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Editorial

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Childhood Obesity: Need for Multipronged Approach

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Childhood obesity is a growing public health problem. Between 1970 and 2000, the number of obese children in United States tripled.[1] In 2009-2010, 30.4% of children and adolescents aged 2 through 19 years were found to be overweight or obese.[2] African American and Hispanic children have been found to have higher rates of overweight and obesity than Caucasian American children.[3] Childhood obesity is particularly harmful as it is associated with several short term medical consequences including adverse blood lipid profile, altered glucose metabolism, obstructive sleep apnea and long term medical effects including higher risk of hypertension, diabetes, cardiovascular disease, gall bladder disease, and osteoarthritis in adulthood.[4] The Bogalusa Heart Study found that by age 10 years, 60% of overweight children have at least one biochemical or clinical cardiovascular risk factor and 25% have more than two.[5] Childhood overweight and obesity have also been linked with psychosocial problems such as poor self-image, lowered self-esteem, eating disorders, and poor quality of life.[6]

In 2006 medical care costs of adult obesity in the United States were estimated to be close to $147 billion.[7] Two of the key determinant behaviors of obesity namely, unhealthy dietary habits and physical inactivity behavior, together account for approximately 300,000 deaths every year.[8] Therefore in Healthy People 2020 there are several objectives related to childhood obesity.[9] One of them aims at reducing the proportion of children aged 2 to 5 years who are considered obese from 10.7 percent in 2005-08 to 9.6 percent. Second objective aims at reducing the proportion of children aged 6 to 11 years who are considered obese from 17.4 percent in 2005-08 to 15.7 percent. Third objective aims at reducing the proportion of adolescents aged 12 to 19 who are considered obese from 17.9 percent in 2005-08 to 16.1 percent. The final objective aims at reducing the proportion of children and adolescents aged 2 to 19 who are considered obese from 16.1 percent in 2005-08 to 14.5 percent.

DETERMINANTS OF CHILDHOOD OBESITY

Sharma & Ickes[10] have published an article on psychosocial determinants of childhood obesity. Some of the non-modifiable determinants of obesity that the study identified included genetics, age, height, and having older siblings. Among modifiable factors were physical inactivity, television watching, and nutritional behaviors and environments. Consuming polyunsaturated fatty acids was associated with obesity. Consuming adequate servings of fruits and vegetables was protective against overweight and obesity. Maternal smoking during pregnancy, lack of breast feeding, high birth weight, weight gain in first week of life, and rapid growth in infancy were other modifiable factors for overweight and obesity. Final set of modifiable factors was related to parents such as parental overweight and obesity, parental education especially maternal education level, and socio-economic status. Commonly suggested modifiable public health strategies to combat childhood obesity are promoting breastfeeding, limiting television viewing, encouraging physical activity, increasing fruit and vegetable intake, controlling portion size, and limiting soft drink consumption.[11]

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TYPES OF INTERVENTIONS FOR CHILDHOOD OBESITY

In order to combat the complex problem of childhood obesity several approaches have been tried. These approaches can be classified into five categories: (1) school-based interventions; (2) after school interventions; (3) family and home based interventions; (4) community interventions; and (5) policy interventions. Communities need a multipronged approach to counteract the threat of growing problem of childhood obesity and all these modalities for interventions should be judiciously weaved into an effective public health approach. We will discuss the status of these interventions and suggest ways to improve these efforts.

SCHOOL-BASED INTERVENTIONS FOR CHILDHOOD OBESITY

Sharma[12] conducted a review of school based interventions which was published in Obesity Reviews and included 11 interventions from USA and UK. The participants in these interventions were from kindergarten, primary grades, middle school to high school. Most of these interventions targeted both physical activity and nutrition behaviors though there were some interventions that focused on only one dimension such as TV watching or restricting drinking of carbonated drinks or increasing physical education time in the school. Most of the interventions were based on some behavioral theory and the most popular theory was social cognitive theory. Most of the interventions focused on individual level behavior change approaches. Most of the interventions focused on short term changes right after the intervention and very few measured long term changes. On the whole, interventions resulted in modest changes in behaviors and mixed results with indicators of obesity. TV watching was the most modifiable behavior, followed by physical activity and nutrition behaviors. The outcome measures such as lowered BMI, triceps skin fold thickness and waist circumference were not measured by all studies.

In order to enhance the effectiveness of school based interventions these must be based on behavioral theories and must document changes in constructs of the theories, must have explicit outcome measures, must conduct systematic process evaluations, must follow-up participants for longer period of time, and must focus on both physical activity and nutrition behaviors.

AFTER SCHOOL INTERVENTIONS FOR CHILDHOOD OBESITY

The after school environment offers an alternative venue for childhood obesity prevention. Branscum and Sharma[13] conducted a review of after-school based interventions and included 20 interventions published in 25 articles. The participants in these interventions were mostly from primary grades, with some kindergarten and middle school, but no high school participants. Unlike the school-based interventions, most of these interventions targeted either physical activity or nutrition behaviors though there were some interventions that focused on both dimensions, and a few studies focused on other behaviors such as body size perceptions, depressive symptoms, and self-concept. As with the school-based interventions, most of the interventions were based on some behavioral theory and the most popular theory was again social cognitive theory. Common limitations the authors noted for the evaluation of after-school obesity prevention interventions included: very few follow-up evaluations past the point of posttest, very few studies reported an a priori sample size determination, and many studies focuses on changing the behaviors of the children, and not their parents.

The authors concluded that after school programs have greater flexibility and often include activities that are not offered during the school day or can complement school-based subject matter including arts and drama, cultural enrichment and health education.[13] The after school environment is growing, and has the potential to impact a large number of children. According to the National Center for Education Statistics (NCES), almost half (43%) of youth (K-8th grade) now participate in some form of after school programming.[14] In terms of delivery and the potential recommendations for these programs they are very similar to school-based programs. Once again these programs must be theory based and the constructs of the theories must be measured before and after the program. These programs must have robust process evaluations. Outcome measures must be identified and systematically measured.

FAMILY AND HOME-BASED INTERVENTIONS FOR CHILDHOOD OBESITY

Knowlden and Sharma[15] have published a systematic review of 12 family and home based interventions targeting childhood overweight and obesity. The family and home environment is a highly influential psychosocial antecedent of childhood obesity. From the 12 studies in the review studies, eight targeted weight status and four targeted behavioral measures. Nine of the reviewed studies produced significant outcomes. The calculated effect sizes ranged from small to medium. Over sixty percent of the interventions targeted overweight or obese children and more than half focused on parents exclusively. The majority of the programs incorporated educational sessions as the primary modality for intervention delivery. Less than half of the interventions included home visitations. All of the interventions included home-based activities to reinforce behavior modification.

Differing from school-based and after-school based interventions, which typically target children, family and home based interventions primarily focus on parents. Changing the behavior of parents is the emphasis of such interventions. Once again for enhancing the effectiveness of family and home based interventions such programs should be based on behavioral theories directed toward parents and explicit measurement of theoretical constructs must be undertaken. Both dietary and physical activity behaviors must be targeted. For measuring di

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etary behaviors, behavior logs maintained by parents are useful. Physical activity can be evaluated through behavior logs or standardized scales or accelerometers.

COMMUNITY INTERVENTIONS FOR CHILDHOOD OBESITY

Community-based interventions are also gaining popularity in the area of childhood obesity prevention and control. Often times these are implemented in association with school-based interventions or another type of interventions and therefore their distinct identity is not established. Examples of these interventions include intervention by Jelalian and colleagues,[16] ACT! Actively Changing Together,[17] Niños Sanos, Familia Sana (Healthy Children, Healthy Family)[18] and such other programs. The challenge with community interventions for childhood obesity is the large scale and the long duration for the intervention.[19] Community-based participatory approaches have been used in evaluation of many of these projects which have their limitations. The classical randomized controlled trial is difficult and expensive to implement in such large scale community interventions. Group randomized controlled trials are often a more practical alternative.

POLICY INTERVENTIONS FOR CHILDHOOD OBESITY

Policy interventions are the cornerstone of health promotion efforts in public health and form an important avenue for childhood obesity interventions. Some funding organizations like Robert Wood Johnson Foundation exclusively fund policy level initiatives in the area of childhood obesity. Brenan and colleagues[20] have developed a review system to evaluate the growing literature on policy and environmental strategies to prevent childhood obesity. They identified documents published between 2000 and May 2009 in scientific and grey literature on policy or environmental strategies to reduce obesity or overweight, increase physical activity, and improve nutrition among youth (ages 3-18 years). Using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework they abstracted studies of 24 intervention strategies related to policy. The policy interventions are in their infancy and more systematic work needs to be undertaken in this regard.

CONCLUSIONS

In this brief communication we have understood the problem of childhood obesity, the determinants of childhood obesity, and the five major types of interventions that are currently being used to prevent and control childhood obesity. Some success has been seen with these different interventions; however a new approach must include a combination of these approaches. Ideally a synergistic multipronged approach is needed in any community that utilizes all five modalities of interventions. The school-based interventions are very popular but these must be substantiated by other forms of interventions. The after school interventions are an extension of the school based approaches and will grow in popularity. The family and home based interventions target parents as opposed to children and serve as complementary approaches. The community interventions and policy interventions are difficult to implement. The former require heavy investments of resources while the latter require detailed and intricate planning and advocacy. A new intervention for childhood obesity must start with a school-based and after school-based intervention as an entry. It must then have a family and home based and community outreach components. Finally it should tackle policy issues. Such a new multipronged obesity intervention would be able to effectively reduce the rates of overweight and obesity in children.

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