

# Current intervention strategies aimed at the prevention of adolescent obesity

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## Introduction

In the US during the past three decades the prevalence of overweight and obesity among school children and adolescents has tripled.

NHANES 2005-2006

- 16.3% of children (2-12) were obese and 31.9% were overweight.
- 17.6% of adolescents (12-19) were obese and 34.1% overweight.

There are four major modalities for the management of overweight and obesity in adolescents

- 1.) Dietary management
- 2.) Increasing physical activity
- 3.) Pharmacological therapy
- 4.) Bariatric surgery

However, primary prevention efforts are needed over secondary and tertiary prevention

- Schools are the most common setting for primary prevention interventions for reducing obesity.
- Sharma (2006) published a review of preventative interventions in 2006.
  - Identified 11 such interventions published between the years 1999 and 2004.
  - Most focused on primary prevention and targeted both physical activity and nutrition.
  - Majority of the interventions were based on some behavioral theory (i.e. Social Cognitive Theory) however, VERY FEW measured and documented changes in behavioral constructs of the theory.
  - Majority of the interventions were longer than six months.
  - Majority of interventions focused on individual level behavior change approaches and few addressed broader policy and environmental level changes.
  - Majority of the interventions utilized existing teachers for implementation.
  - Only a few interventions documented the degree of fidelity in implementation of the planned interventions.
  - On the whole the review showed that the interventions resulted in modest changes in behaviors and had mixed results with indicators of obesity such as BMI, triceps skinfold thickness and waist circumference.
- Purpose of this review is to update these findings for current practice.

## Methods

A literature review was conducted to collect studies for inclusion.

- Databases: Pubmed, ERIC and CINAHL
- Keywords: "Adolescent", "Obesity", "Prevention", & "Intervention"

The inclusion criteria for this review include:

- 1) publication in English language
- 2.) publication between 2005-2009
- 3.) a primary research article with an obesity prevention intervention
- 4.) the intervention must have been implemented with adolescents

Exclusion criteria were articles in languages other than English, published before 2004, review articles, and interventions implemented with other age groups

- A total of 13 studies met the criteria.
- Nine were for primary prevention

Study/Grade/Age/Year of publication	Theory & Duration	Intervention Components	Salient Findings
<i>Fit for Life</i> -- K-8 <sup>th</sup> grade -- 5-14 year olds -- 2007	No known theory 4 years	(1) American Heart Association's Heart power kits (2) Virtual wellness club that used booklets to track health habits (3) Point source programs for residents for healthy options at restaurants (4) Occupational health initiatives that included fairs and screenings (5) Community activity that included working with health agencies	-- No significant change in overweight or obesity rates -- Changes in behaviors and their antecedents not studied
<i>Policy-based School Intervention</i> -- 4 <sup>th</sup> - 6 <sup>th</sup> grade -- Mean age 11.3 years -- 2008	Social marketing and other theories 2 years	(1) Self-assessment (School Health Index) (2) Nutrition Education - <i>Planet Health and Know your Body</i> (3) Nutrition policies for foods sold (4) Social marketing of healthy food products (5) Family outreach through newsletters and weekly workshops	-- 50% reduction in the incidence of overweight -- After 2 years only 7.5% children in the intervention group were overweight as compared to 14.9% in the control group and this difference was statistically significant
<i>Nutrition in the Garden</i> -- 6 <sup>th</sup> grade -- 10-13 year olds -- 2007	No known theory 12 weeks	(1) Food recall workbooks used to illustrate appropriate portion size (2) Twelve week nutrition education curriculum (3) Hands-on garden-based activities (i.e. maintaining a garden)	-- Students in garden-based nutrition group increased their fruit and vegetable consumption (p < 0.001) than other two groups -- Significant increase in Vitamin A, C, and fiber (p < 0.05)
<i>Dutch Obesity Intervention in Teenagers</i> -- 6 <sup>th</sup> grade -- 12-14 year olds -- 2009	Intervention Mapping 20 months	(1) Eleven lessons in courses of biology and physical education (2) Environmental component consisting of asking schools to offer additional physical education classes and changes in school cafeteria	-- At 20 months (1) Biceps skinfold thickness among girls decreased and (2) Triceps, bicep and subscapular skinfold thickness decreased for boys
<i>School-based Obesity Prevention Program</i> -- 4 <sup>th</sup> -8 <sup>th</sup> grade -- 12-15 year olds -- 2008	No known theory 16 class sessions	(1) Sixteen sessions during P.E. classes (2) Topics included reviewing food labels, portion sizes, & food pyramid (3) Each session also included 20-30 min of physical activity	-- Formative evaluation revealed that small group settings was successful -- Lack of parental involvement was a limitation
<i>Choice, Control, &amp; Change</i> -- 7 <sup>th</sup> grade -- 11-13 year olds -- 2007	Theory of planned behavior 8 weeks	(1) Twenty-four lessons taught by science teachers over 7-8 weeks (2) Curriculum met national science standards in biology and science (3) Five units: (1) Getting right amount of energy, (2) making healthy food and activity choices (3) Importance of healthy food and activity choices (4) Impact of environment, and (5) Skills of a competent mover and eater.	-- Significant decrease in sedentary activities -- Significant increase in frequency of fruit and vegetable intake -- Decrease in frequency of sweetened beverages, packaged snacks, eating at fast food restaurants and ate and drank smaller portions
<i>Present and Prevent</i> -- Middle school -- Mean age 14.5 years -- 2008	Evaluation based on theory of reasoned action 1 week	(1) A commercially available Power Point program consisting of two 30 min slides (2) Topics included: health problems associated with obesity, causes of obesity, importance of preventing obesity, body image, benefits of healthy weight, healthful food choices, reading food labels, portion control, changing unhealthy habits, how to increase physical activity, and overcoming barriers.	-- Significant improvement in knowledge scores between pretest and post test for experimental group -- No effect on attitudes -- Significant improvement in friends subjective norm between pretest and post test for experimental group -- Significant improvements in behavioral intention for eating fried foods, sweets, looking at food labels, and limiting TV watching between pretest and post test for experimental group
<i>Michigan Model (MM) Nutrition Curriculum</i> -- Middle school -- Mean age 12.5 years -- 2008	No known theory 1 month	Eight lessons: (1) five food groups; (2) health benefits of each food group; (3) selling points for each food group; (4) food labels; (5) advertising claims; (6) healthy body image; (7) surviving fast food; (8) nutrition at school	-- Significant increase in nutrition knowledge at post test for intervention group -- Significant improvement in eating behaviors and efficacy expectations for intervention group -- Intervention group was more likely to eat fruits and vegetables
<i>USDA Fresh Fruit &amp; Vegetable Program (FFVP)</i> -- 4 <sup>th</sup> -9 <sup>th</sup> grade -- 9-14 year olds -- 2008	No known theory 2 years	Provision of a free fresh fruit or vegetable daily	-- Intervention students when compared to control were more willing to try fruits (24.8% vs. 12.8%, p < 0.01) and vegetables (25.1% vs. 18.4%, p = 0.01) at school.

## Conclusions/Recommendations

- As obesity and overweight increases the need for novel approaches for prevention and management are greatly needed.
- From this review it appears that while not all studies have utilized theory-based approaches, the trend toward using theory is growing.
- Some of the new theories that are being used include: the theory of reasoned action, the theory of planned behavior, intervention mapping, and social marketing theory
- Growing use of newer behavioral theories will improve the quality of interventions.
- It is less likely that brief interventions will impact weight status
  - However, these interventions do have the potential to influence important mediating variables that drive behavior change.
- Given that theory-driven approaches are important and needed, evaluations should focus on measuring changes in the constructs that mediate behavior change.
- Schools were also found to be the most common place for intervention
  - This appears appropriate, since virtually all children attend some form of private or public school.
- Limitations:
  - Not all studies employed the use of a process evaluation
  - Policy and environment changes are still uncommon
  - Future studies that attempt such changes are recommended to document key challenges and barriers they are faced with, and what actions they took or foresee taking to overcome such barriers.
  - Lack of an appropriate control group was also noted, however, this may be difficult to overcome since it is conceivable that it would be difficult to find schools willing to participate in studies as control schools, or schools that receive no intervention.

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