and chronic management. The establishment of specialty care centers for adolescent obesity

would facilitate long-term management, promoting healthy weight and lifestyle through the lifetime.

Although a specialty care center may be a wonderful intervention for overweight adolescents, careful consideration of each patient is warranted. It would be advised to use The Transtheoretical model of Change to screen patients for the appropriate treatment and intervention. If an adolescent were in the preparation, action, or maintenance phase it would be suitable to have them very active in an obesity intervention/treatment regime. However, if an adolescent were in the precontemplation or contemplation state, education possibly in the form of multiple clinic visits with their provider would be deemed more appropriate. An important note about a patient's readiness to change is the fluid movements they may make between stages, thus prompting providers to assess and reassess continually. Adolescent obesity management practice should be tailored to the special needs of each individual.

Research

In medical and nursing practice safety is the number one concern when making decisions. This is done by looking at the current data, applying it to the present situation and making a risk-benefit comparison. At this time, the health risks of obesity are well known. However, there is a limited amount of data addressing current obesity treatment modalities for adolescents which makes risk analysis difficult. What needs to be determined is at what point do the risks of obesity (morbidity, and mortality) overcome the risks of the treatment? Obesity and obesity treatment have raised many medical and ethical questions that still need answers for nursing practice. At this time, more studies need to be completed looking at the long-term effects of all modalities for obesity

treatment in adolescents with special attention for safety and efficacy before a concrete position can be made.

Current trends have shown bariatric surgery as an option for morbid obesity with current data displaying promising short-term data. Unfortunately, due to the lack of adolescent bariatric subjects little is known about the long-term safety and efficacy of surgery in this young population. Many assumptions have been made using data from the adult population, as the first adolescents who have undergone bariatric surgery are now only reaching their mid forties. To address this issue, The National Institute of Diabetes, Digestive, and Kidney Disorders formed The Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) consortium in 2006, which is made up of four clinical centers and a data coordinating center (Cincinnati Children's Hospital, 2007). This consortium is comprised of a group of surgeons, physicians, and scientists. Their goal is to facilitate coordinated clinical, epidemiological and behavioral research in the field of adolescent bariatric surgery, through the cooperative development of common clinical protocols and a bariatric surgery database that will collect information from participating clinical centers performing bariatric surgery on teenagers (Cincinnati Children's Hospital Medical Center, 2007). This group has designed a prospective observational cohort study of 200 adolescent bariatric patients who will be undergoing surgery between 2007 and 2009 in four academic medical centers (Inge, Zeller, Harmon, Helmrath, Bean, Modi, & et al., 2007). It is hoped that this analysis will display accurate information about the risks and benefits of bariatric surgery in adolescents which will assist patients and providers alike in determining appropriate measures for each individual.

Education

Through and during adolescence a great amount of time is spent in school. Physical education class requirements vary within schools from state to state with many schools not requiring or offering any physical education throughout elementary and/or high school. Over the years participation has steadily decreased with daily participation in high school physical education class 42% in 1991 and by 2005 had dropped to 33% (Healthy Youth, 2006). Also in 2005 it was recorded that more than one third of students in grades 9-12 did not regularly engage in vigorous-intensity physical activity, and 10% of not participating in any moderate or vigorous physical activity (Health Youth, 2006). Due to these alarming statistics of inactivity in our youth, daily health and physical education classes need to be a standard and mandatory part of curriculum. For many adolescents, school is the only opportunity they have to obtain any type of physical activity. If physical education classes are withheld from curriculum, a great disservice is being committed against our youth's health. Health and physical education classes are not the sole answer to fighting adolescent obesity, yet it is a very important piece of the complex puzzle.

Policy

Many chronic disease models have published guidelines to assist in their diagnosis, treatment, and management. For example, when managing hypertension clinicians follow the recommendations published by The Joint National Committee (JNC) in regards to prevention, detection, evaluation, and treatment of high blood pressure (U.S. Department of Health and Human Services, 2003). As another example, when managing cholesterol in patients, clinicians may utilize the Framingham scale to assess and

determine proper treatment for their patients (National Heart, Lung, and Blood Institute, 2007). Under current guidelines children whose BMI fall above the 95% for age-adjusted weight for height are considered overweight, but the guidelines stop there. Once this clinical diagnosis is made it is unknown clinically what the next step should be. It would be recommended using the Transtheoretical Model for Change that the patient's readiness for change be assessed, and then the management plan tailored. At this time, there is not an obesity management/treatment guide published by a governing body of expertise for providers to utilize when addressing obesity despite its high prevalence and high morbidity and mortality. Due to the lack of resources and guidance obesity in adolescents is inconsistently addressed and managed. Providers may not know how to manage an overweight teen, and instead of addressing the issue it may be avoided. For obesity to be consistently addressed and managed; clear, concise, published guidelines, such as algorithms, need to be published with outcomes evaluated for efficacy. By doing this obesity will be addressed consistently at all teen visits, optimizing care. Overall, protocols or algorithms would be beneficial to help guide obesity management in adolescent patients.

Summary

As stated earlier, "Children today have a shorter life expectancy than their parents for the first time in 100 years." (PE4Life, 2004, p.3). This statistic alone is frightening, and further fuels the need for our health system to assist our youth and their families in making healthy lifestyle changes. These changes are imperative in helping our youth lead a healthy lifestyle, detouring them from becoming obese, and possibly suffering obesity associated morbidity and early mortality. Through completing my extensive literature

review, it was apparent that the nursing profession is rising to the health epidemic that adolescent obesity has become. Emerging research has initiated new procedures in practice, and although specific policies have not been written in terms of management, it is an issue that is currently being addressed. In conclusion, the healthcare profession including myself can and is playing a strong role in the comprehensive management of adolescent obesity.

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LRC10948