The Mental Health Implications of Childhood Obesity

Overview
Linking mental and physical health

Feature
Above all, do no harm

Review
Can we prevent childhood obesity?

Letters
Helping chronically suicidal youth

Next Issue
Our Spring 2010 issue will address preventing substance abuse in children and youth.

About the Children’s Health Policy Centre
As an interdisciplinary research group in the Faculty of Health Sciences at Simon Fraser University, we aim to connect research and policy to improve children’s social and emotional well-being, or children's mental health. We advocate the following public health strategy for children's mental health: addressing the determinants of health; preventing disorders in children at risk; promoting effective treatments for children with disorders; and monitoring outcomes for all children. To learn more about our work, please see www.childhealthpolicy.sfu.ca.
Overview

Linking mental and physical health

Obesity is the source of tremendous social and emotional adversity for children and families. We discuss when weight should be considered a concern, explore why obesity is increasing and look at how we can help children stay healthier.

Review

Can we prevent childhood obesity?

Is it possible to prevent obesity? To answer this question, we examined each study in a recent systematic review of 34 randomized controlled trials and found three programs that succeeded in reducing body mass index. Our findings are analyzed here.

Feature

Above all, do no harm

Could obesity prevention programs cause unintended harm — perhaps by increasing children’s dissatisfaction with their bodies or by increasing the incidence of eating disorders? We examine the evidence.

Letters

Helping chronically suicidal youth

A reader asks whether Dialectical Behaviour Therapy (DBT) might help youth who are chronically suicidal. If you have a question or comment, please be sure to contact us by email or by regular post.

Appendix

Research methods

References

We provide all references cited in this edition of the Quarterly.

Links to Past Issues

How to Cite the Quarterly

We encourage you to share the Quarterly with others and we welcome its use as a reference (for example, in preparing educational materials for parents or community groups). Please cite this issue as follows:

Linking mental and physical health

“When I was little I got mocked so much I know more fat jokes than anybody else going. I’m better at it than they are. I spent just such a long time being bothered by it and I got so low on so many occasions.”

—Seventeen-year-old girl

“I’m a single parent. I work two jobs ... the health thing is always an issue. Having a child that’s overweight, having him get picked on is just such a big thing. Yet, trying to have him eat healthier ... nothing has really worked. I don’t know if I haven’t tried hard enough. But just to get some feedback, and maybe some resources that can help me with our lifestyle today, [would help me] with getting on track.”

—Parent of an overweight child

The emotional and social costs of obesity

As these quotes document, obesity can create tremendous social and emotional adversity for children and families. Peer rejection is a leading concern. Peers rank obese children among the least desirable playmates. As many as one-third of obese children have no reciprocated friendships. Obese youngsters themselves report being less socially accepted. The research literature also documents many damaging stereotypes. For instance, one study found that eight- to sixteen-year-olds viewed obese young people as less attractive, less athletically skilled and more aggressive than their peers. Similarly, when six- to ten-year-olds were asked to respond to pictures of an overweight body shape, they ascribed characteristics such as “lazy,” “dirty,” “stupid” and “mean.” Strikingly, children as young as five have been found to engage in such negative stereotyping. These concerns make obesity one of the most stigmatized public health problems, particularly in childhood.

Given the negative stereotyping and peer rejection, it is not surprising that many obese children develop poor self-perceptions. Many struggle with low self-esteem, a negative body image and dissatisfaction with physical appearance. These experiences can have lasting consequences, in that being teased about weight and shape in childhood frequently leads to body dissatisfaction in adulthood.

Obesity also appears to be a contributing factor in the development of mental health problems in children; studies have found significantly higher prevalence rates for psychiatric diagnoses in obese children and youth.
compared both to children in the general population and to children with other chronic health conditions. Higher than average rates of depression, anxiety, eating disorders, social withdrawal and behavioural problems have been found among obese children and youth in other studies as well. Girls may be particularly vulnerable to the emotional costs of obesity. A review of gender differences found that overweight girls were stigmatized significantly more often than boys. These girls typically faced more teasing, bullying and social marginalization in both friendships and romantic relationships. (For general information on ways to prevent bullying, please see our previous issue Addressing Bullying Behaviour in Children.)

**When is weight a concern?**

To address the mental and physical health consequences of obesity, it is helpful to have a common standard for identifying healthy and unhealthy body weights. Body mass index (BMI) is one such standard. BMI is easily calculated by dividing a child's weight in kilograms by his or her height in metres squared.

For adults, BMI interpretation is consistent. Adults with BMIs of 30 or greater are classified as obese, while those with BMIs between 25 and 30 are classified as overweight. These standards are set based on known health risks associated with higher weights, such as increased risk of elevated blood pressure. However, because children's BMIs change substantially as they grow and develop, cut-off points for obesity vary markedly by age (and gender). For example, BMI cut-offs for obesity range from a low of 19.1 for four-year-old girls to a high of 29.8 for 17.5-year-old girls. If an individual child's weight is a concern, the child's primary care practitioner should be consulted.

Although many children struggle with being overweight, others have issues with being underweight. For children who are extremely underweight, eating disorders can be a concern. Please refer to our previous report Preventing and Treating Eating Disorders in Children and Youth for further information on this topic.

Most Canadian children maintain a healthy body weight. However, the prevalence of overweight young people has tripled over the past three decades in Canada and internationally. Obesity is particularly prevalent in wealthy countries in North America and Western Europe. Among 34 countries providing self-reported data for 10- to 16-year olds, Canada ranked fifth worst, with 19.3% of young people — or one in five —
classified as overweight.\textsuperscript{16} Even higher rates are found when researchers measure BMI, rather than relying on self-reports. For example, in a study of 8,661 2- to 17-year-old Canadians, 26\% were classified as overweight, with 8\% of those classified as obese.\textsuperscript{12}

\textbf{Why is obesity increasing?}

Obesity is caused by an imbalance between calories (energy) consumed and calories (energy) expended.\textsuperscript{17} Both these factors, in turn, are influenced by complex gene-environment interactions as children grow and develop in the different contexts. Regarding the environment in particular, profound global shifts in activity levels and diet have been identified as key determinants in increasing childhood obesity rates.\textsuperscript{17}

Reductions in activity levels have resulted from other social changes. High levels of “screen time,” such as watching television, playing video games and using computers, are one issue. Canadian children who log more than two hours per day of screen time are twice as likely to be overweight or obese compared to those who spend one hour or less in front of a screen.\textsuperscript{12} Reduced physical education in schools also affects children’s activity levels. The World Heath Organization (WHO) recently expressed concern over reduced physical education budgets in many Canadian schools.\textsuperscript{18} Furthermore, Health Canada recently reported that more than half of Canadian children are not being active enough for optimal growth.\textsuperscript{19}

Besides activity levels, significant changes have also occurred in children’s diets. Energy-dense foods — predominantly snack foods like cookies, potato chips and donuts — are increasingly available and increasingly consumed in Canada and globally.\textsuperscript{17} These foods are high in fat and sugar but low in nutrients. Because even small portions contain many calories, these foods create limited sensations of fullness, in turn encouraging children to eat more.\textsuperscript{20}

Exacerbating matters, young people are the target of intense food marketing campaigns.\textsuperscript{21} Many children are exposed to advertising and sales of unhealthy foods in schools, which in turn generates school revenues.\textsuperscript{21} Advertising does affect children’s consumption. Research has consistently shown that advertising leads children to choose advertised foods and request these from their parents significantly more often than when there is no advertising.\textsuperscript{21}
In addition to what they eat, many children are also being served too much to eat. Portion sizes for many foods began to increase in the 1970s and have continued to increase. Pop sales are the most notable example of this trend. For instance, the 64-ounce “double gulp” sold by one international retailer is now 10 times larger than the servings when pop was first sold in the early 1900s.

All of these changes have resulted in many children and families being exposed to “obesogenic environments,” where physical activity is discouraged and unhealthy food consumption is encouraged. Homes, neighbourhoods, schools and communities can all become environments that encourage obesity.

The economics of obesity

Economic factors play a role in children’s consumption of unhealthy foods. Families with limited budgets often purchase energy-dense foods because they are typically less expensive than healthier foods. For instance, one dollar can purchase 1,200 kcal of cookies compared to only 250 kcal of fresh carrots. Not surprisingly, several studies have identified food costs as a particular barrier to dietary change for low-income families. Conversely, higher-income households typically have better-quality diets and fewer overweight family members.

Economics also affects food availability. In many disadvantaged neighbourhoods, healthy products are not readily available in local grocery stores. Lower-income Canadian neighbourhoods are often dominated by variety stores that charge high prices for the few healthy foods they sell. Low-income neighbourhoods also have 2.5 times as many fast-food outlets — which tend to purvey high-calorie, low-nutrient foods — compared to wealthier neighbourhoods, further increasing the risk for children in poorer neighbourhoods.

Opportunities for physical activity are also affected by economics. For example, a Canadian study found that disadvantaged neighbourhoods lacked safe playgrounds and parks; they also afforded fewer children the chance to participate in organized physical activity, compared to affluent neighbourhoods.

Given these findings, it is not surprising that researchers have found strong links between socio-economic disadvantage and obesity. One large Canadian survey (representative of the entire population) found poorer neighbourhoods had significantly higher rates of childhood obesity — 16%, compared to 7% in more affluent neighbourhoods. The same trend applied to children who were overweight — 35% among poorer neighbourhoods,
compared to 24% among wealthier neighbourhoods.26 This relationship was found to exist even after individual child and family characteristics such as age, gender, family income and education were taken into account.26 In other words, poorer neighbourhoods have social and physical environments that do not support healthy body weights. The findings from this and other, international studies provide strong evidence of the importance of living environments as determinants of obesity.26

Legislating the way to healthy eating

Many jurisdictions have passed laws limiting access to unhealthy foods in the general population. For example, in September 2009, British Columbia became the first Canadian province to enact legislation restricting trans fats in restaurants and schools.27 (Trans fats, typically used to improve the shelf life and texture of foods, have been linked to increased cholesterol levels and heart disease.)28

Some regions have gone further. In addition to restricting trans fats in eating establishments, New York City also now legally requires large restaurant chains to post the caloric content of all foods in their menus.29 Such food labelling initiatives can greatly assist parents in making healthier selections for their children.

Many governments have also adopted policies directly aimed at children. For example, the provincial government’s guidelines for food and beverage sales in BC schools prohibit the sale of particularly unhealthy items, such as pop, in which sugar is the first ingredient and nutrients such as iron and calcium are very low.30 Similarly, in a move that counters the proven impact of advertising on children’s food consumption, Sweden has banned television and radio ads targeting children under 12 since 1991.21

On a global level, the WHO31 has identified additional large-scale policy approaches to promote healthy eating (see Table 1). These approaches have

### Table 1: Strategies to promote healthy eating

- Restrict food and beverage advertisements that exploit children's inexperience
- Offer healthy food choices at schools, including limiting foods high in salt, sugar and fat
- Provide standardized and easily understandable nutrition labelling
- Supply consumers with food information that is sensitive to literacy levels and local culture
- Provide incentives to promote the development, production and marketing of foods that contribute to a healthy diet
- Implement fiscal policies that reduce the costs of healthy foods
- Adopt food and nutritional policies that protect public health by addressing food safety and security

**How to reduce the perils of eating out**

American adults and children consume an average one-third of their calories from eating out according to the American Center for Science in the Public Interest. For this reason, it makes sense for parents and caregivers to pay close attention to the foods children get when eating outside of the home. You can check the searchable database of nutritional information on thousands of menu items in B.C. made available by the *Vancouver Sun*. 


tremendous potential to alter obesogenic environments for large populations of children and families. For example, since Canada passed regulations mandating the labelling of trans fats, an evaluation of 92 foods found that 9% of products were discontinued and most of the reassessed products still being sold contained reduced trans fats.32

Creating physically active neighbourhoods
Just as communities have worked to overcome barriers to healthy eating, many have also created opportunities for children to safely engage in physical activities. For example, many Canadian communities have organized walking school buses, which promote children walking to and from school by establishing safe routes chaperoned by adults. An evaluation of this program in disadvantaged elementary schools in Seattle found that significantly more children walked to school following participation in the initiative.33

Opportunities for children to engage in physical activities can have benefits beyond physical health. Studies have linked aerobic fitness to cognitive gains for children, including more efficient executive processes.34,35 Given the many benefits of physical fitness, it is essential that young people be provided with opportunities to engage in these activities. Such investment can be cost-effective. For example, a study of single Canadian parents receiving social assistance found that those receiving subsidized recreational programming used approximately $1,000 less in health and social services after a two-year period.36

There are many additional ways to boost children’s activity levels. The WHO,31 as part of its global strategy on diet, physical activity and health, has outlined many such strategies, summarized in Table 2. These large-scale initiatives have the potential to increase healthy activities for many children, population-wide.
Helping communities and parents raise healthy children

Childhood is the optimal time to prevent obesity and to help children develop healthy lifelong approaches to eating and exercise. To identify which child, family and school-based interventions are most helpful in achieving these goals, we systematically examine the research evidence in our Review article.

While it is important to promote positive food choices and healthy activity levels, community-level determinants of obesity also need to be addressed. If children reside in neighbourhoods where healthy foods are not readily available or are beyond their families’ budgets, there is little “choice” in their diets. Similarly, if children reside in neighbourhoods with limited opportunities for physical activity or no safe places to play outside, even the most effective exercise program is likely to be of limited value. For these reasons, social policies and community-based initiatives need to be part of our collective efforts to curb childhood obesity.

### Table 2: Strategies to promote physical activity

<table>
<thead>
<tr>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide children with daily physical education in school</td>
</tr>
<tr>
<td>Ensure that schools have appropriate facilities and equipment to support physical activities</td>
</tr>
<tr>
<td>Offer children and families programs that enhance knowledge about physical activity</td>
</tr>
<tr>
<td>Adopt policies that support health care providers to offer practical guidance on the benefits of physical activity</td>
</tr>
<tr>
<td>Create communities where physical activities, such as walking and cycling, are safe and accessible</td>
</tr>
<tr>
<td>Provide an infrastructure that increases access to facilities that support physical activities</td>
</tr>
<tr>
<td>Implement national guidelines for health-enhancing physical activities</td>
</tr>
</tbody>
</table>

Helping communities and parents raise healthy children
Can we prevent childhood obesity?

The mainstays in preventing childhood obesity have been programs that promote healthy eating and physical activity. But how effective are these programs? To answer this question, we looked at the evidence from a recent high-quality systematic review. (Our criteria for selecting this review are described in the Appendix.)

What 32,000 children can teach us

Kamath and colleagues recently published a systematic review of 34 randomized controlled trials (RCTs) evaluating various programs designed to prevent childhood obesity. The focus was primary prevention, or reducing the incidence (or new cases) of obesity. Therefore, although many RCTs included at least some children who were already overweight, the authors specifically excluded RCTs that included only obese children. In total, outcomes for more than 32,000 children were evaluated in these 34 RCTs.

The programs included in the review varied greatly in terms of components, comprehensiveness and duration. For example, program components ranged from child education to parent support to environmental modifications. Some programs included only a single component; others were multi-faceted. Table 3 summarizes the essential components of the various programs. Children were typically the main intervention focus, although many programs also included parents and schools. Program providers also varied, from health care professionals to teachers and community members. Settings included homes, schools, clinics and community venues.

<table>
<thead>
<tr>
<th>Program Approach</th>
<th>Essential Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child behavioural training</td>
<td>Providing directed healthy snack preparation Guiding play during recess</td>
</tr>
<tr>
<td>Child cognitive training</td>
<td>Recognizing triggers for unhealthy eating Setting goals for reduced television watching</td>
</tr>
<tr>
<td>Child and parent education</td>
<td>Listing low-fat lunch suggestions in a newsletter Teaching the healthy food guide pyramid</td>
</tr>
<tr>
<td>Parent training and social support</td>
<td>Completing activity packages with parent collaboration Participating in family fun night at school</td>
</tr>
<tr>
<td>Environmental modification</td>
<td>Installing equipment to limit television and video game use in homes Modifying school cafeteria recipes</td>
</tr>
</tbody>
</table>
Where prevention failed to make a difference

When the review’s authors pooled outcomes in a meta-analysis, they found that prevention programs did not make a significant difference overall in body mass index (BMI). In other words, program participants did not achieve significantly lower body weights (measured using BMI) than comparison children. However, one factor did make a significant difference — program duration. Programs lasting longer than six months demonstrated significantly better outcomes than briefer ones.

Programs that stand out

To identify particularly promising programs, we examined each study in the review to see which specific programs reduced BMI. (Such findings are not always captured or reported when findings are pooled in a meta-analysis, as with the review used here.) Three such programs were found. Two were comprehensive programs focusing on both healthy eating and exercise (i.e., *Hip-Hop to Health Junior* for younger children and *The Middle-School Physical Activity and Nutrition Study* for older children). The other (unnamed) program aimed to decrease children’s screen time, including television watching and video game playing. Children in all three programs had significantly better BMI outcomes than comparison children. Details of the *Hip-Hop to Health Junior* program are highlighted in the sidebar.

What improvements were found?

Although most of the prevention programs failed to reduce BMIs, additional meta-analyses identified three significant benefits for program participants: increased physical activity levels, decreased sedentary behaviour and decreased unhealthy eating. These are important accomplishments, given that both diet and physical activity influence health separately and interactively. Physical activity has also been recognized as a fundamental means of improving young people’s physical and mental health. Of note: programs that aimed to decrease sedentary behaviours were significantly more effective with children than with adolescents.

Putting research into practice

To best support children’s healthy development, a comprehensive strategy to prevent obesity is needed. Prevention programs targeted at children, families and schools should be central to this effort. Current evidence suggests that longer programs and programs that are used early in children’s lives will likely have the best outcomes. When such programs are delivered within a system that has effective large-scale social policies, such as those identified in our Overview article, communities and families will be better positioned to create conditions that foster children’s health.

Hip-hopping to health

Given concerns about the high prevalence of overweight minority children, a group of researchers evaluated the effectiveness of a comprehensive eating and exercise program — *Hip-Hop to Health Junior*. The 14-week program targeted 409 preschool children attending 12 Head Start programs in Chicago. The 40-minute lessons, delivered three times per week, included topics such as eating healthy foods, exercising and reducing television viewing. Each lesson also included 20 minutes of physical activity. Program foods were specifically chosen for their affordability. Parents also received weekly newsletters with homework assignments, such as writing down specific ways they could increase their family’s fruit and vegetable consumption.

Although children in both groups had BMI increases after two years, children in the control group had significantly greater BMI increases than children in *Hip-Hop to Health Junior*. These results show that obesity prevention programs can be effective, especially when they start in early childhood and are tailored to children’s developmental, cultural and economic circumstances.
Above all, do no harm

Far too many children, including those with good health, are dissatisfied with their weight and shape. Troubling numbers include findings that 40% of young girls worry about being fat\(^1\) and 50% of adolescent girls have used unhealthy weight control behaviours.\(^2\) Girls’ particular vulnerability to these concerns speaks to gender-specific cultural pressures to be thin.\(^2\)

These alarming numbers raise the question of whether obesity prevention programs could cause unintended harm, such as increasing children’s dissatisfaction with their bodies or increasing the incidence of eating disorders.\(^1\) To help answer this question, two researchers set out to examine whether obesity prevention programs have these unintended social and emotional consequences.

Carter and Bulik\(^3\) conducted a systematic review of the impact of obesity prevention programs on psychological well-being and disordered eating. Their review included 22 controlled studies of obesity prevention programs. Most programs included both eating and physical activity interventions, while six focused only on physical activity and two focused only on nutrition education. Of the 22 programs, 19 were delivered to children in school-based settings. Of the remaining three, two were family-based programs targeting children with overweight parents, and one was a community-based program targeting low-income families.\(^4\) Programs varied considerably in length, with 10 lasting more than one year and 12 lasting between 12 weeks and one year.\(^4\) Programs were delivered in North American, Europe, Asia and South America.

Are there unintended risks?

For most of the assessed variables, including body satisfaction and self-esteem, no significant differences were found between program participants and controls (see Table 4). When differences were found, all but one favoured young people in the intervention programs. For example, young people who participated in some of the prevention programs had reduced concern with weight and shape, increased intentions to eat healthy foods and enhanced self-worth. Only one negative outcome was found, for one program only. African-American girls who participated in an after-school obesity prevention program were more likely to engage in unhealthy weight control behaviours, including skipping meals and fasting, than girls in

---

\(^1\) Fifty percent of adolescent girls have used unhealthy weight control behaviours.

\(^3\) When differences were found, all but one favoured young people in the intervention programs.
the control group. However, the program also produced some positive benefits, including increasing girls’ intentions to eat healthy foods and their enjoyment of physical activity.

Unfortunately, many studies failed to measure important mental health outcomes. For example, none assessed whether program participation was associated with the onset of mental disorders or excessive weight loss. As well, some studies had few participants and therefore may have been unable to detect important differences between intervention and control groups (e.g., Story et al., 2003).

Gathering further evidence

Since this review was conducted, additional program evaluations with mental health–related data have been published. For example, two randomized controlled trials with middle-school-age girls found that prevention program participants were significantly less likely to engage in negative weight-related behaviours, such as self-induced vomiting and laxative or diet pill abuse.

Prospective program evaluation data can also provide important clues about the successes (and failures) of the “natural experiments” that certain well-planned large-scale policy interventions can constitute. In one such case, Arkansas passed an act in 2003 that aimed to reduce childhood obesity using an array of statewide interventions. Children’s outcomes were then tracked. Evaluations found that BMIs “leveled off,” with no concomitant increase in diet pill consumption, excessive exercising or weight-based bullying. Similarly, researchers who examined data from the US Centers for Disease Control found no increases in unhealthy weight-related behaviours (including the use of laxatives, diet pills and vomiting) in American youth over 10 years beginning in 1995, a time when many obesity prevention programs were initiated across the United States. These data provide additional supporting evidence that obesity prevention programs can be delivered without causing adverse effects.

Table 4: Outcome differences between intervention and control groups

<table>
<thead>
<tr>
<th>No Significant Differences</th>
<th>Positive Outcome for Intervention Participants</th>
<th>Negative Outcome for Intervention Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive self-perceptions (5)</td>
<td>Positive self-perceptions (1)</td>
<td>Unhealthy weight control behaviours (1)</td>
</tr>
<tr>
<td>Unhealthy body image ideals (1)</td>
<td>Over concern with weight/shape (2)</td>
<td></td>
</tr>
<tr>
<td>Binge eating (1)</td>
<td>Healthy eating intentions (2)</td>
<td></td>
</tr>
<tr>
<td>Unhealthy weight control behaviours (2)</td>
<td>Positive physical activity attitudes (1)</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy for healthy eating (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive physical activity attitudes (5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Numbers in parentheses indicate the number of studies with such findings.

Obesity prevention programs can be delivered without causing adverse effects.

Feature CONTINUED
To the Editors:

In the previous issue of the Quarterly, you reviewed interventions to address suicidality. However, Dialectical Behaviour Therapy (DBT) was not among them. What have evaluations of DBT found?

Vanessa Saayman
Victoria, BC

Originally developed as a treatment for chronically suicidal women with borderline personality disorder, DBT teaches emotional regulation, distress tolerance and interpersonal skills using problem-solving and behavioural skills training. Because of its documented effectiveness in adults, DBT is now being adapted for suicidal adolescents.

What do we know about the effectiveness of DBT?

No studies of DBT have met the inclusion criteria for any of our systematic reviews to date. Nevertheless, we did uncover three non-randomized controlled trials of DBT with suicidal adolescents. However, none focused exclusively on chronically suicidal adolescents or reported separate outcomes for them. As well, because the studies either failed to randomize participants or to use adequate randomization methods, we do not know whether positive findings were simply due to chance.

The one Canadian study showed a reduction in self-reported suicidality at one-year follow-up for youth receiving DBT and for youth receiving treatment as usual, with no significant differences between treatments. In one of the two American studies, suicide attempts were 2.5 times higher among youth receiving treatment as usual (8.6%) compared to those receiving DBT (3.4%). However, statistical analyses were not conducted to determine whether DBT was significantly more effective than the comparison treatment. In the other American study, scores on a suicide inventory were reduced for youth receiving DBT and for the comparison treatment. However, the authors did not report on statistical significance, so differences between the groups could not be evaluated.

These preliminary findings suggest that DBT in youth needs to be evaluated using more rigorous research designs and larger samples before widespread implementation is warranted. As well, when components of DBT developed with adults are adapted for youth, a developmental perspective rather than a personality disorder focus should be taken. In other words, developmental changes need to be recognized in adapting DBT and assessing its effectiveness for youth.
Appendix

Research methods

To find the highest-quality research, we used systematic methods adapted from the *Cochrane Collaboration*.\(^\text{52}\) Since our scoping of the literature generated a tremendous number of recent publications, we limited our search to systematic reviews published in peer-reviewed scientific journals.

To identify high-quality reviews, we first applied the following search strategy:

<table>
<thead>
<tr>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Medline, PsycINFO, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects &amp; The Campbell Collaboration Library of Systematic Reviews</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Obesity <em>and</em> prevention, treatment <em>or</em> intervention</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>- English-language articles published from 2004 through July 2009</td>
</tr>
<tr>
<td>- Child participants (age 0–18 years)</td>
</tr>
</tbody>
</table>

Next, we applied the following criteria in assessing the 77 retrieved reviews:

**Review**

- Clear descriptions of methods, inclusion and exclusion criteria, sources (including database names) and search years

**Individual studies within the review**

- Interventions specifically aimed at preventing childhood obesity
- Random assignment of participants to intervention and control/comparison groups at study outset
- Majority of the studies had maximum attrition rates of 20% *or* use of intention-to-treat analysis
- Outcome measures included body mass index (BMI)
- Levels of statistical significance reported for BMI outcomes based on intervention assignment

One team member assessed each retrieved review. Only the selected review\(^\text{37}\) met all the aforementioned criteria, which was then verified by a second team member. ☝️
References


36. Browne, G., Byrne, C., Roberts, J., Gafni, A., & Whittaker, S. (2001). When the bough breaks: Provider-initiated comprehensive care is more effective and less expensive for sole-support parents on social assistance. Social Science and Medicine, 53, 1697–1710.


2009/ Volume 3
4 - Preventing Suicide in Children and Youth
3 - Understanding and Treating Psychosis in Young People
2 - Preventing and Treating Child Maltreatment
1 - The Economics of Children's Mental Health

2008/ Volume 2
4 - Addressing Bullying Behaviour in Children
3 - Diagnosing and Treating Childhood Bipolar Disorder
2 - Preventing and Treating Childhood Depression
1 - Building Children's Resilience

2007/ Volume 1
4 - Addressing Attention Problems in Children
3 - Children's Emotional Wellbeing
2 - Children's Behavioural Wellbeing
1 - Prevention of Mental Disorders