

Prevalence of Obesity and Hypertension in the Elementary, Middle and High School Aged Population¹

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Abstract

Childhood and adolescent obesity and overweight have reached an epidemic proportion in the United States. It has been reported that the most important risk of high blood pressure in children is obesity. If a child suffers from high blood pressure his or her risk of being obese is also high. The findings of this study did not corroborate those of the review of the literature which states that being overweight is almost always a predictor of hypertension. In this study more children were overweight than they were hypertensive. The figures for obesity are in line with those reported by the literature.

Introduction

Problem/Purpose

According to the U.S. Department of Education, there are approximately 48 million school-aged children and adolescents in the United States (U.S. Department of Education, 2003 cited in Rector, 2005). Of these, the American Diabetes Association predicts 1.7 per 1000 of those younger than 20 will develop diabetes. Diabetes in this age group is solely attributed to obesity, sedentary lifestyle, and the predisposition of certain ethnic groups (American Diabetes Association, 2000 cited in Rector, 2005). Further, it has been reported that the most important risk of high blood pressure in children is obesity. If a child suffers from high blood pressure his or her risk of being obese is also high (American Women's Clubs Overseas, Inc., 2004). In the past, providers have monitored blood pressure in young children primarily after an illness episode. Hypertension was considered a symptom of or a reaction to an illness rather than a possible cause. Because hypertension in childhood has been considered a risk factor for hypertension in early adulthood providers are now being urged to monitor blood pressure as part of the routine pediatric visits before illness occurs (The Federation of American Women's Clubs Overseas Inc, 2004). Essential hypertension or blood pressure for which there is no pathological cause is a disease of aging. However this type is now being identified in children and adolescents (U.S. Department of Health and Human Services, 2005). The purpose of this study is to explore the prevalence of obesity and hypertension in the elementary, middle and high school aged population. For purposes of this study the terms obesity and overweight will be used interchangeably.

Review of the Literature

Childhood and adolescent obesity and overweight have reached an epidemic proportion in the United States. According to Cochran, 2005 it is estimated that 30 percent of the population is affected with this problem making it the most common chronic disease of this age group. Being overweight is not only a matter of cosmetics but it has become a health issue that can be associated with significant problems in child and adulthood. Generally, there is a high likelihood that an overweight child will become an obese adult.

There is controversy over the definitions related to obesity. For adults more than 18 years of age, the definitions are based on body mass index or BMI (Cochran, 2005) “BMI is the ratio of weight in kilograms to the square of height in meters” (American Academy of Pediatrics, 2003 p 424). In children, there are no absolute numbers of BMI defining normal and overweight instead, the BMI must be plotted on a BMI growth curve and the percentile for the child determined. BMI growth curves exist for males and females. The growth charts consist of a series of percentile curves that illustrate the distribution of selected body measurements in U.S. children (Centers for Disease Control, 2000).

Pediatric growth charts have been used by pediatricians, nurses, and parents to track the growth of infants, children, and adolescents in the United States since 1977. The 1977 growth charts were developed by the National Center for Health Statistics (NCHS) as a clinical tool for health professionals to determine if the growth of a child is adequate. The 1977 charts were also adopted by the World Health Organization for international use (Centers for Disease Control, 2000).

The exact definition of obesity does not matter as much as knowing what the BMI percentile of the child is and if it is normal or abnormal, increasing or decreasing. Normal weight is a measurement which falls between the fifth and ninety-fifth percentiles. A child with a “weight for length” that plots greater than 95 percent is considered overweight (Cochran, 2005).

Adverse effects of childhood overweight include psychosocial, insulin resistance, problems with the cardiovascular system, joints, menstruation, gallbladder, sleep apnea, diabetes type 2, hypertension, early onset puberty, polycystic ovary syndrome, fatty liver disease, eating disorders, stroke, headaches and possibly increased cancer risk (Cochran 2005, Committee on Nutrition, 2002, Obesity in America).

“The rate of diagnosis of hypertension in children and adolescents appears to be increasing” (Sorof, 2004 cited in Luma, 2006 p 1). This in part is attributed to the prevalence of childhood obesity as well as the growing awareness (Luma, 2006). About five of every 100 children have higher than normal blood pressure (American Academy of Pediatrics, 2003) Body size is an essential determinant of blood pressure in children. As such, it is necessary to include the child’s height percentile to determine if blood pressure is normal (Luma, 2006).

The definition of hypertension in children and adolescents is based on the normative distribution of blood pressure in healthy children. Normal blood pressure is defined as systolic and diastolic blood pressure that is less than the 90th percentile for sex, age, and height on at least three separate occasions. Hypertension is defined as blood pressure greater than the 99th percentile plus 5mmHg (United States Department of Health and Human Services, 2005). For purposes of this study hypertension is defined as that which is $\geq 95^{\text{th}}$ percentile.

“Children and adolescents with severe elevation of blood pressure are at increased risk of adverse outcomes including hypertensive encephalopathy, seizures, cardiovascular accidents and congestive heart failure” (United States Department of Health and Human Services, 2005 p 22).

Research Question

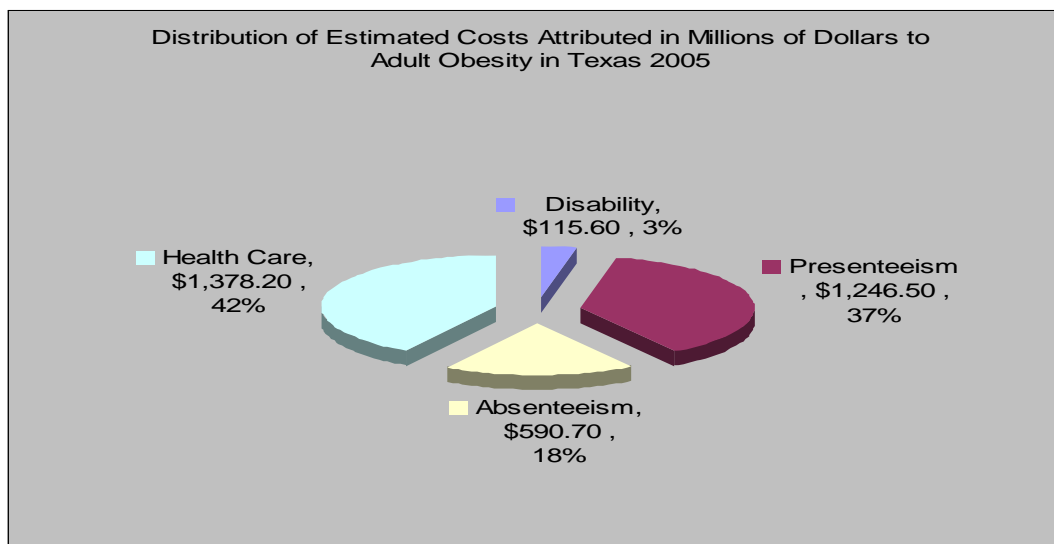
The research question for this study was: What is the incidence of obesity and hypertension in the elementary, middle, and high school aged population?

Significance to the Laredo Community

“In 2005, more than half (53.3 percent) of Texans aged 18 to 29 were overweight or obese. Those aged 30 to 44 were much more likely to be overweight or obese, with a prevalence of 67.3 percent. Those 45 to 64 were heavier; 71.3 percent were overweight or obese. Seventy-one percent of Hispanics are overweight” (Texas Comptroller of Public Accounts, 2007, p 1).

Being overweight or obese, as has previously been discussed, contributes to the earlier onset of chronic disease processes such as hypertension, stroke, osteoarthritis, gallbladder disease, asthma, sleep apnea and certain cancers. “These diseases cost employers – directly in higher health care costs and indirectly through lost productivity when workers are out sick, disabled or simply not functioning up to standard” (Texas Comptroller of Public Accounts, 2007, p 1).

“The Comptroller estimates that costs to Texas businesses due to adult obesity and obesity-related illnesses totaled more than \$3.3 billion in 2005, and these costs are growing. Health care expenditures and decreased productivity at work (called “presenteeism”) accounted for most of these costs” (Texas Comptroller of Public Accounts, 2007, p 1). The pie graph below shows the distribution of expenditures in millions of dollars which have been attributed to problems related to obesity. These numbers are expected to increase as those who are in the school system now who are obese enter the workforce. The Texas Comptroller of Public Accounts estimates that if the trend continues the cost to businesses in the state will be \$15.8 billion annually. At present, Texas ranks tenth among the states’ share of overweight and obese population and the estimated cost nationally attributed to overweight and obesity is \$123 billion (Texas Comptroller of Public Accounts, 2007 and Leade Health).



Source: Counting Cost and Calories Executive Summary The Cost of Obesity: Squeezing Texas Employers Texas Comptroller of Public Accounts and Centers for Disease Control and Prevention

Research Methodology

The research design was exploratory. Permission for data collection was obtained from the Texas A&M International University IRB. The data was extracted from that compiled by the school district’s campus Registered Nurses as part of the district’s participation in the ANTES (Acanthosis Nigricans: The Education and Screening) Project of the University of Texas System-Mexico Border Health Coordination Office. The sampling technique was one of convenience. The data was grouped and organized using descriptive statistics.

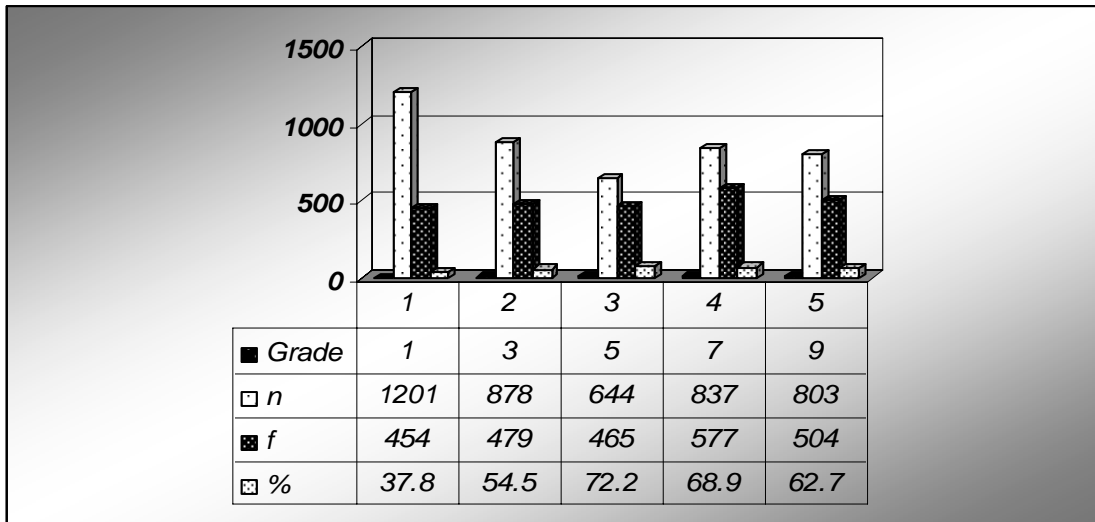
Data Analysis

Aggregate data is presented as follows, total population for the grade level, number or frequency of students who met inclusion criteria and the corresponding percentage from the total population for the respective grade level.

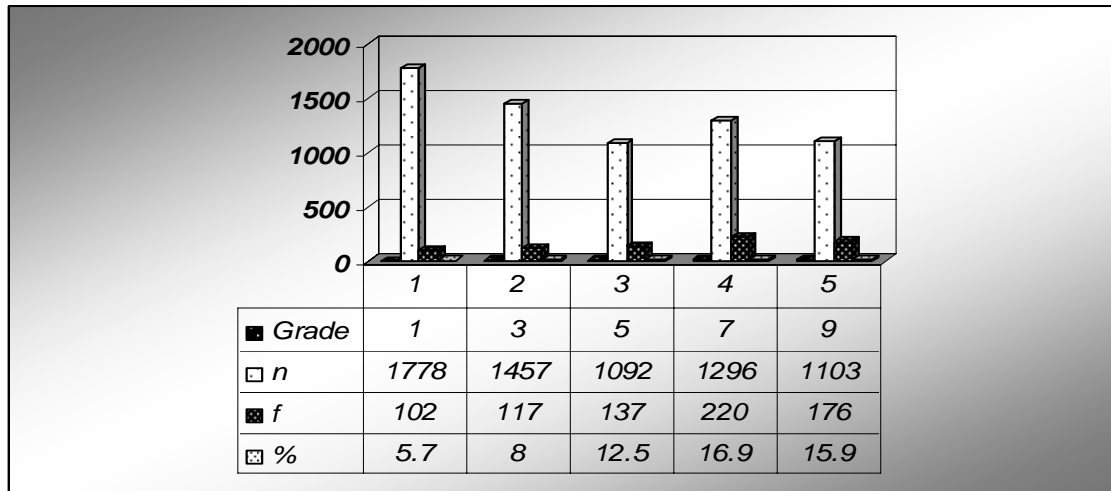
Findings

Graphs one and two below present the findings as pertain those students who met with the definitions of being overweight and hypertensive. The total number of students screened for each grade is represented as a value of *n* followed by the frequency or *f* of students who met the inclusion criteria and the corresponding percentage from the total student population for the corresponding grade.

Graph 1 Overweight



Graph 2 Hypertensive



Conclusion

The findings of this study did not corroborate those of the review of the literature which states that being overweight is almost always a predictor of hypertension. In this study more children were overweight than they were hypertensive. A possible explanation may be that the researcher was interested in the number of those students who met the hypertension definition and not those who had “an elevated” blood pressure reading or plotted below the 95th but higher than the 90th percentile.

Nonetheless, the figures for obesity are in line with those reported by the literature. The highest percentage, 72.2, of overweight children occurred in the fifth grade level followed by the seventh and ninth grades. Further investigation of this is recommended as well as correlation of lab values such as blood glucose with those students who are overweight. Of value may be a longitudinal study of the same population to determine if indeed overweight children become obese adults and diabetic as the literature purports.

References

- American Academy of Pediatrics. (2003). Prevention of Pediatric Overweight and Obesity. Pediatrics vol 122 (2).
- Centers for Disease Control and Prevention. (2000). CDC Growth Charts: United States. Retrieved July 3, 2007 from <http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/background.htm>.
- Cochran, W. (2005). Understanding the Childhood Obesity Epidemic. Obesity Action Coalition
- Committee on Nutrition, (2002). Prevention of Pediatric Overweight and Obesity. American Academy of Pediatrics Publications.org 112(2).
- Leade Health, (). The Business Case for Weight/Obesity Management Using Health Coaching Interventions. Retrieved from <http://www.leadehealth.com>.
- Luma, GB and Spiotta, RT. (2006). Hypertension in Children and Adolescents. American Family Physician vol 73 (9).
- Obesity in America. Org. (). Childhood Obesity. Retrieved May 29, 2007 from <http://www.obesityinamerica.org/childhoodoverweight.html>.
- Rector, S. (2005). School-Aged Children and Adolescents. In Allender, J.A. and Spradley, B.W. (Ed.). Community Health Nursing 6th Edition. Philadelphia: Lippincott, Williams, & Wilkins.
- Texas Comptroller of Public Accounts. (2007). Counting Cost and Calories Measuring the Cost of Obesity to the Texas Employers. Retrieved July 7, 2007 from <http://www.window.state.tx.us/specialrpt/obesitycost/summary/>.
- The Federation of American Women's Clubs Overseas, Inc. Global Concerns Committees. Hypertension in Children and Adolescents. Retrieved May 1, 2007, from http://www.fawco.org/global_concerns/health_issues/hypertension_children_2004.html
- U.S Department of Health and Human Services. (2005). The Fourth Report on the Diagnosis and Treatment of High Blood Pressure in Children and Adolescents.

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