Childhood Obesity: A Transtheoretical Case Management Approach

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Childhood obesity is an increasing health problem because of its strong associations with chronic health problems in children and adults. Obesity during childhood commonly persists into adulthood and is resistant to interventions that involve only recommendations to decrease caloric intake and to increase caloric expenditure through increased physical activity. The challenge with this approach to childhood obesity is that it is not theoretically based, nor does it consider the child's or the parent's perceptions of the health problem or their transition along the stages of behavioral change. Case management has been proven to be successful in managing various chronic health problems in both adults and children. This article will introduce a new intervention model based on the transtheoretical framework by utilizing case management in a primary care setting to treat childhood obesity.

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Key words: Overweight; Behavioral; Cognitive; Intervention

The prevalence of overweight children in the United States continues to increase and appears to be reaching epidemic rates (Frank, Anderson, & Schmid, 2004). Children aged > 5 years are identified as obese if their body mass index (BMI) is greater than the 95th percentile for age and gender (Harvey, Holubkov, & Reis, 2004). More than 11% of American children are obese, and an additional 25% can be considered overweight (Dehghan, Akhtar-Danesh, & Merchant, 2005). A number of risk factors that predispose a child to overweight, obesity, or both have been identified. These factors include the characteristics of the child, the characteristics of the parent, and the characteristics of their environment (Goodman & Whitaker, 2002). The treatment of obesity needs to begin in the early stages of the disorder (Jain et al., 2001) to limit the physical and emotional (Flodmark, 2005) comorbidities that are tied to this disorder. The central components of common weight reduction programs for children involve changes in diet and increases in physical activity. Emerging literature also indicates that effective childhood weight reduction programs involve both the child and the parent (St Jeor, Perumean-Chaney, Sigman-Grant, Williams, & Foreyt, 2002).

The Transtheoretical Model (TTM) provides an excellent framework within which to assess the child’s and the parent’s awareness and acceptance of the problem of obesity and their level of desire to change their behavior to address the problem. The TTM describes four stages of change through which people progress in making health-related changes. Based upon the parent’s and the child’s stage of change, this model can be employed by the practitioner to direct appropriate interventions. The case management approach may be an effective mechanism for introducing TTM-based interventions designed to reduce childhood obesity. The case management approach allows the interventions to be individualized, taking the

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child, the parent(s), and their environment into consideration (Brown, McLaine, Dixon, & Simon, 2006). This article will describe the problem of childhood obesity and will introduce how the TTM can provide the basis for a potentially effective case management intervention to reduce childhood obesity.

THE PROBLEM OF CHILDHOOD OBESITY

Obesity is more prevalent than ever among American children and adolescents (Harvey et al., 2004). Few children have the knowledge necessary to make healthy nutritional or physical activity choices on their own; therefore, parents are key mediators of obesity prevention among their children. Parents play a large role in influencing the diet and physical activity of their young children by their own actions (Toschke, Beyerlein, & von Kries, 2005). In fact, parental obesity has been noted as one of the most predictive indicators of childhood obesity (Magarey, Daniels, Boulton, & Cockington, 2003; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). In contrast, daughters of physically active parents (including mother and father) were reported to have significantly higher levels of daily physical activity (Davison, Cutting, & Birch, 2003).

The development of obesity is associated with a number of factors, including decreased physical activity, decreased participation in organized sports, increased television viewing, and decrease in proper nutrition (Salbe et al., 2002). American children spend more of their time playing video games and watching television than performing any activity other than sleep (Dennison, Erb, & Jenkins, 2002). Television viewing is often thought of as one of the most adjustable causes of obesity in children (Matheson, Killen, Wang, Varady, & Robnsson, 2004).

Another modifiable trend that plays a large role in the American lifestyle is the increase in fast-food consumption. Americans consumed 50% of their meals away from home in 1994 and spent close to 50% of their food budgets on fast-food restaurants in 1998 (Thompson et al., 2004). There is a positive association between the amount of television viewed per day and meals eaten at fast-food restaurants per week and the BMI. In fact, children who view fast-food advertisements on television are more apt to request the product than those who do not watch television for more than an hour at a time (Matheson et al., 2004). In addition to excessive intake of fast foods, there is also an increase in fruit juice consumption in overweight children. In support of this, Ludwig, Peterson, and Gortmaker (2001) found that the ratio of becoming overweight increases by 60% for each serving of sugar-sweetened drink consumed daily by children (Ludwig et al., 2001).

HEALTH PROBLEMS RELATED TO CHILDHOOD OBESITY

Childhood obesity is a strong risk factor for a number of common health conditions in children. Hyperlipidemia, hypertension, glucose intolerance, insulin insensitivity, mental health concerns (e.g., depression, low self-esteem, and impaired health-related quality of life; Ravens-Sieberer, Redegeld, & Bullinger, 2001), atherosclerosis, asthma (Patel, Welsh, & Foggs, 2004), and orthopedic problems in children are all linked to obesity (Krebs & Jacobson, 2003). Obesity is one of the most common clinical signs of type 2 diabetes (non insulin dependent) (Ramchandani, 2004). A recent study consisting of 167 obese children showed that 4% had been diagnosed with type 2 diabetes, with 16%, 27%, and 26% of the obese Caucasian, African-American, and Hispanic adolescents being in the prediabetic state (Vivian, 2006). These health problems significantly contribute to the development of common chronic diseases in later life, including hypertension, type 2 diabetes, hyperinsulinemia, coronary heart disease, stroke, osteoarthritis, cancer (such as endometrial, breast, prostate, and colon cancers), and psychological disorders (such as depression, eating disorders, distorted body image, and low self-esteem) (Kaur, Hyder, & Poston, 2003; Schwarzenberg, 2005). Several studies demonstrated the persistence of childhood obesity into adulthood (Krassas & Tzotzas, 2004; Taylor, Grant, Goulding, & Williams 2005). After the age of 3 years, the likelihood that obesity will persist into adulthood increases with the age of the child. A 6-year-old obese child has a 50% risk of becoming an obese adult, whereas 70–80% of obese adolescents remain obese into adulthood. Thus, it is highly likely that obese children will grow into obese adults (Guo, Wu, Chumlea, & Roche, 2002). As obese children continue to grow into obese adults, there is an increase in obesity-related chronic problems in
adulthood, and the cycle of obesity across family generations continues (Guo et al., 2002).

**THE TREATMENT OF OBESITY AND THE BARRIERS TO TREATMENT**

Weight loss is a simple equation of decreased caloric intake and increased caloric expenditure through increased physical activity. Interventions to decrease caloric intake and increase caloric expenditure need to concentrate on modifying eating and physical activity habits so that new behaviors are formed, resulting in lasting changes throughout one’s life (O’Brien, Holubkov, & Reis, 2004). The goal of modifying diets has been to decrease and stabilize caloric and fat intakes. This is based on the theory that children who are obese consume too many calories relative to their caloric expenditure. Although this dieting method of linking the amount of calories consumed to the amount of calories expended works for adults, the approach to weight reduction in children differs because the weight loss must be slow due to the rate at which children grow. In most cases, it is recommended that overweight children maintain their current body weight or reduce their weight slowly so that they can still grow in height while experiencing a corresponding decrease in BMI (kg/m²) (Fowler-Brown & Kahwati, 2004).

Any dietary changes for children need to focus on ensuring that they consume at least five servings of fruits and vegetables daily, as well as on meeting their calcium and iron needs (Faulkner, 2002). One commonly studied diet is the traffic-light diet based on the food pyramid. This approach teaches children to “go” with foods that are green (broccoli and asparagus), use “caution” with yellow foods (corn and squash), and “stop” with foods that are red (beef). Children using this diet have been found to have a decreased intake of “red foods,” a decrease in percent overweight, and reduced palatability for foods that are high in sugar (Moran, 1999). Interventions that incorporate both diet changes and increases in physical activity are more successful than those that only used one component alone. Among the treatment programs designed to increase physical activity, the most successful in doing so were the less structured programs that allowed the child to choose one’s physical activity (Louthan et al., 2005; Trowbridge, Sofka, Holt, & Barlow, 2002).

Family involvement is another key factor in the successful reduction of the BMI in overweight children and has been proven to be more successful than interventions that target the child or the parent alone. Parental involvement is necessary when treating childhood obesity (Veugelers & Fitzgerald, 2005) because parents play a vital role in the development of children’s eating and physical activity habits. Jiang, Xia, Greiner, and Lian (2005) showed that, among a group of children involved in a 2-year longitudinal study, a family-based behavior program including their parent(s) resulted in a decrease in the percentage of the children who were overweight compared to the children who received the interventions without parental involvement (Jiang et al., 2005).

Parental perception of the child’s obesity is also an important factor in predicting a successful weight loss intervention. Unfortunately, when mothers of obese children were asked to define obesity, they responded by saying that they did not consider a child overweight if the child had a good appetite (Faulkner, 2002). Some mothers defined a healthy child as one who eats and were only concerned about their child’s eating habits when they were not eating (Wolf et al., 2004).

In addition, many practitioners lack understanding of children’s obesity and strategies on how to identify and treat this disorder. A survey of 940 providers, including pediatricians, nurse practitioners, and registered dieticians, found that a wide variety of interventions were administered to parents of obese children but few children were referred to organized programs or nutritionists (Trowbridge et al., 2002). In addition to the lack of clear guidelines, many practitioners failed to schedule follow-up appointments, and patients often failed to keep the appointments that were made. After a review of the charts of 40 obese children for a period of 1 year, 40% of the children were found to have been referred to a nutritionist; however, only 5% attended the appointment. In addition, 87% failed to arrange a follow-up appointment to monitor the success of behavioral interventions prescribed by their primary care provider (Louthan et al., 2005). Physicians identified three reasons for failing to treat childhood obesity: inadequate time to address the problem in the office setting, lack of necessary skills and tools, and inadequate reimbursement for programs targeting obesity. A substantial amount of effort is involved in achieving and maintaining long-term weight loss in children (Faulkner, 2002). Thus, there is a tremendous need.
for effective interventions that address both the parent and the child by focusing on movement toward the maintenance of appropriate eating habits and physical activity goals.

CASE MANAGEMENT

A case management approach to facilitating health behavior change has been shown to be an effective method in managing many chronic conditions. Case management is a collaborative process between the case manager, other interdisciplinary health care team members (including primary care physicians, nurse practitioners, dieticians, exercise physiologists, psychologists, social workers, and so on), and the client that involves assessment, planning, implementation, coordination, monitoring, and evaluation of services to meet the client’s health needs (Prochaska & DiClemente, 1992). This allows the care providers to individualize their care based on the needs of the child. Case management is an effective multifaceted service that can result in significant and quantifiable cost savings in the management of chronic illnesses (Velicer, Prochaska, Fava, Norman, & Redding, 1998). Beck et al. (2004) and Guevara, Wold, Grum, and Clark (2003) reported the effectiveness of a case management approach in successfully treating children with type 1 diabetes and asthma, respectively. In patients hospitalized for chronic heart disease, utilization of a case manager has been demonstrated to reduce the length of hospital stay and to decrease subsequent readmissions (Kim & Soeken, 2005).

The success of the case management approach is due to the assessment of the child’s and the parent’s perception of the health condition and benefits, and the barriers to the treatment of the condition, while utilizing the resources available to manage the condition. The case manager then collaborates with all the parties involved to develop individualized interventions consistent with the parent’s and the child’s needs and resources. Case management subscribes to the principle that managing a chronic health condition must be individualized to the patient’s current needs and resources. The case management approach is useful and appropriate, in conjunction with the TTM, in the treatment of obese children due to individualization of their care.

THE TTM

The TTM, developed by Prochaska and DiClemente (1992), consists of four behavioral stages of change: precontemplation, contemplation, action, and maintenance. The stages of change represent the progress that individuals undergo in an attempt to modify their behavior to change their health. Proper assessment of the stage of change in both the child and the parent is essential in providing effective individualized case management interventions to treat childhood obesity. The first stage, precontemplation, describes individuals who do not recognize that a health problem exists or do not believe that they need to change their health behaviors. Individuals are usually in this stage when they are uninformed or misinformed about their health conditions, or because they have experienced numerous unsuccessful attempts to alter their behaviors and they have become discouraged about their ability to change (Logue et al., 2005). Precontemplation is followed by contemplation, in which the client intends to take action in the near future but has not yet initiated a change in one’s behavior. Individuals in this stage are aware of the advantages of changing their health-related behavior but have not yet initiated the change. The third stage of change is the action stage, which is characterized by the individual making modifications to one’s behavior based on one’s knowledge about the behavior. The final stage of change, maintenance, focuses on the prevention of relapsing into the old behavior. Individuals in this stage should have established new behavior patterns, making them less likely to relapse and more confident in maintaining the new behavior.

The TTM has been used by a number of investigators to design successful interventions to change health behaviors, including smoking, emotional distress, alcohol abuse, weight loss, and mammography screening (Prochaska & DiClemente, 1992). The success of these previous interventions has been dependent upon two assumptions of the model. First, movement between stages in the model is linear, although movement back and forth between stages is common before a permanent transition to the next stage, and, ultimately, movement to the maintenance stage is realized. The second assumption is that individuals’ present stage of change has implications for the types of intervention that will assist them in progressing through the model toward the maintenance stage.

Cognitive approaches are most effective when individuals have not yet changed their behavior (precontemplation and contemplation stages), whereas behavioral strategies are more appropriate
when individuals have initiated or are attempting to maintain new behaviors (action or maintenance stages) (Prochaska, 1991; Prochaska, DiClemente, & Norcross, 1992). Cognitive approaches may include: (a) consciousness raising (increasing knowledge of obesity and the health effects of diet, physical activity, and environment); (b) social liberation (modifying diet, physical activity, and environmental factors, resulting in social benefits); (c) self-evaluation (examining the effects of current diet, physical activity, and environmental factors on obesity and health); (d) environmental reevaluation (exploring the relationships between diet, physical activity, and environmental factors, and the physical, social, and emotional environments). Behavioral approaches may include (a) self-liberation (telling oneself that it is possible to change diet, physical activity, and environmental factors); (b) counterconditioning (finding a substitute behavior for the usual diet, physical activity, and environmental factors); (c) stimulus control (removing items or stimuli that remind one of the usual diet, physical activity, and environmental factors); (d) reinforcement (receiving a reward for avoiding the usual diet, physical activity, and environmental factors, and engaging in new behaviors) (Prochaska, 1991; Prochaska & DiClemente, 1992).

CASE MANAGEMENT FOR THE TREATMENT OF CHILDHOOD OBESITY

The proposed intervention involves a case management approach administered through the TTM framework, with the goal of reducing BMI among obese children by modifying their eating habits and by increasing their physical activity. The case manager can provide the interventions during an office/clinic visit, with follow-up interactions in person, over the telephone, or through e-mail as intervention methodology. The case manager can individualize the interventions based upon the overweight/obese child’s and the parent’s stage of change and available resources in the environment. The stage of change in the child and the parent who present for weight management of the child can be easily assessed using the two versions of the University of Rhode Island Change Assessment developed by Sefton-Silver (1996).

Once the stage of change of the parent and the child regarding weight management of the child is known, the case manager can provide interventions for the parent and the child to assist them with transition between these stages. When designing individually based interventions for the parent and the child, the case manager must be prepared with different components of the plan. Specific components may target the parent’s stage of change, whereas the others may be directed at the child’s stage of change. A parent may be in the action stage and ready for behavior modification, whereas the child may only be in the contemplation stage and not ready for behavior changes. The activities maybe designed to help the child reduce one’s BMI and to help the parent understand and participate in the BMI reduction. To maximize the effectiveness of these components, the plan should involve both the parent and the child. The goal of the interventions is to help support the child and the parent to...
to reduce the child’s BMI (Figure 1).

The general design of the activities is to modify eating habits and to increase physical activity, whereas the precise activities will depend on the child’s and the parent’s individual perceptions and surrounding environment. For individuals in the precontemplation and contemplation stages, cognitive strategies should be utilized to increase knowledge, change attitudes, reduce barriers, and enhance the benefits of desired behaviors in relation to obesity and its impact on the child and the family (Figure 1). For individuals in the maintenance and action stages, behavioral strategies should be used to change dietary and physical activities and to provide reinforcement for achieving new behaviors (Figure 1). Periodically, the stage of change of the parent and the child regarding weight management of the child should be reassessed to determine appropriate cognitive (Table 1) or behavioral (Table 2) interventions.

<table>
<thead>
<tr>
<th>Table 1. Cognitive Intervention Strategies</th>
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<tr>
<td>Cognitive Activity</td>
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<tr>
<td>1. Complete a family tree of obesity and obesity-related diseases</td>
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<td>2. Watch “Supersize Me” video</td>
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<td>3. Complete a log of duration of time spent engaged in sedentary activities</td>
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<td>4. List the pros and cons of overweight and inactivity</td>
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<td>5. Identify activities that prohibit, or that are performed instead of, physical activity</td>
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<td>6. Identify cues to not engaging in physical activity</td>
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<td>7. Identify recommendations for physical activity and compare to the current level of physical activity</td>
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<td>8. Identify choices that can increase the level of physical activity</td>
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<tr>
<td>9. Identify the actual and desired BMI Self-evaluation</td>
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<tr>
<td>10. Identify the impact of obesity on social functioning Self-liberation</td>
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<tr>
<td>11. Identify approaches to increasing physical activity Environmental reevaluation</td>
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<tr>
<td>12. Identify perceptions of weight and physical activity Self-evaluation</td>
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<tr>
<td>13. Understand classification of activities into various levels of physical activity Consciousness raising</td>
</tr>
<tr>
<td>14. Identify one friend who maintains a &quot;healthy&quot; or &quot;active&quot; level of physical activity Environmental reevaluation</td>
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</tbody>
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The final stage of maintaining the desired behaviors to reduce the child’s BMI (Figure 1).

The general design of the activities is to modify eating habits and to increase physical activity, whereas the precise activities will depend on the child’s and the parent’s individual perceptions and surrounding environment. For individuals in the precontemplation and contemplation stages, cognitive strategies should be utilized to increase knowledge, change attitudes, reduce barriers, and enhance the benefits of desired behaviors in relation to obesity and its impact on the child and the family (Figure 1). For individuals in the maintenance and action stages, behavioral strategies should be used to change dietary and physical activities and to provide reinforcement for achieving new behaviors (Figure 1). Periodically, the stage of change of the parent and the child regarding weight management of the child should be reassessed to determine appropriate cognitive (Table 1) or behavioral (Table 2) interventions.

<table>
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<th>Table 2. Behavioral Intervention Strategies</th>
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<tr>
<td>Behavioral Activity</td>
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<tr>
<td>1. Interact with others who engage in “healthy” eating and activity patterns Stimulus control</td>
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<tr>
<td>2. Read all food labels before eating foods Counterconditioning</td>
</tr>
<tr>
<td>3. (Grocery-store) scavenger hunt for favorite and healthy foods Counterconditioning</td>
</tr>
<tr>
<td>4. Eat foods according to the food guide pyramid Stimulus control</td>
</tr>
<tr>
<td>5. Eat “healthy foods” in a fast-food restaurant Counterconditioning</td>
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<tr>
<td>6. Document eating of new healthy foods Counterconditioning</td>
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<tr>
<td>7. Plan for dealing with situations where “unhealthy” foods are likely to be eaten or when physical activity decreases (vacation) Self-liberation</td>
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<tr>
<td>8. Plan a meal according to the food guide pyramid Counterconditioning</td>
</tr>
<tr>
<td>9. Set goals for diet, weight, and physical activity Counterconditioning</td>
</tr>
<tr>
<td>10. Document progress toward goals (public display) Stimulus control</td>
</tr>
<tr>
<td>11. Provide rewards for achieving milestones toward goals (public display) Reinforcement</td>
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<tr>
<td>12. Reduce barriers to physical activity Counterconditioning</td>
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<tr>
<td>13. Compare current and previous diets and physical activity behaviors Self-liberation</td>
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<tr>
<td>14. List realized benefits of increased physical activity and diet change Self-liberation</td>
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<tr>
<td>15. Make a number of plans on how to engage in fewer sedentary activities Self-liberation</td>
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the dishes. Another activity that raises awareness in the family is examining the ways food is prepared in the home, paying attention to added fat, calories, and sodium. Other activities include identifying healthy foods and keeping track of time spent on passive activities such as watching television, working on a computer, or playing video games. This will help the parent and the child become aware of healthy foods that they can eat and physical activities that they can engage in. These activities attempt to increase the child’s and the parent’s awareness, knowledge, attitude, and belief about the problem of obesity, transitioning them to the next stage of change involving changes in their behavior.

Once the child or the parent moves into the action stage of the model, the case manager will need to start incorporating behavioral strategies and activities into the intervention. The parent and the child should work together to change their dietary habits and increase their physical activity. Some activities include both the child and the parent trying new foods, attempting to make healthy choices when eating fast foods, engaging in fewer sedentary activities, and increasing their physical activity. The parent is responsible for the food that is kept in the house and can assist the child by having healthy food choices available and by decreasing the amount of high-calorie and high-fat foods kept in the home. The parent can also provide physical activities for the child after school, encouraging the child to decrease sedentary activities. The child and the parent may start out in different stages and move through the stages at different speeds; therefore, interventions may involve both cognitive and behavioral components.

CONCLUSION

Health care providers typically do not have the time, knowledge, or skills necessary to effectively address the emerging problem of childhood obesity during a typical outpatient clinic visit. Due to this emerging epidemic, and the significant comorbidities associated with this condition, practitioners need to develop effective interventions to address this problem. Interventions based on the TTM framework must first identify the stage that the child and the their parent are in and the environment environmental resources available. Based on this individualized assessment, a case manager, through frequent contact with the parent and the child, can administer interventions that are appropriate to the stage of change and the resources available. The progress of the parent and the child through the stages of change can be frequently assessed to modify the intervention for it to be consistent with their progress. This case management approach based upon the TTM has the potential to be an effective approach to reducing childhood obesity and overweight.

REFERENCES


