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Evaluating the Effectiveness of the Utah County Fit WIC Program

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EVALUATING THE EFFECTIVENESS OF THE
UTAH COUNTY FIT WIC PROGRAM

By

Elizabeth R. Nixon

A plan B report in partial fulfillment of the
requirements for the degree

of

MASTER OF DIETETICS ADMINISTRATION

in

Nutrition, Dietetics, and Food Sciences

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2011

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ABSTRACT

Evaluating the Effectiveness of the
Utah County Fit WIC Program

by

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Utah State University, 2011

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Childhood overweight and obesity is a growing problem across America. Public health interventions are needed to help address this problem. The purpose of this study was to evaluate the effectiveness and outcomes of the Utah County Fit WIC Program – which was initiated to address the needs of children who are overweight or at-risk of overweight based on Body Mass Index (BMI)-for-age.

Data was collected over the course of one year to examine associations between discussion of child's weight and goal setting with parent(s)/caregiver(s) and changes in participants' (n=167) BMI-for-age. The mean BMI-for-age decreased for participants studied across a one year period, measuring -4.50 at six months, and -3.55 at one year (p=0.000 at both intervals). Participants who were initially identified as being at-risk of overweight at their initial examination had a larger change in BMI-for-age over six months and one year than those initially assessed as overweight. Discussing a child's weight and setting goals was not found to be significantly correlated with change in BMI

percentile. No significant difference in BMI-for-age or change in BMI-for-age was observed based on ethnicity (Hispanic or non-Hispanic) or gender. Despite this, the Utah County Fit WIC Program was found to be successful in decreasing mean BMI-for-age over time for participants.

In summary, while the results of this study did not show differences between the intervention and non-intervention groups that were statistically significant, there was still a downward trend in overall BMI-for-age measurements for participants in the Utah County Fit WIC Program. This is a positive outcome. With continued improvement, it is expected that this program and other similar programs will be beneficial in terms of childhood weight management.

(50 pages)

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CHAPTER I

INTRODUCTION AND REVIEW OF LITERATURE

Introduction

Statement of Problem

Over the last 20 years, the United States has seen a dramatic increase in obesity, now estimated at 34% among adults (Centers for Disease Control and Prevention, 2011b). Obesity in childhood is associated with obesity later in life and is also increasing, nearly tripling since the 1970's (Nader et al., 2006). The Centers for Disease Control (CDC) estimates that in the United States approximately 17% of children and adolescents aged 2-19 are obese (2011b). Obesity also continues to rise in preschool aged children ages two-five -- increasing from 5.0% to 10.4% between 1976-1980 and 2007-2008 (Ogden & Carroll, 2010).

Individuals who are at-risk of being overweight as children are more likely to be overweight as an adolescent than those not at-risk as children. Overweight in adolescence, in turn, is predictive of obesity in adulthood (Nader et al., 2006). Health educators and other professionals who provide services for participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) are in a unique position to educate parent(s)/caretaker(s) of preschool-aged children about childhood obesity, to collect data, and to disseminate information about this issue.

The WIC program was established to improve nutrition and prevent nutrition-related health problems in women, infants, and children (ages 1 through 5). Nearly five million children were enrolled in the WIC program in 2010 (United States Department of

Agriculture Food and Nutrition Service, 2010). Services offered by the WIC program include a supplemental food package, nutrition education, and referrals to social services and health care resources (Oliveira, Racine, Olmsted, & Ghelfi, 2002). Participating children must recertify every six months to qualify for this program (Oliveira et al., 2002).

The Utah County WIC Program implemented their Fit WIC Program to help reverse the current trend of childhood obesity by identifying at-risk children at semi-annual certification appointments. Following an in-depth initial nutrition assessment that includes collecting anthropometric data, additional education is to be given to the parent(s)/caretaker(s) of children aged two to five-years old who are overweight or at-risk of becoming overweight. These risks are identified according to Utah WIC Policies and Procedures Nutrition Risk Manual which defines an overweight child as one who has a BMI-for-age at or above the 95th percentile as plotted on the CDC 2000 gender specific growth charts (Utah Department of Health WIC Program, 2011). This same policy defines a child who is at-risk of overweight as one who has a BMI-for-age at or above the 85th percentiles and below the 95th percentile. It should be noted that these cutoff values were established using the 1998 Expert Committee recommendations, which have recently been updated (Barlow, 2007). The new recommendations include changed terminologies for the two categories and label a BMI-for-age at or above the 95th percentile as “obesity,” and those between the 85th and 94th percentiles as “overweight.” Categories for this study were assigned, however, using current Utah WIC Policies and Procedures and will be used throughout this paper (Overweight= BMI-for-age at or above

95th percentile, At-risk of overweight = 85th-94th percentile) (Utah Department of Health WIC Program, 2011).

When overweight or risk for overweight is identified, WIC nutrition staff, consisting of Registered Dietitians and other qualified health professionals, work with parent(s)/caretaker(s) to discuss possible interventions that may help to reduce the child's risk for overweight and obesity. Examples of interventions that nutrition staff members are encouraged to use include seeking for appropriate beverage consumption, healthy eating, increased physical activity, and decreased screen time. Goals are then set to improve these behaviors. Nutrition staff may also set up additional follow up appointments to further track the child's weight trend and offer additional support. Discussion of a child's weight status with parent(s)/caretaker(s), and goal setting are the interventions being studied in this examination of the Utah County Fit WIC Program.

Despite the fact that this program has worthwhile goals, its effectiveness has not been adequately measured. The aim of this study was to determine the effectiveness of this Fit WIC program in reducing BMI-for-age and identify areas where modifications can be made to improve this program in the future. It is expected that, with evaluation, the Fit WIC Program will be better delivered and result in a greater reduction in childhood obesity rates among participants at WIC clinics in Utah County.

Problem

The Utah County Fit WIC Program seeks to reduce the incidence of childhood obesity through interventions for those who are found to be at-risk for overweight, or who currently are overweight. The effectiveness of the interventions in this program has not been adequately evaluated.

Purpose and Objectives

Purpose

The purpose of this study was to determine if the interventions currently used by the Utah County Fit WIC Program result in a reduced BMI-for-age in children who have previously been assessed as being at-risk for overweight or overweight according to the Utah WIC Program criteria (Utah Department of Health WIC Program, 2011).

Objectives

1. Determine if discussing a child's risk of becoming overweight or obese with their parent(s)/caretaker(s) during WIC certification visits, as evidenced by a written care plan or goal, leads to improvements in BMI-for-age over a period of time (six months and one year).
2. Determine the impact -- if any -- of goal setting on a child's BMI-for-age (over a six month and one year period) when goals are set at semiannual WIC appointments with parent(s)/caretaker(s) of children who are overweight (or at-risk for overweight).
3. Compare the effectiveness of this program for Hispanic clients to non-Hispanic clients by comparing overall reduction in BMI-for-age between the two populations.

It was hypothesized that discussing children's BMI-for-age percentiles with parents would result in a reduction in BMI-for-age percentiles over time (six months and one year). It was also anticipated that the inclusion of goal-setting would result in more pronounced improvement (as measured by change in BMI-for-age). Finally, it was

expected that this program was already having a positive impact on decreasing the overweight status of at-risk children – and especially among those who set goals with nutrition staff.

Review of Literature

The Problem of Childhood Overweight and Obesity

The epidemic of obesity is a great public health concern. Risks associated with childhood and adolescent obesity include Type 2 Diabetes, cardiovascular disease, orthopedic problems, and neurologic conditions (Must & Anderson, 2003). It is expected that these and other weight-related consequences will become more common in children if body weights continue to rise (Whitlock, Williams, Gold, Smith, & Shipman, 2005). It is estimated that the annual medical costs of obesity are \$147 billion, with the annual medical costs of an obese person on average costing \$1,429 more than a person of a normal weight (CDC, 2010b). The deleterious consequences of obesity do not just affect individuals, but society as a whole is impacted due to consequences such as increased health risks, and increased burdens on the health-care system (Whitlock et al., 2005).

Utah has one of the lowest obesity rates in the country with an adult obesity rate of 22.5% in 2010, behind only Colorado and Nevada (CDC, 2011b) . Though lower than other states, this rate is still higher than the Healthy People 2010 goal of 15% (CDC, 2010b). The rate of adult obesity in Utah County ranked number 13 out of 29 counties, measuring at 25% in 2008 (CDC, 2008). A study conducted in Utah public elementary schools found that the rate of childhood overweight or obesity was 20.4% in 2010 (Physical Activity, Nutrition, and Obesity Program, 2010).

There are multiple factors contributing to the epidemic of obesity many of which stem from our “obesogenic” (CDC, 2010a) environment -- one that promotes increased food intake of nonhealthful foods and physical inactivity. The need to combat this environment is a challenge that health providers should be aware of, and indicates a need for public health programs to help prevent obesity (Aranceta, Moreno, Moya, & Anadon, 2009).

Characteristics of WIC Participants

Two-thirds of WIC participants live at or below the poverty line (Connor, Bartlett, Mendelson, Condon, & Sutcliffe, 2010). Obesity rates have been shown to be high among low-income children and it is estimated that one out of every seven low-income preschool children is obese (CDC, 2011a). Low income status in the early years of a child’s life correlates with an increased risk for overweight as adults compared to those who had higher incomes during this period of time (Ziol-Guest, Duncan, & Kaili, 2009).

Children who participate in the WIC program are likely to be more at-risk than low-income children who are not participating in this program. Research conducted through the University of Texas at San Antonio (Sparks, 2010) found that children participating in the WIC program were less likely to have been born to a woman who was married than children who were categorically eligible but not participating. Mothers who have a child participating in the WIC program were more likely to have less than a high school education, to be a member of a racial/ethnic minority, more likely to live in poverty, and more likely to be young (less than 20-years-old at the time of the child’s birth) than mothers of children who qualify for WIC but choose not to participate. WIC

staff members need to be aware of these challenges as they seek to address the issue of a high BMI-for-age with this population.

In 2008, 42.1% of WIC participants identified themselves as Hispanic/Latino (Connor et al., 2010). Childhood overweight and obesity is common among minority populations -- including those of Hispanic origin (CDC, 2010b). Results from the National Health and Nutrition Examination Survey (NHANES) 2007-2008 study support this disparity (Ogden & Carroll, 2010). Among participants of NHANES, 26.8% of Mexican American boys were obese, nearly double the rate of obesity found in non-Hispanic White boys where the rate was estimated at 16.7%. Obesity levels in this group have also increased more rapidly than in non-Hispanic White populations with obesity rates in Mexican American boys rising from 14.1% to 26.8% between 1988-1994 and 2007-2008 while the increase seen in non-Hispanic White boys was from 11.6% to 16.7%.

Measuring Risk

A study using data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (Nader et al., 2006) analyzed height and weight measurements from early childhood to adolescence. They found that participants who were >85th percentile BMI-for-age during the preschool years were more than five times as likely to be overweight at age 12 than those who were never overweight during this period. These trends also continued into the elementary school years. These findings give a clear reason to begin interventions as early as indicated by a child is measuring at the 85th percentile or above to stop the progression of obesity-related factors rather than hoping that these patterns will resolve on their own

(Nader et al., 2006) Additionally, based on this study, BMI-for-age measurements for children appear to be highly correlated with weight status during adolescence and adulthood.

Based on evidence collected by the US Preventive Services Task Force (Whitlock et al., 2005), the CDC 2000 gender-specific growth charts, which are used in WIC nutritional assessments, are considered an appropriate standard for assessing children's risk for overweight and obesity later in life. They were found to be as good as -- or better than -- measurements such as Ponderal Index or skinfold measurements.

Challenges Facing the WIC Program

The WIC program faces challenges as it addresses obesity in a low-income population. A study conducted with the Kentucky WIC program (Chamberlin, Sherman, Jain, Posers, & Whitaker, 2002) found that some of the barriers to addressing obesity in this population are based on the perceptions that health care professionals have of WIC participants. It was found that professionals believed that most mothers were not likely to implement advice given in WIC counseling sessions because they were dealing with stressors of everyday life due to low income status. It was also felt that mothers of WIC participants may lack basic knowledge of normal child development and of ways of setting limits with their children. They may also use food as a coping mechanism, and may also seem to lack motivation and commitment to changing a behavior.

Another challenge to addressing obesity in WIC clinics are the perceptions of the WIC staff as they address childhood obesity. A study that surveyed staff at WIC clinics in Virginia (Serrano, Gresock, Suttle, Keller, & McGarvey, 2006) found that staff comfort level with discussing childhood overweight-related topics was highest among staff

members who were underweight or normal weight, and lowest among those staff who were obese. Also, when asked how possible it was for WIC staff to help children attain a healthy weight or to prevent children from becoming overweight, most staff members felt that it was only “somewhat possible.” These challenges need to be addressed in order for interventions in WIC clinics to be most effective.

It can also be difficult for nutrition professionals to establish a rapport with clients in the short time that is left for nutrition counseling after all of the requirements for certifying the participants have been met. This was found to be a barrier to properly addressing the issue of weight with clients, especially if a child’s pediatrician had not told parent(s)/caretaker(s) that their child was overweight or at-risk for overweight (Chamberlin et al., 2002). Changes may need to be made to adequately address the issue of childhood obesity in a WIC clinic setting, and evidence of successful interventions is needed as WIC administrators consider programs to address this problem.

Interventions

Although health care professionals in and outside of the WIC program face challenges in promoting interventions for childhood obesity, Kubik et al (Kubik, Story, Davey, Dudovitz, & Zuehlke, 2008), found that most parents believed that it was beneficial for a health care provider to discuss their child’s weight as well as diet, activity level, and sedentary activities during clinic visits. Parents may be more receptive to a health care provider’s counseling and more willing to change than commonly believed. This gives further evidence that interventions that include discussing a child’s weight and recommending ways to improve diet and activity levels may be beneficial.

Experts recommend that health care professionals should be willing to initiate conversations and ask questions about lifestyle factors behaviors that are correlated with obesity and provide education and interventions that promote general healthy living. This is sometimes referred to as “the healthy lifestyle prescription” (Whitlock et al., 2005). Childhood weight interventions that seemed to show improvements were those that addressed physical activity or sedentary behaviors (Whitlock et al., 2005). Goals set in interventions should be small and attainable behavior change goals. These need to be short-term, achievable, and client-centered goals if they are to be effective (Chamberlin et al., 2002).

References

- Aranceta, J., Moreno, B., Moya, M., & Anadon, A. (2009). Prevention of overweight and obesity from a public health perspective. *Nutrition Reviews*, *67* (Suppl. 1), S83-S88.
- Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report. *Pediatrics*, *120* (Suppl. 4), S164-S192. doi: 10.1542/peds.2007-2329C
- Centers for Disease Control and Prevention. (2008). County level estimates of obesity--state maps. Retrieved September 7, 2011, 2011
- Centers for Disease Control and Prevention. (2010a). Overweight and obesity. Retrieved September 9, 2010, 2010, from <http://www.cdc.gov/obesity/>
- Centers for Disease Control and Prevention. (2010b). Vital Signs: State-Specific Obesity Prevalence Among Adults — United States, 2009. *Morbidity and Mortality Weekly Report*, *59*. Retrieved from <http://www.cdc.gov/obesity/data/trends.html#National>
- Centers for Disease Control and Prevention. (2011a). Overweight and Obesity. Retrieved September 9, 2011, from <http://www.cdc.gov/obesity/childhood/data.html>
- Centers for Disease Control and Prevention. (2011b). U.S. Obesity Trends Retrieved October 3, 2011, from <http://www.cdc.gov/obesity/data/trends.html#National>
- Chamberlin, L. A., Sherman, S. N., Jain, A., Posers, S. W., & Whitaker, R. C. (2002). The challenge of preventing and treating obesity in low-income, preschool children. *Arch Pediatr Adolesc Med*, *156*, 662-668.
- Connor, P., Bartlett, S., Mendelson, M., Condon, K., & Sutcliffe, J., , et al. (2010). *WIC Participant and Program Characteristics 2008*. Retrieved from <http://www.fns.usda.gov/ora>.
- Kubik, M. Y., Story, M., Davey, C., Dudovitz, B., & Zuehlke, E. U. (2008). Providing Obesity Prevention Counseling to Children during a Primary Care Clinic Visit: Results from a Pilot Study. *Journal of the American Dietetic Association*, *108*, 1902-1906.
- Must, A., & Anderson, S. E. (2003). Effects of Obesity on Morbidity in Children and Adolescents. *Nutrition in Clinical Care*, *6*, 4-12.

- Nader, P. R., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R., . . . Susman, E. J. (2006b). Identifying risk for obesity in early childhood. *Pediatrics*, *118*, e594-e601. doi: 10.1542/peds.2005-2801
- Ogden, C., & Carroll, M. (June 2010). Prevalence of obesity among children and adolescents: United States, Trends 1963-1965 through 2007-2008 Retrieved September 9, 2011, 2011
- Oliveira, V., Racine, E., Olmsted, J., & Ghelfi, L. M. (2002). The WIC Program: Background, Trends, and Issues (Vol. Food Assistance and Nutrition Research Report Numbr 21). <http://www.ers.usda.gov/publications/fanrr27/fanrr27.pdf>: United States Department of Agriculture.
- Physical Activity, Nutrition,, and Obesity Program,, Bureau of Health Promotion,, Utah Department of Health. (2010). Childhood overweight in Utah 2010. Retrieved from http://health.utah.gov/obesity/documents/HW_Elem_Project_2010.pdf
- Serrano, E., Gresock, E., Suttle, D., Keller, A., & McGarvey, E. (2006). Fit WIC: attitudes, perceptions and practices of WIC staff toward addressing childhood overweight. *J Nutr Educ Behav*, *38*, 151-156.
- Sparks, J. (2010). Childhood morbidities among income- and categorically-eligible WIC Program participants and non-participants. *Journal of Children and Poverty*, *16*(1), 47-66.
- United States Department of Agriculture Food and Nutrition Service. (2010). WIC Program Monthly Data Retrieved September 9, 2011, 2011
- Utah Department of Health WIC Program. (2011). Federal Fiscal Year 2011 Policy and Procedures Manual, Section D: Nutrition Risk Manual, 2011
- Whitlock, E. P., Williams, S. B., Gold, R., Smith, P. R., & Shipman, S. A. (2005). Screening and Interventions for Childhood Overweight: A Summary of Evidence for the US Preventive Services Task Force. *Pediatrics*, *116*(1), e125-e141.
- Ziol-Guest, K. M., Duncan, G. J., & Kaili, A. (2009). Early Childhood Poverty and Adult Body Mass Index. *American Journal of Public Health*, *99*(3), 527-532.

CHAPTER II
EVALUATING THE EFFECTIVENESS OF THE
UTAH COUNTY FIT WIC PROGRAM

Abstract

Childhood overweight and obesity is a growing problem across America. Public health interventions are needed to help address this problem. The purpose of this study was to evaluate the effectiveness and outcomes of the Utah County Fit WIC Program – which was initiated to address the needs of children who are overweight or at-risk of overweight based on Body Mass Index (BMI)-for-age.

Data was collected over the course of one year to examine associations between discussion of child’s weight and goal setting with parent(s)/caregiver(s) and changes in participants’ (n=167) BMI-for-age. The mean BMI-for-age decreased for participants studied across a one year period, measuring -4.50 at six months, and -3.55 at one year (p=0.000 at both intervals). Participants who were initially identified as being at-risk of overweight at their initial examination had a larger change in BMI-for-age over six months and one year than those initially assessed as overweight. Discussing a child’s weight and setting goals was not found to be significantly correlated with change in BMI percentile. No significant difference in BMI-for-age or change in BMI-for-age was observed based on ethnicity (Hispanic or non-Hispanic) or gender. Despite this, the Utah County Fit WIC Program was found to be successful in decreasing mean BMI-for-age over time for participants.

In summary, while the results of this study did not show differences between the intervention and non-intervention groups that were statistically significant, there was still

a downward trend in overall BMI-for-age measurements for participants in the Utah County Fit WIC Program. This is a positive outcome. With continued improvement, it is expected that this program and other similar programs will be beneficial in terms of childhood weight management.

Keywords: public health; childhood obesity; WIC; program evaluation

Introduction

In the past 20 years, there has been a dramatic increase in obesity in both adults and children in the United States (Centers for Disease Control and Prevention, 2011b; Nader et al., 2006). The Centers for Disease Control and Prevention (CDC) estimates that approximately 17% of children and adolescents aged 2-19 are obese (2011b). Obesity also continues to rise in preschool-aged children (two- to five-years-old) -- increasing from 5.0% to 10.4% between 1976-1980 and 2007-2008 (Ogden & Carroll, 2010).

Risks associated with childhood and adolescent obesity include, but are not limited to, Type 2 Diabetes, cardiovascular disease, orthopedic problems, and neurologic conditions (Must & Anderson, 2003). It is expected that these and other weight-related consequences will become more common in children if body weights continue to rise (Whitlock, Williams, Gold, Smith, & Shipman, 2005).

Children who are at-risk of being overweight are also more likely to be overweight as an adolescent. Overweight in adolescence, in turn, is predictive of obesity in adulthood (Nader et al., 2006). A study using data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (Nader et al., 2006) found that participants who were >85th percentile BMI-for-age at any

time during the preschool years were more than five times as likely to be overweight at age 12 than those who were never overweight during this period.

There are multiple factors contributing to the epidemic of obesity many of which stem from our “obesogenic” (CDC, 2010a) environment -- one that promotes increased food intake of nonhealthful foods and physical inactivity. The need to combat this environment is a challenge that health providers should be aware of, and indicates a need for public health programs to help prevent obesity (Aranceta, Moreno, Moya, & Anadon, 2009).

Although there are challenges to implement interventions for childhood obesity, health professionals working in the public health field may be able to facilitate change. Childhood weight interventions that address both physical activity and sedentary behaviors appear to result in improvement in weight (Whitlock et al., 2005). Health care professionals are encouraged to be willing to initiate conversations and ask questions about lifestyle factors and behaviors that are correlated with obesity and provide education and interventions that promote general healthy living (Whitlock et al., 2005). Goals that are short-term, achievable, and client centered are most likely to be effective in these interventions (Chamberlin, Sherman, Jain, Posers, & Whitaker, 2002).

The association of overweight and obesity in preschool years with overweight and obesity later in life give a clear reason to begin interventions early -- as indicated by a child measuring at the 85th percentile or above -- to stop the progression of obesity-related factors rather than hoping that these patterns will resolve on their own (Nader et al., 2006). Discussing a child’s weight and recommending ways to improve the child’s diet and physical activity levels at clinic visits may be one route to addressing this issue.

Parents may be more receptive to a health care provider's counseling and more willing to change than commonly believed (Kubik, Story, Davey, Dudovitz, & Zuehlke, 2008) giving further reason for development of clinic-based interventions to address childhood obesity.

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was established to improve nutrition and prevent nutrition-related health problems in women, infants, and children (ages 1 through 5). Services offered by the WIC program include a supplemental food package, nutrition education, and referrals to social services and health care resources (Oliveira, Racine, Olmsted, & Ghelfi, 2002). Participating children must recertify every six months to qualify for this program (Oliveira et al., 2002).

Nearly five million children were enrolled in WIC in 2010 (United States Department of Agriculture Food and Nutrition Service, 2010). Health educators and other professionals who provide services for participants in the WIC program are in a unique position to educate parent(s)/caretaker(s) of preschool-aged children about childhood obesity, to collect data, and to disseminate information about this issue.

Children participating in the WIC program may have several risk factors for obesity -- including their low-income status (Connor, Bartlett, Mendelson, Condon, & Sutcliffe, 2010; CDC, 2011a; Ziol-Guest, Duncan, & Kaili, 2009). Children who participate in the WIC program are likely to be more at-risk than low-income children who are not participating in this program (Sparks, 2010). It was found that children enrolled in WIC were more likely have risk factors such as being born to a young single mother with less than a high school education and to be a racial/ethnic minority than

those who are eligible but do not participate (Sparks, 2010). Many children participating in the program may also be of minority populations, including those of Hispanic origin, where rates of childhood overweight and obesity are higher than those found in non-Hispanic White populations (CDC, 2010b; Connor et al., 2010; Ogden & Carroll, June 2010).

The WIC program faces challenges as it addresses obesity among low-income and at-risk populations. These include, but are not limited to, negative perceptions towards WIC participants among WIC staff (Chamberlin et al., 2002) and discomfort in discussing childhood overweight-related topics (Serrano, Gresock, Suttle, Keller, & McGarvey, 2006). It has also been found that the short time (around 15 minutes) allotted for nutrition counseling during certification appointments can be insufficient to properly addressing the issue of weight with clients (Chamberlin et al., 2002). Changes may need to be made to adequately address the issue of childhood obesity in a WIC clinic setting -- and evidence of successful interventions is needed as WIC administrators consider programs to address this problem. This analysis of the Utah County Fit WIC Program will provide evidence of a program that can be implemented as part of standard WIC services.

The Utah County WIC Program implemented their Fit WIC Program to work to improve the current trend of childhood obesity by identifying at-risk children and families at the standard semi-annual certification appointments. Although Utah has one of the lowest adult obesity rates (22.5%) in the country, behind only Colorado and Nevada (CDC, 2011b), rates are still higher than the Healthy People 2010 goal of 15% (CDC, 2010b). A study conducted in Utah public elementary schools found that the rate

of childhood overweight or obesity was 20.4% in 2010 (Physical Activity, Nutrition, and Obesity Program, 2010)

As part of the Utah County Fit WIC Program, children who are overweight or at-risk for overweight are identified following an in-depth initial nutrition assessment that includes collecting anthropometric data. WIC nutrition staff (consisting of Registered Dietitians and other qualified health professionals) work with parent(s)/caretaker(s) of these children to discuss possible interventions that may help to reduce the child's risk for overweight and obesity. Examples of behaviors that nutrition staff members are encouraged to inquire about and promote are appropriate beverage consumption, healthy eating, increased physical activity, and decreased screen time. Goals are then set to improve these behaviors. Discussion of a child's weight status with parent(s)/caretaker(s), and goal setting are the interventions being studied in this examination of the Utah County WIC Fit WIC Program.

Risk categories for overweight or at-risk for overweight are identified according to Utah WIC Policies and Procedures Nutrition Risk Manual (Utah Department of Health WIC Program, 2011). This defines an overweight child as one who has a BMI-for-age at or above the 95th percentile as plotted on the CDC 2000 gender specific growth charts. This same policy defines a child who is at-risk of overweight as one who has a BMI-for-age at or above the 85th percentiles and below the 95th percentile. It should be noted that these cutoff values were established using the 1998 Expert Committee recommendations, which have now been updated (Barlow, 2007). These new recommendations include different terminology for the two categories. A child's BMI-for-age value at or above the 95th percentile is now considered "obesity," and values between the 85th and 94th

percentiles are considered “overweight” Categories for this study were assigned using current Utah WIC Policies and Procedures (Utah Department of Health WIC Program, 2011).

Based on evidence collected by the U.S. Preventive Services Task Force (Whitlock et al., 2005), the CDC 2000 gender-specific growth charts, which are used in WIC nutritional assessments, are considered an appropriate standard for assessing children’s risk for overweight and obesity later in life. They were found to be as good as - - or better -- than measurements such as Ponderal Index or skinfold measurements.

Despite the fact that the Utah County Fit WIC Program has worthwhile goals, its effectiveness has not been adequately measured or evaluated. The aim of this study was to determine the effectiveness of this Fit WIC Program in reducing BMI-for-age and to identify areas where modifications can be made to improve this program in the future. It is expected that, with evaluation, the Fit WIC Program will be better delivered and result in a greater reduction in childhood obesity rates among participants at WIC clinics in Utah County.

The objectives of this study were to 1) determine if discussing a child’s risk of becoming overweight or obese with their parent(s)/caretaker(s) during WIC certification visits, as evidenced by a written care plan or goal, leads to improvements in BMI-for-age over a period of time (six months and one year), 2) to determine the impact -- if any -- of goal setting on a child’s BMI-for-age (over a six month and one year period) when goals are set at semiannual WIC appointments with parent(s)/caretaker(s) of children who are overweight (or at-risk for overweight), and 3) compare the effectiveness of this program

for Hispanic clients versus non-Hispanic clients by comparing overall reduction in BMI-for-age between the two populations.

It was hypothesized that discussing a child's BMI-for-age percentiles with parents would result in a reduction in BMI-for-age percentiles over time (six months and one year). It was also anticipated that the inclusion of goal-setting would result in more pronounced improvements (as measured by BMI-for-age). Finally, it was expected that this program was already having a positive impact on decreasing the overweight status of at-risk children – especially among those who set goals with nutrition staff.

Methods

IRB approval for this project was obtained from the Utah Health Department.

Participants

The population for this study was children ages two through five-years-old who were participants in the Utah County WIC Program and were assessed as being overweight or at-risk for overweight based on a nutritional evaluation at a certification appointment.

Study Design

This study is a retrospective analysis of medical record data gathered in 2010 and 2011 regarding BMI-for-age percentiles over a one year period to determine the effectiveness of the interventions of the Utah County Fit WIC Program

Data were gathered in 2010 and 2011 from the WICnu computer system. Data gathered included the child's initial BMI, BMI-for-age percentile, gender, and ethnicity

(Hispanic or non-Hispanic). Information was also gathered about whether or not the nutritionist discussed these weight-related risks with parents as evidenced by a written care plan and/or a written goal. Initial data was obtained from certification appointments completed in the first quarter of 2010, again six months later, and then one year later.

Procedure

Data was analyzed using SPSS. Mean values, standard deviations, and distribution of continuous variables, as well as the frequency distribution of categorical variables were obtained and analyzed. Mean values of the change in BMI-for-age at six months and one year across factors (i.e. gender and ethnicity) were compared using ANOVA. Paired t-tests were used to examine change in BMI-for-age over six months and one year. A repeated measures analysis was used to control for confounders and test for change in BMI-for-age over time.

Results

Participant Demographics

Of the 305 participants originally identified in the first quarter of 2010, 167 were included in the final data set. Individuals who did not recertify at regular intervals, or who were no longer in the WIC computer system (i.e. due to transferring to another clinic), or who had confounding medical conditions (i.e. Down's syndrome) were not included.

In the final data set, 91 (54%) were Hispanic, and 76 (46%) were non-Hispanic. One-hundred-two (61%) were male, and 65 (39%) were female. Sixty-five (39%)

participants were identified initially as overweight and 102 (61%) as at-risk of overweight.

The average BMI-for-age among children who were overweight at the initial screening was at the 97.45th percentile -- compared to 89.66th percentile in those who were initially screened as at-risk of overweight ($p=0.000$). The average start BMI-for-age for all participants was 92.69th percentile. Overall, all those in this data set showed a decrease in BMI-for-age at both six months (-4.50, $p=0.000$) and at one year (-3.55, $p=0.000$).

A differential effect of change in BMI-for-age by initial weight status was seen at both six months ($p=0.051$) and at one year ($p=0.057$). Overall, those initially identified as being at-risk of overweight saw a greater change in BMI-for-age than those initially identified as being overweight (Table 1). No significant difference was seen based on gender for change in BMI-for-age at both six months and one year ($p=0.526$, 0.678 respectively).

TABLE 1:
BMI-for-age and Change in BMI-for-age Values Over a One Year
Period Based on Initial BMI-for-age Category
(n=167)

	<i>Overweight</i> (n=65)	<i>At-risk of</i> <i>Overweight</i> (n=102)	<i>p-</i> <i>value*</i>
Mean Start BMI-for-age (Quarter 1 2011)	97.45	89.66	0.000
Mean BMI-for-age Quarter 3 2010	94.94	83.9	0.000
Mean End BMI-for-age (Quarter 1 2011)	95.61	85.02	0.000
Mean change in BMI-for-age 6 months	-2.52	-5.76	0.051
Mean change in BMI-for-age 1 year	-1.84	-4.64	0.057

**p-values calculated using ANOVA*

Impact of Discussing BMI-for-age

Of the 167 participants, 138 (83%) had either a goal or a care plan documented during the first quarter of 2010, and 135 (81%) during the third quarter of 2010 (Table 2). Overall, there was a larger reduction in BMI-for-age at one year for those who discussed BMI-for-age at quarter one (-3.84) and quarter three (-3.86) compared to those who did not (-2.13, -2.22), though the difference was not significant compared to those that did not have a care plan or a goal.

TABLE 2:
Impact of Discussing Child's Overweight/Risk of Overweight with
Parent(s)/Caretaker(s)
(n=167)

	<i>Goal or Care Plan Quarter 1 2010</i>			<i>Goal or Care Plan Quarter 3 2011</i>		
	<i>No Goal or Care Plan (n=29)</i>	<i>Goal or Care Plan (n=138)</i>	<i>p-value*</i>	<i>No Goal or Care Plan (n=32)</i>	<i>Goal or Care Plan (n=135)</i>	<i>p-value*</i>
Mean Start BMI-for-age (Quarter 1 2010)	90.94	93.06	0.027	91.22	93.04	0.48
Mean BMI-for-age Quarter 3 2010	85.38	88.79	0.172	86.91	88.5	0.508
Mean End BMI-for-age (Quarter 1 2011)	88.8	89.22	0.851	88.99	89.18	0.93
Mean change in BMI-for-age 6 months	-5.56	-4.27	0.551	-4.31	-4.54	0.911
Mean change in BMI-for-age 1 year	-2.13	-3.84	0.368	-2.22	-3.86	0.369
% Participants Initially Categorized as Overweight	20.70%	42.80%	0.027	25%	42.20%	0.072
% Male	72.40%	58.70%	0.168	62.50%	60.70%	0.854
% Hispanic	41.40%	57.20%	0.119	43.80%	57%	0.175
% non-Hispanic	58.60%	42.80%	0.119	56.30%	43%	0.175

* *p-values were obtained using ANOVA for continuous variables, and using a Chi-squared analysis for categorical variables.*

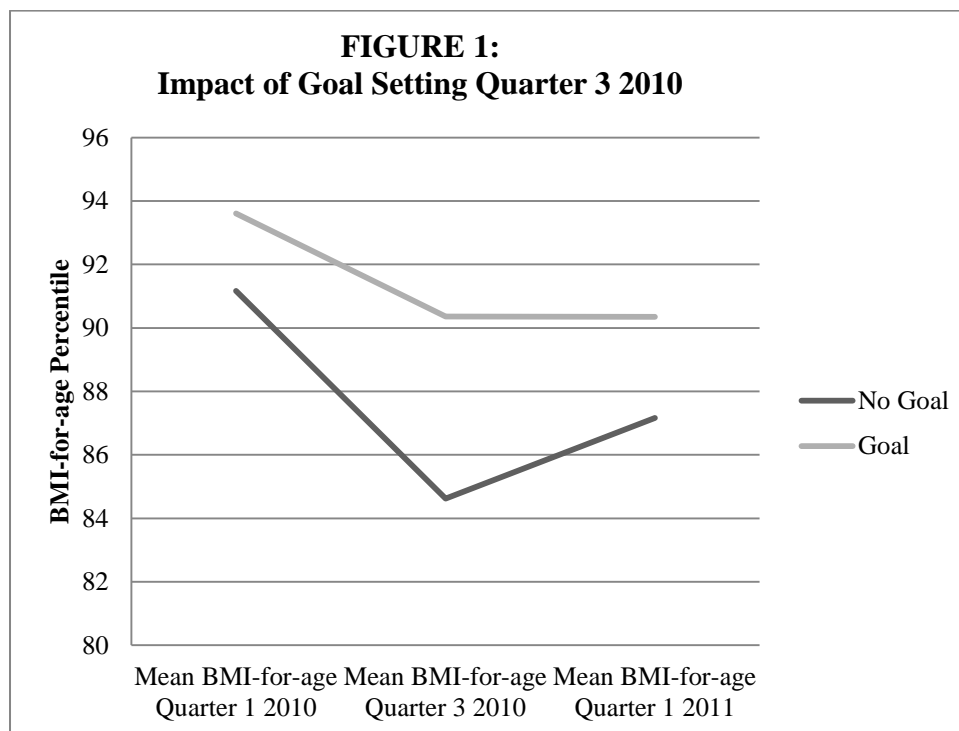
Impact of Goal Setting

A goal was set with parent(s)/caretaker(s) for 120 (72%) participants in quarter one 2010, and for 104 (62%) of participants in quarter three 2010. Goal setting at quarter one 2010 was not associated with reduction in BMI-for-age at six months ($p=0.587$) or at one year ($p=0.472$) (Table 3.) Goal setting at quarter three 2010 was also not associated with a reduction in in BMI-for-age at one year ($p=0.614$). It was observed, however, through a repeated measures analysis that those who had a goal set during quarter three 2010 were more likely to maintain their BMI-for-age than those who did not have a goal. Those who did not have goal set increased BMI-for-age during this period, as evidenced by an increase in mean BMI-for-age by quarter one 2011 (Table 3) (Figure 1).

TABLE 3:
Impact of Goal Setting with Parent(s)/Caretaker(s)
(n=167)

	<i>Goal Setting Quarter 1 2010</i>			<i>Goal Setting Quarter 3 2011</i>		
	<i>No Goal (n= 47)</i>	<i>Goal (n=120)</i>	<i>p- value*</i>	<i>No Goal (n=63)</i>	<i>Goal (n=104)</i>	<i>p- value*</i>
Mean Start BMI-for-age (Quarter 1 2011)	92.61	92.73	0.888	91.17	93.61	0.001
Mean BMI-for-age Quarter 3 2010	87.41	88.51	0.602	84.62	90.36	0.003
Mean End BMI-for-age (Quarter 1 2011)	89.89	88.85	0.576	87.16	90.35	0.062
Mean change in BMI-for- age 6 months	-5.2	-4.22	0.587	-6.55	-3.25	0.048
Mean change in BMI-for- age 1 year	-2.72	-3.87	0.472	-4.01	-3.26	0.614
% Participants Initially Categorized as Overweight	36.20%	40.00%	0.648	25.40%	47.10%	0.005
% Male	61.70%	60.80%	0.918	54%	65.40%	0.142
% Hispanic	51.10%	55.80%	0.578	54%	54.80%	0.916
% non-Hispanic	48.90%	44.20%	0.578	46%	45.20%	0.916

** p-values were obtained using ANOVA for continuous variables, and using a Chi-squared analysis for categorical variables.*



Ethnicity

Mean start BMI-for-age percentile for participants who were Hispanic was 93.13 versus the mean for those who were non-Hispanic which was 92.17 ($p=0.194$). Mean change in BMI-for-age at six months was -4.18 for Hispanic versus -4.88 for non-Hispanic participants, with change in BMI-for-age at one year -3.54 for Hispanic versus -3.56 for non-Hispanic participants. No difference in program effectiveness was shown for participants who were Hispanic compared to those who were non-Hispanic at both six months and one year based on change in BMI-for-age ($p=0.670, 0.985$) (Table 4).

TABLE 4:
BMI-for-age and Change in BMI-for-age Values Over a One Year
Period Based on Ethnicity
(n=167)

	<i>Hispanic</i> (n=91)	<i>non- Hispanic</i> (n=76)	<i>p- value*</i>
Mean Start BMI-for-age (Quarter 1 2011)	93.13	92.17	0.194
Mean BMI-for-age Quarter 3 2010	88.95	87.3	0.386
Mean End BMI-for-age (Quarter 1 2011)	89.59	88.61	0.558
Mean change in BMI-for-age 6 months	-4.18	-4.88	0.670
Mean change in BMI-for-age 1 year	-3.54	-3.56	0.985

**p-values calculated using ANOVA*

Discussion

This program was found to be effective in reducing BMI-for-age in preschool-aged WIC participants over time and appeared to be equally effective for both Hispanic and non-Hispanic participants. Participants in the Utah County Fit WIC Program all showed a mean decrease in BMI-for-age over six months (-4.50) and one year (-3.55).

Results from a study comparing both a home-based and clinic-based intervention for preschool-aged children (Stark et al., 2011), indicate that those in the home-based intervention showed a reduction in BMI-for-age percentile of -2.1 at six months and -1.1 at one year, and those participating in the clinic-based program saw a change in BMI-for-age percentile of 0.3 at six months and 1.6 at one year. There was a greater difference in BMI-for-age improvement at both six months and one year for participants in the Utah County Fit WIC program when compared to this study.

Participation in this Fit WIC Program seemed to be the most successful for those with BMI-for-age percentiles between the 85th and 94th percentiles, and was associated with a larger decrease in BMI-for-age for participants who were initially assessed as at-risk of overweight compared to those who were initially assessed as overweight. These results may indicate that interventions such as this may help prevent children's BMI-for-age values from reaching the 95th percentile or above.

This study found that although BMI-for-age values are decreasing, this change was not significantly associated with discussion of weight status with parent(s)/caretaker(s) nor goal setting at certification appointments. It is possible that other aspects of the WIC program such as education provided between certification appointments, or the healthful foods found in the WIC supplemental food package may contribute to this change in BMI-for-age. In 2009, changes were made to the WIC food packages to include more healthful foods such as whole grains, fruits, and vegetables. At the WIC Food Package Evaluation Symposium which was held in 2010, results from a study conducted in the California WIC Program were reported which found that intakes of fruit, vegetables, whole-grains, and lower-fat milk increased when the new WIC food packages were implemented (Altarum Institute, 2011).

Limitations of this study include confounding factors due to initial BMI-for-age. In both of the program interventions studied (discussing with parent(s)/caretaker(s) and goal-setting), intervention groups had a higher percentage of children who were initially assessed as overweight than in the non-intervention groups over both time periods (Table 2). Initial weight status was found to have an impact on program effectiveness. Though a confounding factor in assessing the impact of program interventions, this does indicate

that staff are identifying and seeking to intervene for those with the highest BMI-for-age percentiles.

One limitation to retrospective studies such as this is that counseling and goal setting was done by multiple staff members in a non-standard way over the study time period. It is likely that the same staff member who discussed a child's weight with a parent(s)/caretaker(s) at the initial appointment was not the same staff member who met with them during the second appointment. Another limitation may have been that those who had the highest BMI-for-age (100th percentile) the computer system did not show changes in these participants unless BMI-for-age dropped below this percentile. Also, this study did not control for seasonal factors, which may also play a role in BMI-for-age due to increased inactivity in winter months.

Recommendations for future research include determining what would be classified as a "significant" reduction in a growing child's BMI-for-age over time. Also, the role of initial weight status found in this study indicates a need for research into how to effectively help those children who are at the highest BMI-for-age percentiles. Research should also be done to explore the role of education given between certification appointments, and the role of WIC food packages on BMI-for-age percentiles of WIC participants.

Conclusions

As the obesity epidemic continues, effective interventions are needed to help reduce the prevalence of obesity in America. These prevention interventions, while needed at all age levels, could potentially have a lasting impact when started when a

person is young. The Utah County Fit WIC Program seeks to use its unique role as a program for low-income children to reduce the incidence of childhood obesity. Though not found to be associated with discussing weight status with parent(s)/caretaker(s) or goal setting, this study found mean BMI-for-age percentiles decreased for participants at both six months and one year.

This program provides a model for interventions for children who are overweight or at-risk for overweight. This study shows that despite challenges faced by this supplemental food program, the WIC program may be a venue for interventions to help reduce rates of overweight and at-risk of overweight among a low-income population.

References

- Altarum Institute. (2011). Early Outcomes: Impact of the new WIC foods. Retrieved from http://www.calwic.org/storage/5-WIC-Policy-Brief-FINAL_2.pdf
- Aranceta, J., Moreno, B., Moya, M., & Anadon, A. (2009). Prevention of overweight and obesity from a public health perspective. *Nutrition Reviews*, *67* (Suppl. 1), S83-S88. doi: 10.1111/j.1753-4887.2009.00166.x
- Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report. *Pediatrics*, *120*, S164-S192. doi: 10.1542/peds.2007-2329C
- Centers for Disease Control and Prevention. (2010a). Overweight and obesity. Retrieved September 9, 2010, 2010, from <http://www.cdc.gov/obesity/>
- Centers for Disease Control and Prevention. (2010b). Vital Signs: State-Specific Obesity Prevalence Among Adults — United States, 2009. *Morbidity and Mortality Weekly Report*, *59*. Retrieved from <http://www.cdc.gov/mmwr/pdf/wk/mm59e0803.pdf>
- Centers for Disease Control and Prevention. (2011a). Overweight and obesity. Retrieved September 9, 2011, from <http://www.cdc.gov/obesity/childhood/data.html>
- Centers for Disease Control and Prevention. (2011b). U.S. Obesity Trends Retrieved October 3, 2011, from <http://www.cdc.gov/obesity/data/trends.html#National>
- Chamberlin, L. A., Sherman, S. N., Jain, A., Posers, S. W., & Whitaker, R. C. (2002). The challenge of preventing and treating obesity in low-income, preschool children. *Arch Pediatr Adolesc Med*, *156*, 662-668.
- Connor, P., Bartlett, S., Mendelson, M., Condon, K., & Sutcliffe, J., et al. (2010). *WIC Participant and Program Characteristics 2008*. Retrieved from <http://www.fns.usda.gov/ora>.
- Kubik, M. Y., Story, M., Davey, C., Dudovitz, B., & Zuehlke, E. U. (2008). Providing Obesity Prevention Counseling to Children during a Primary Care Clinic Visit: Results from a Pilot Study. *Journal of the American Dietetic Association*, *108*, 1902-1906. doi:10.1016/j.jada.2008.08.017
- Must, A., & Anderson, S. E. (2003). Effects of Obesity on Morbidity in Children and Adolescents. *Nutrition in Clinical Care*, *6*, 4-12.

- Nader, P. R., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R., . . . Susman, E. J. (2006). Identifying risk for obesity in early childhood. *Pediatrics, 118*, e594-e601. doi: 10.1542/peds.2005-2801
- Ogden, C., & Carroll, M. (2010). Prevalence of obesity among children and adolescents: United States, Trends 1963-1965 through 2007-2008 Retrieved September 9, 2011, from http://www.cdc.gov/nch/data/hestat/obesity_child_07_08/obesity_child_07_08.pdf
- Oliveira, V., Racine, E., Olmsted, J., & Ghelfi, L. M. (2002). The WIC program: Background, trends, and issues. (FANRR-27). Retrieved from <http://www.ers.usda.gov/publications/fanrr27/fanrr27.pdf>.
- Physical Activity, Nutrition,, and Obesity Program,, Bureau of Health Promotion,, Utah Department of Health. (2010). Childhood overweight in Utah 2010. Retrieved from http://health.utah.gov/obesity/documents/HW_Elem_Project_2010.pdf
- Serrano, E., Gresock, E., Suttle, D., Keller, A., & McGarvey, E. (2006). Fit WIC: attitudes, perceptions and practices of WIC staff toward addressing childhood overweight. *J Nutr Educ Behav, 38*, 151-156.
- Sparks, J. (2010). Childhood morbidities among income- and categorically-eligible WIC Program participants and non-participants. *Journal of Children and Poverty, 16*(1), 47-66. doi: 10.1080/1796120903575093
- Stark, L. J., Spear, S., Boles, R., Kuhl, E., Ratcliff, M., Scharf, C., . . . Rausch, J. (2011). A pilot randomized controlled trial of a clinic and home-based behavioral intervention to decrease obesity in preschoolers. *Obesity, 19*(1), 134-141. doi: 10.1038/oby.2010.87
- United States Department of Agriculture Food and Nutrition Service. (2010). WIC Program Monthly Data Retrieved September 9, 2011, from, http://www.fns.usda.gov/pd/37WIC_Monthly.htm
- Utah Department of Health WIC Program. (2011). Federal Fiscal Year 2011 Policy and Procedures Manual, Section D: Nutrition Risk Manual. Retrieved September 17, 2011, from http://health.utah.gov/wic/pdr/policy_procedures/current_RY/D.%20Nutrition%20ORisk%20Manual.pdf
- Whitlock, E. P., Williams, S. B., Gold, R., Smith, P. R., & Shipman, S. A. (2005). Screening and Interventions for Childhood Overweight: A Summary of Evidence for the US Preventive Services Task Force. *Pediatrics, 116*(1), e125-e141. doi: 10.1542/peds.2005-0242

Ziol-Guest, K. M., Duncan, G. J., & Kaili, A. (2009). Early Childhood Poverty and Adult Body Mass Index. *American Journal of Public Health*, 99(3), 527-532. doi: 10.2105/AJPH.2007.130575

CHAPTER III

CONCLUSIONS AND APPLICATIONS

Discussion

This study evaluated the effectiveness of the Utah County Fit WIC Program. The objectives were to 1) determine if discussing a child's risk of becoming overweight or obese with their parent(s)/caretaker(s) during WIC certification visits, as evidenced by a written care plan or goal, leads to improvements in BMI-for-age over a period of time (six months and one year), 2) determine the impact -- if any -- of goal setting on a child's BMI-for-age (over a six month and one year period) when goals are set at semiannual WIC appointments with parent(s)/caretaker(s) of children who are overweight (or at-risk for overweight), and 3) compare the effectiveness of this program for Hispanic clients versus non-Hispanic clients by comparing overall reduction in BMI-for-age between the two populations.

The results of this study demonstrated effectiveness in reducing BMI-for-age in preschool-aged WIC participants over time and appeared to be equally effective for both Hispanic and non-Hispanic participants. Participants in the Utah County Fit WIC Program all showed a mean decrease in BMI-for-age over both a six months (-4.50) and one year (-3.55).

Results from a study comparing both a home-based and clinic-based intervention for preschool-aged children (Stark et al., 2011), indicate that those in the home-based intervention showed a reduction in BMI-for-age percentile of -2.1 at six months and -1.1 at one year, and those participating in the clinic-based program saw a change in BMI-for-

age percentile of 0.3 at six months and 1.6 at one year. There was a greater difference in BMI-for-age improvement at both six months and one year for participants in the Utah County Fit WIC program when compared to this study.

Although there was overall improvement (decrease) in BMI-for-age values among participants in this program, this change could not be statistically correlated with discussion of weight status with parent(s)/caretaker(s) nor goal setting at certification appointments (in intervention vs. non-intervention). Despite statistically insignificant differences between the two groups based on these factors, all of the participants in this program over the study period showed improvements. This positive finding suggests that this program may be beneficial to WIC participants.

Participation in the Utah County Fit WIC Program seemed to be most successful for those with BMI-for-age percentiles between the 85th and 94th percentiles and was associated with a larger decrease in BMI-for-age for participants who were initially assessed as at-risk of overweight compared to those who were initially assessed as overweight. It may be that interventions such as those found in this program may help prevent children's BMI-for-age percentiles from reaching the 95th percentile or above.

It is possible that other aspects of the WIC program -- such as education provided between certification appointments or the healthful foods found in the WIC supplemental food package -- may contribute to this change in BMI-for-age.

In 2009, changes were made to the WIC food packages to include more whole grains, fruits, and vegetables. As reported at the WIC Food Package Evaluation Symposium held in 2010, results from a study conducted in the California WIC program

demonstrated that intakes of fruit, vegetables, whole-grains, and lower-fat milk increased when the new WIC food packages were implemented (Altarum Institute, 2011).

Discussing weight at a WIC clinic visit, though not significantly found to be associated with reduction in BMI in this study, may still be contributing to a lower BMI-for-age in this population. It is possible that parents may be receptive to this type of clinic-based intervention (discussion of weight with a physician or health care professional) -- as indicated in a 2008 study by Kubik, et al. (Kubik, Story, Davey, Dudovitz, & Zuehlke, 2008). This type of intervention could be especially helpful to a low-income population where participation in counseling sessions with nutrition staff for qualified applicants in the WIC program is free of charge. It is possible that healthful interventions were implemented at home that contributed to an improved BMI-for-age based on the advice of WIC nutrition staff, of which this study did not collect data.

This study supports the assumption that participation in the WIC program is associated with positive changes in a child's weight, and that similar interventions could be implemented within the framework of a WIC clinic despite challenges. It has been reported that staff members perceive WIC participants as resistant and unable to change due to their circumstances (Chamberlin, Sherman, Jain, Posers, & Whitaker, 2002). Results of this study demonstrate otherwise, and may help improve staff member's perception of participants. It may also help those staff members who may be uncomfortable with discussing weight in the WIC clinic setting (Serrano, Gresock, Suttle, Keller, & McGarvey, 2006) overcome challenges to addressing childhood obesity. The evaluation of this Fit WIC Program also shows that participation in this program had an

impact despite the challenge of trying to establish a rapport with clients in a short clinic visit (Chamberlin et al., 2002).

BMI-for-age early in life is linked with increased risk for a high BMI later in life (Nader et al., 2006). Programs such as the Utah County Fit WIC Program may be able to play a role in not only helping to lower BMI-for-age in overweight children, but also in preventing overweight and obesity in the populations they serve. As risks for overweight and obesity are identified, and interventions made, it is expected that reduced BMI-for-age levels in the preschool period will continue later in life. While providing interventions for children who are at-risk or overweight, this program may also be a model for incorporating prevention counseling at certification appointments for participants who are within a healthy weight range, to help prevent obesity, as is encouraged in the report by Barlow (2007).

Limitations of this study include confounding based on initial BMI-for-age. Initial weight status was found to have an impact on program effectiveness. In both of the interventions studied (discussing with parent(s)/caretaker(s) and goal-setting), intervention groups had a higher percentage of children who were initially assessed as overweight compared to the non-intervention groups over both time periods. Though a confounding factor in assessing the impact of program interventions, this does indicate that staff are identifying and seeking to intervene for those with the highest BMI-for-age percentiles.

Also, the computer system did not show changes in participants who had the highest BMI-for-age values (100th percentile) unless BMI-for-age dropped below this percentile. In the future interventions should be studied specifically for this group, and

based on the Expert Committee recommendations (Barlow, 2007) these participants who are beyond the 99% cutoff, could be classified as “severely obese” and actions take to differentiate between BMI changes over time for these participants. This would help to give a more accurate picture of the effectiveness of interventions for this high-risk group.

Additionally, this study did not control for seasonal factors (i.e. reduced physical activity during winter months). This may also have impacted BMI-for-age values.

Finally, because this was a retrospective study, it was difficult to standardize interventions and control for variability. Counseling and goal setting were done by multiple staff members in a non-standardized fashion before the data for this study was collected or analyzed. It is highly possible that the same staff member who discussed a child’s weight with a parent(s)/caretaker(s) at the initial appointment during the study period was not the same staff member who met with them during the second appointment. Although nutrition staff members are encouraged to conduct thorough assessments and set goals with all patients, considerable variability between individual counseling techniques and styles, goal setting, and charting of interventions is probable.

Areas of Future Research

While this study showed that the BMI-for-age levels of those participating in Utah County’s Fit WIC Program improved, future research needs to be done to further develop and evaluate public-health interventions for childhood obesity. Recommendations for future research include:

- Determine what should be classified as a “significant” reduction in BMI-for-age of a growing child.

- Research effectiveness of interventions that are targeted to children with the highest BMIs-for-age (above the 95th percentile).
- Explore the role nutrition education provided as part of the WIC program between semi-annual certification appointments on weight status.
- Continue to analyze the impact of the new food packages (Altarum Institute, 2011) on children's consumption of fruits and vegetables and the effect on participants' weight status.
- Conduct long-term studies to evaluate if improvements in BMI-for-age at the preschool age in WIC participants translate into healthy BMI's later in life.
- Determine parent's perception of WIC clinic staff addressing their child's weight at certification appointments, similar to the research that has been done with parents discussing weight with their physician (Kubik et al., 2008).

Recommendations and Conclusions

It is important that clinic visits be a positive experience for clients. It may be beneficial for Utah County WIC and other community clinics to train staff on patient-centered approaches to addressing weight with parent(s)/caretaker(s) such as motivational interviewing (Barlow, 2007). To be sensitive to participants and parent(s)/caretaker(s), staff members should also be encouraged to use neutral terms when addressing a child's weight such as "excess weight" and discuss the meaning of a child's "BMI", versus using terms such as "obesity" and "excess fat" (Barlow, 2007).

It is recommended that WIC clinics seeking to provide interventions on the clinic level provide training to staff to help address possible negative perceptions of WIC

participants (Chamberlin et al., 2002) or their perceptions about addressing overweight and obesity in their clinics (Serrano et al., 2006). Evidence of successful programs, such as the Utah County Fit WIC Program, may help improve these perceptions.

This study shows that despite challenges faced by this supplemental food program, the WIC program may be a venue for interventions to help reduce rates of overweight and at-risk of overweight among a low-income population. This program is an example of an intervention that can be implemented as part of current WIC services. Simple modifications can be made to integrate education about healthy behaviors to address or prevent overweight or obesity into each individual clinic. Medical record reviews, similar to the one done for this study, can help evaluate progress on weight management interventions and programs. IRB approval for analyses of this type can be obtained through the State Health Department IRB board.

Standardization would improve the quality of analysis for this program and other similar programs. Charting could be standardized by categorizing interventions. One way to categorize these interventions could be by using the 10 healthy lifestyle and eating behaviors identified by Barlow (2007). These recommendations are appropriate for a WIC population and encompass many of the behaviors already encouraged by clinic staff. Further analysis could then be done to determine which interventions lead to the greatest improvements in BMI-for-age values.

Effective interventions and weight management strategies are needed to help reduce the prevalence of obesity in America. These prevention interventions, while necessary at all age levels, may be most influential when introduced at an early age. The Utah County Fit WIC Program seeks to use its unique position as a program that provides

services to low-income children and families to help reduce the incidence of childhood obesity and improve other measures of health. This program may also serve as a model for other programs implementing interventions for children who are overweight or at-risk for overweight.

Although this study did not demonstrate a statistically significant association between BMI-for-age percentile changes and discussion of child's weight status with their parent(s)/caretaker(s), the mean BMI-for-age percentiles did decrease at both six months and one year. This trend indicates that, with continued improvement of this program (i.e. standardization of charting and education), the Utah County Fit WIC Program and other similar programs are beneficial in terms of childhood weight management.

References

- Altarum Institute. (2011). Early Outcomes: Impact of the new WIC foods. Retrieved from http://www.calwic.org/storage/5-WIC-Policy-Brief-FINAL_2.pdf
- Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report. *Pediatrics*, *120* (Suppl. 4), S164-S192. doi: 10.1542/peds.2007-2329C
- Chamberlin, L. A., Sherman, S. N., Jain, A., Posers, S. W., & Whitaker, R. C. (2002). The challenge of preventing and treating obesity in low-income, preschool children. *Arch Pediatr Adolesc Med*, *156*, 662-668.
- Kubik, M. Y., Story, M., Davey, C., Dudovitz, B., & Zuehlke, E. U. (2008). Providing obesity prevention counseling to children during a primary care clinic visit: Results from a pilot study. *Journal of the American Dietetic Association*, *108*, 1902-1906. doi: 10.1016/j.jada.2008.08.017
- Nader, P. R., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R., . . . Susman, E. J. (2006). Identifying risk for obesity in early childhood. *Pediatrics*, *118*, e594-e601. doi: 10.1542/peds.2005-2801
- Serrano, E., Gresock, E., Suttle, D., Keller, A., & McGarvey, E. (2006). Fit WIC: attitudes, perceptions and practices of WIC staff toward addressing childhood overweight. *J Nutr Educ Behav*, *38*, 151-156.
- Stark, L. J., Spear, S., Boles, R., Kuhl, E., Ratcliff, M., Scharf, C., . . . Rausch, J. (2011). A pilot randomized controlled trial of a clinic and home-based behavioral intervention to decrease obesity in preschoolers. *Obesity*, *19*(1), 134-141. doi: 10.1038/oby.2010.87

APPENDIX



State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Utah Department of Health

DAVID N. SUNDWALL, M.D.
Executive Director

Division of Family Health and Preparedness

MARC E. BABITZ, M.D.
Division Director

February 9, 2011

Elizabeth Nixon, RC,CD
Utah County Health Department
1164 E 700 N
Provo, UT 84606

Re: IRB Approval on Project #301 – Evaluating the effectiveness of the Utah County FitWIC program

Dear Ms. Nixon:

Thank you for submitting your project to the UDOH IRB for review.

IRB approval is given to your project entitled: IRB Project #301 - Evaluating the effectiveness of the Utah County FitWIC program, with submitted evidence of approval from the State WIC office

If you have any additional questions, please contact me at 801-273-6643.

Sincerely,

Iona Thraen
Chair



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