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UNDERSTANDING THE ROLE OF SCHOOLS IN COMMUNITY PREVENTION OF
CHILDHOOD OBESITY

by

Kaitlyn Braun

A Senior Honors Project Presented to the

Honors College

East Carolina University

In Partial Fulfillment of the

Requirements for

Graduation with Honors

by

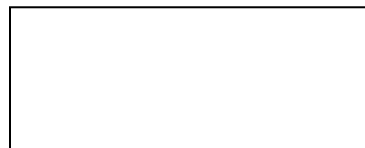
Kaitlyn Braun

Greenville, NC

May 2014

Approved by:

Faculty Mentor (signature required):



Kim L. Larson, RN, PhD



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Understanding the Role of Schools in Community Prevention of Childhood Obesity

Childhood obesity is a growing problem in the United States, and in North Carolina. A 2009-2010 survey found that 13.4% of children aged 2-17 years were obese in North Carolina and that 17.4% of this same age group were obese in eastern North Carolina (North Carolina State Center for Health Statistics, 2011). By contrast, 18% percent of children aged 6-11 years in the United States were obese (Ogden, Carroll, Kit, & Flegal, 2012). There are many adverse health complications that may accompany childhood obesity and obesity in childhood and adolescence is associated with adult mortality (Han, Lawlor, & Kimm, 2010). An obese child is likely to become an obese adult who may face serious, long-term health problems including heart disease, diabetes and hypertension. Treating these and other obesity related conditions cost the United States about 190 billion dollars in 2005 and costs billions each year (Hilton, 2013). Childhood obesity by itself costs 14.1 billion dollars per year in medical costs (Institute of Medicine, 2012).

Many causes of childhood obesity can be identified in the child's environment. Unhealthy food choices in numerous locations, such as, schools, neighborhood corner stores, and fast food restaurant are readily available to children. Additionally limited opportunities for many children regarding daily physical activity are contributors to the problem of childhood obesity (Center for Disease Control and prevention, 2013). Since children are in school every weekday for most of the year, schools are considered an important location for science-based interventions to address childhood obesity among children from all socioeconomic and ethnic backgrounds (Hollar, Messiah, Lopez-Mitnik, Hollar, Almon, & Agatston, 2010).

Community interventions are an important part of the fight against childhood obesity. There are so many different resources in the community, including organizations and influential community leaders that can be used to work for a common cause. For example, in the communities that lack safe places for outdoor activity or that lack accessible fresh fruits and vegetables for the community members, these leaders and organizations can partner together to come up with solutions. These solutions may include community events such as community field days, or getting together to form a safe place for activity and gardening such as a community garden with a park or walking track. These community based interventions provide what is needed for families to lead a healthy lifestyle and therefore support the efforts to reduce childhood obesity (Economos & Irish-Hauser, 2007)

Review of Literature

Definition, Cause and Prevalence of Childhood Obesity

Childhood obesity is defined as having a body mass index (BMI) at or above the 95th percentile on the BMI-for-age growth charts (Ogden et al., 2012). According to the American Heart Association (2013) 33% of American children and teens are overweight or obese.

There may be many factors contributing to obesity. If the child lives in an unsafe community, they may not have as many places to go and be active (Center for Disease Control and Prevention, 2013). The national recommendation for physical activity in children is at least 60 minutes of physical activity per day, although more than that may be more beneficial. Physical activity helps to keep energy expenditure less than or equal to energy intake so that weight gain is avoided or weight loss is achieved. Effects on body mass index in children has been seen with 30 to 60 minutes three to five times per week (Institute of Medicine, 2012). In most cases, childhood obesity occurs when children eat an excessive amount of calories and do not get enough physical exercise. This is common in America where the children's environments encourage consumption of unhealthy foods in addition to sedentary lifestyles (Centers for Disease Control and Prevention, 2013).

A big contributor to lack of physical activity is amount of time children spend watching TV, playing videogames or playing on the computer. Children 8-18 years of age accrue an average of seven and a half hours per day of screen time. This time spent in front of screens watching TV or playing games may cause an unhealthy influence on the children's food preferences through advertisements and can also lead to increased energy intake due to snacking during these times (Center for Disease Control and Prevention, 2013).

Depending on the socioeconomic status of the child's family, there may be little access to healthy, affordable foods. Unhealthy foods are more readily available and cost less than the healthier options. When the family eats at a restaurant, they face large portion sizes and may not realize the impact that these portions may have on their caloric intake (Center for Disease Control and Prevention, 2013).

Since parents are largely responsible for children's intake, they play a large role in ensuring that children are receiving adequate nutrition in their meals. A good resource for parents is "My Plate" which is the recommended amounts of each food groups for a healthy diet from the United States Department of Agriculture (USDA). "My Plate" informs parents about the nutritional requirements based on age group and is a good source for parents to refer to when preparing meals at home or school lunches. It is recommended that half of your plate be fruits and veggies and the other half be divided between grains and proteins with more of the grains being whole grains. Children aged 4-13 also need two and a half to three cups of low fat dairy products each day. The USDA also warns against heavy consumption of solid fats and sweets (United States Department of Agriculture, n.d.).

Impact of Childhood Obesity on Health

Obese children have an increased likelihood of becoming obese adults and the lifespan of these children may be decreased. The obese children of today may be the first generation that does not outlive their parents (Avery, Johnson, Cousins, & Hamilton, 2013). Although childhood obesity is a significant problem in the United States, some parents are not aware that their child is overweight or obese. In a review of the North Carolina Child Health Assessment and Monitoring Program, it was found that 11.4 percent of parents of overweight children and 31.1 percent of parents of obese children reported being told that their child was overweight or obese. It is recommended that obesity screening be universal and that if a child is identified as overweight or obese, then the child should be referred for treatment (Miles, Skinner, & Perrin, 2011).

When a child is obese, they face the chance of almost every organ system being affected in a negative way. High blood pressure, elevated lipids, and psychological disorders are more prevalent among obese children (Hollar et al., 2010). The predisposition to Diabetes Mellitus type 2 is so high in obese individuals that this disease is now occurring in childhood whereas it once occurred in adulthood (Institute of Medicine, 2012). Obese children are more likely to have respiratory problems and nutritional deficiencies. Furthermore, the atherosclerotic process in these children happens at an increased rate so they are at a higher risk of cardiovascular disease later in life. Han et al., (2010) found increased complaints of musculoskeletal issues such as fractures, discomfort, impaired mobility and misalignment of the lower extremities.

Assessments and Measurements

In order to determine the weight status of a child, their height and weights are measured and these measurements are then used to calculate the body mass index for the child. The body mass index is found by taking the child's weight in kilograms and dividing it by the square of the child's height in meters (United States Preventive Services Task Force, 2010b). Once the body mass index is obtained, the body mass percentile of the child is determined using the Center for Disease Control and Prevention's BMI for age and sex specific growth charts (Greening, Harrell, Low, & Fielder, 2011).

If the child has a body mass index at or above the 85th percentile on the charts, they are considered overweight and if the child has a body mass index at or above the 95th percentile, they are considered obese (Han et al., 2010). Once a child is screened, if they are found to be overweight or obese, then they may be referred to behavioral counseling. The focus of treatment is usually diet and exercise and establishing healthy habits while trying to change the unhealthy habits (United States Preventive Services Task Force, 2010a).

One of the things that clinicians can use to assess the child's habits is the amount of calories consumed. Caloric needs vary based on child's age and gender. Children aged four to thirteen require 1200-1800 calories and have a limit of 120-160 empty calories per day (United States Department of Agriculture, n.d.). If the child is consuming more calories than required, this can be used when establishing new healthy habits.

Interventions for Childhood Obesity

The best approach to the childhood obesity epidemic is prevention. A review of the literature found that community based interventions with a school component and strategies that focus on both nutrition and physical activity are effective in preventing childhood obesity. This review included nine studies from both the US and other countries done from 2003-2010 and the community interventions that did not have a school component did not have statistically significant effects on the weights of children. Examples of the community interventions reviewed were statewide policy changes in schools and childcare centers, improving school menus, increasing physical activity in schools, and increasing accessibility to healthy foods and physical activity in the community (Bleich, Segal, Wu, Wilson & Wang, 2013).

The Cochrane Collaboration conducted a larger review of the literature which included 55 studies from 1998-2009. The authors of the review came to the conclusion that nutrition education in schools, increased opportunities for physical education during the school week, improvements in school food supplies, and engaging with parents and teachers to help them encourage the children to make healthier decisions are all promising strategies to address the childhood obesity issue. The authors also found that the most common setting for interventions was the school setting (Waters et al., 2011).

Many prevention programs take place in schools since it is more feasible to include more children than in other settings. School settings provide many chances for nutritional and health education and since some students get as much as 51% of their daily energy intake at school, the school meals can be altered to reduce high-calorie, energy-dense food intake (Hollar et al., 2010).

In regard to nutrition teaching, there are different methods that can be used. Some school interventions have used nutritional school and family based events to try and incorporate nutrition into community activities (Greening et al., 2011). Other interventions combined in-class nutrition teaching with interactive teaching such as school gardens (Hollar et al., 2010). The gardens can be used in hands-on nutrition lessons and to help students gain appreciation of the process of planting and harvesting fruits and vegetables leading to an increased consumption of these foods. In one study, there was a 23% increase in the number of children who stated that they ate vegetables every day when a pre-test was compared with a post-test (Hermann, Parker, Brown, Siewe, Denney, & Walker, 2006).

Researchers have identified the importance of understanding the staff structure in schools and gaining support from staff on every level. Explaining the benefits and importance of interventions to all involved can increase the compliance with the intervention, making it more successful and allowing the students involved to benefit more from the intervention. By establishing an amicable relationship with the school staff, and consistently communicating updates on the study kept the staff supportive of the researchers' efforts (Berry, et al., 2013).

According to Avery et al., the school nurse may play a large role in keeping lines of communication open. The nurse could monitor children who may be at risk of being obese and participate in the program evaluation. The nurse works closely with parents, teachers and local health care professionals in the community to promote obesity prevention in the school. It would be this nurse's job to ensure that each student has access to health and wellness education. The nurse would work in conjunction with other staff members to ensure that each student is screened and monitored and that the students receive nutrition education (Avery et al., 2013).

In one particularly successful study, the Healthy Living Cambridge kids, researchers involved several aspects of the school and community. The 5-2-1 guidelines were implemented in the 12 schools and encouraged in the community through a citywide policy, monthly coalition meetings and posters throughout the community. These guidelines encouraged children and parents to eat five or more servings for low energy fruits and vegetables daily, limit screen time to less than two hours per day, and increase physical activity to at least one hour every day. School gardens were used to increase student awareness and to encourage the consumption of locally grown fruits and vegetables. There was a decrease in BMI in the overall study sample and there was a reduction in the prevalence of obesity in the children (Chomitz et al., 2010).

A study that addressed the need for low cost interventions in the community was the YMCA Healthy, Fit, and Strong Program. The study focused on the family and child and only cost \$25.00 for six months which was returned if the family stayed committed to the program for the whole six months. The families also received a \$25.00 gift certificate if they brought their child back for measurements and questionnaires at the 12 month mark. This program provided a safe, low cost place for the family to exercise and also provided nutrition education for the parents weekly for 10 weeks. There was a reduction in the overall BMI of the children involved and healthy eating behaviors increased (Schwartz et al., 2012).

Other low-cost interventions for the community include combining community gardens with walking trails and nutrition education. The members of the community can learn about healthy eating and get exercise all in one place while feeling safe and having fun (Warren et al., 2009). When community gardeners were compared with community members who did not participate in the gardening, the gardeners had lower body mass indexes than the non-gardeners. The gardeners were also less likely to be overweight or obese. (Zick, Smith, Kowaleski-Jones, Uno, & Merrill, 2013). Although this study had adult participants, it is obvious that the community gardens offered benefits when body mass index is concerned and therefore could offer benefits to children as well.

In summary, the literature suggests that schools play an important role in the prevention of childhood obesity. The school can provide a place to implement nutrition education and physical activity and can serve as a portal of communication between the community and the parents and students. The purpose of this project was to explore the use of community interventions and how the public school integrates community interventions to prevent childhood obesity. This senior honors project was conducted in partnership with a school nurse preceptor in a public school in rural eastern North Carolina as part of a 7-week community health clinical practicum. During this clinical practicum, I assisted with health assessments of adolescents in grades 5-8, recommended interventions, and participated in follow-up and referral services.

Methods

The methodology used for this project was a program evaluation that included several components. The components were to: a) conduct an environmental assessment of the surrounding area using observation and secondary data and determining available community resources for physical activity and encouragement of healthy eating, b) develop a set of interview questions, c) identify and interview key informants, d) assist the school nurse in assessments, referrals and follow-ups of school aged children in the school based health center.

A total of three key informants were interviewed. The interview questions were reviewed by the faculty mentor to this project. The questions were: 1) What interventions are already in place at the school to increase healthy eating and physical activity in students?, 2) What community resources are available to the students to encourage healthy eating and physical activity?, and 3) How does the school integrate community resources into school activities? The information from these interviews, along with clinical observations and the environmental assessment, were analyzed in consultation with the school nurse and used to develop recommendations for the school. A physical education teacher was supposed to be interviewed, but was unavailable during the time of the interviews.

Findings

The major finding of this project was that there are resources in the community surrounding the school but they are not being utilized and that most of the major community resources, such as a farmers market, the major health resources and the YMCA were located 20 miles away. The area surrounding the public school where the project was conducted was a typical small town with lower and middle socioeconomic condition. The school was in town where there were sidewalks that allowed residents to walk from place to place although there were not many people utilizing them. There were many fast food places that appeared to be highly utilized.

One key informant identified two parks in the community and reported that one park is in a safer area than the other, and is more often used. The town parks and recreation department provides sports programs, but there is a \$30.00 participation fee and the cost of equipment that may deter the students' parents from signing them up. Although many community resources were mentioned, they were not being utilized by the school.

Two informants reported that there were no farmers markets in the same town as the school, and that the nearest one was 20 miles away. Although there are no farmers markets in close proximity, one key informant noted that there was a new community effort to increase the number of farmers markets in the county through the Community Transformation Grant Project. This project has a goal of increasing physical activity and increasing access to healthy food choices in stores as well as increasing the number of farmers markets. One key informant noted that there is one community garden at a nearby church which often works with the school. The church and school partners to honor teachers on certain occasions with breakfast or lunch. The community garden has not been a component of this partnership to date.

The only interventions in place at this school to address childhood obesity were regular physical activity and health classes. There is no committee or task force at the school with a goal of increasing physical activity and healthy eating for the students. There are sports teams available through the school, but not all students can participate.

Through the school based health clinic, students who are higher than the 85th percentile on the CDC BMI-for-age growth chart are referred to the registered dietitian, and students higher than the 95th percentile, are referred to both the dietitian and the nurse practitioner. Although this does provide counseling and health advice to some of the students, this program does not address prevention. The only known community intervention for overweight or obese children was 20 miles away at the YMCA. This intervention is a 10 week physical activity and nutrition program for children aged 6-15 years. This program was discovered on the YMCA's website, yet the informants were not familiar with the program and were not recommending it to children or parents.

Discussion

Community resources that address childhood obesity were not well integrated in this public school. Many of the resources were thought to be too far or too expensive to access. In the school based health clinic, obesity and nutrition were important and assessed by the staff members, but in the school overall, prevention was not a priority.

One way for the school to address obesity prevention, would be for school personnel and community members to form an Obesity Prevention Committee to help the school integrate community resources such as community gardens, farmers markets and community parks. The committee should develop goals and objectives aimed at increasing community integration within the school. The school nurse, dietitian and nurse practitioner should be a part of the committee to allow for accurate tracking of progress through BMI assessments and dietary surveys. This committee would increase the utilization of community resources and help address problems with access to resources.

There is currently a county-wide referendum on the May 2014 election ballot to vote on increased taxes for county parks and recreational facilities. Improved safety and accessibility to inexpensive recreational facilities would contribute toward encouraging physical activity for adolescents in the community.

This project had a few limitations. One limitation was that the physical education teachers were not interviewed. These individuals could have had information that could have contributed to the project. In addition to interviewing the physical education teachers, it might have been useful to contact and interview some of the known community resources to see if there were plans underway to integrate these programs with the school.

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