Effectiveness of Occupation-Based Intervention with Children Diagnosed with Obesity

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Effectiveness of Occupation-Based Intervention with Children Diagnosed with Obesity

Disciplines
Occupational Therapy | Pediatrics | Rehabilitation and Therapy

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Effectiveness of Occupation-Based Intervention with Children Diagnosed with Obesity

Prepared by; Erin Beavers. (email address: beav7391@pacificu.edu)
Date: November 30, 2009

CLINICAL SCENARIO:

The prevalence of childhood obesity in the United States has dramatically increased over the past decades. In fact, the number of children and adolescents diagnosed with obesity is 16 to 33%. (American Academy of Child & Adolescent Psychiatry, 2008) The CDC defines obesity as: at or above the gender and age specific 95th percentile based on CDC growth charts for the United States. Data from the CDC’s National Health and Nutrition, childhood obesity has increased across all aged 2 – 19 years old at rates up to 12% from 1980. (Center for Disease Control and Prevention, 2009) In addition, Health People 2010 has targeted reducing childhood obesity as a main objective. (U.S. Department of Health and Human Services, 2006) The consequences of childhood obesity are alarming. Not only are there physical health related consequences including: cardiovascular disease, type 2 diabetes, asthma, hepatic steatosis, high blood pressure etc, there are also psychological consequences such as: depression, low self-esteem, and social isolation (CDC, 2006; Skar, 2008). Regardless of practice setting (school, clinic, mental health, etc.) childhood obesity is a prominent and common health risk.

In 2006, AOTA published a statement paper indicating that occupational therapists have a unique and holistic viewpoint of how participation in daily occupations can influence the management of obesity regardless of age. (Blanchard, 2006) The cause of obesity in childhood is multi-faceted, but can be traced to: intake of high dense calorie foods, low amounts of physical activity, and excessive time watching electronic media. (Clark, Reingold, & Salles-Jordan, 2007) In order to provide the best possible treatment for children suffering from obesity, occupational therapists need to be creative and go beyond a traditional weight loss approach. Specifically, we need to identify the: personal, occupational, social, and environmental factors that can motivate children with obesity to participate in a fun, active, and healthy lifestyles. In order to research ways in which occupational therapists can contribute to the fight against obesity; the purpose of this CAT is to determine if occupation-based and activities are an effective treatment for weight loss in children with obesity.

FOCUSSED CLINICAL QUESTION:

Is activity-based occupational therapy a feasible and effective treatment for weight loss in children with obesity?
### SUMMARY of Search, ‘Best’ Evidence’ appraised, and Key Findings:

**SUMMARY of Level I, II, III**

| **Sports (Soccer)** | The purpose of the study was to evaluate the feasibility, acceptability, and efficacy of an after-school team sports program for reducing weight gain in low-income overweight children. A co-ed soccer was chosen as the team sport based on participant preferences and past clinical research.  
As a pilot study, this randomized controlled trial was not powered to detect all meaningful differences between groups. However the results were promising. Compared with children receiving health education, children in the soccer group had significant decreases in body mass index $z$ scores at 3 and 6 months and significant increases in total daily, moderate, and vigorous physical activity at 3 months. All 9 children randomized to the soccer group and 5 of 12 children (42%) randomized to the health education group had lower BMI $z$ scores at 3 and 6 months. There were significant baseline BMI $z$ scores by treatment interactions at 3 months ($P=.03$) and 6 months ($P=.04$). At the 6-month follow-up, 8 of 9 children (89%) in the soccer program stated that they would like to continue to play on a soccer team. Parents reported that SPORT helped their children by improving their weight and eating habits, increasing physical activity, and increasing confidence and self-esteem.  
As a pilot study, the main limitation was the small sample size. Another limitation of this study was its length since children were followed up for only 6 months. Although testimonials suggest that program participants remained active after the conclusion of the study, longer follow-up periods are needed to determine whether team sports are effective for longer periods. The authors did state that a full-clinical trial should be implemented in order to improve the power and clinical meaningfulness of the study. The implications for occupational therapists are that occupation-based activities such as sports are both motivating and effective interventions for children with obesity. This information is very helpful for program development in the community as well as school based programs to help children learn healthy lifestyle habits. |
| **Dance** | The purpose of the study was to determine if dance was effective to reduce television watching and increase physical activity in obese African American female children. The pilot study was to test a 12-week intervention and associated measurements for feasibility, as well as the program’s potential for efficacy in a randomized controlled trial.  
The authors reported that the Stanford GEMS Pilot Study results were highly promising. They mention that although not definitive, standardized effect sizes of .38 for BMI and .25 for waist circumference over 12 weeks are arguably of clinical importance. In addition, the results were achieved relative to an active control intervention that included information on altering diet and activity behaviours to prevent obesity, which could alter the difference between groups. The intervention resulted in reductions of more than 20% in television, videotape, and video game use among the treatment group girls, and statistically significant reductions in both reported household television viewing, and the number of dinners eaten while watching television, as compared to controls. The authors also acknowledge that the |
effects on psychosocial outcomes are of interest but the clinical implications are unknown. The treatment intervention produced a statistically significant reduction in weight concerns, which can result in the argument that an obesity prevention intervention for young girls might promote disordered eating attitudes, and/or eating disorders. Finally, treatment group girls reported a near statistically significant improvement in school grades, compared to control group girls.

Intervention effects were assessed by comparing the follow-up values of treatment and control groups with analysis of covariance (ANCOVA), with the baseline value of the outcome, centered at its sample mean, as a covariate. The appropriateness of this analysis is questionable because it adjusts for baseline values of the treatment and the control group; which does not show how the participant’s behaviours changed over time. For example, their results show that the BMI at baseline for the treatment group did not decrease. Instead the BMI increased from baseline to follow-up. However, their results show that the treatment group BMI measurements did not increase as much as the control group. Therefore, the ANCOVA analysis may not show the a true representation of how dance can reduce obesity rates in young girls.

**Gardening**

The purpose of the study was to evaluate the effectiveness of a comprehensive 1-year nutrition program designed to improve the nutrition knowledge and vegetable preferences of upper elementary school aged children. Specifically, they combined nutrition curriculum in addition to planting and harvesting a vegetable garden.

The design of this study was quasi-experimental because the schools, not the students, were assigned to treatment groups in a non-random manner. This design was appropriate because randomization was not possible due to constraints of the school districts. The schools were matched based on demographic profile.

There were three schools participating in the study.
1) The first school was the control group (CO) N = 61
2) The second school received classroom based nutrition education (NL) N=71
3) The third school received the in-class nutrition education and the hands-on gardening activities (NG) N = 81

Findings for the study showed scores from students at the NL and NG sites were significantly greater than those at the CO site ($F = 24.238$, $p< .0005$). Those results were also maintained at the 6 month follow-up ($F = 18.270$, $p =<.0005$). In addition, Post test preference scores for the NL and NG sites were significantly greater than the CO site for carrots ($F = 5.768$, $p < .005$) and broccoli ($F = 4.840$, $p =< .01$). Scores from the NG site were significantly greater than the NL and CO sites for snow peas ($F = 7.657$, $p < .005$) and zucchini ($F = 10.012$, $p , .0005$).

The study concluded that exposure to the in-class nutrition lessons and hands-on gardening activities increased preferences for certain vegetables in fourth graders. Therefore, garden-enhanced nutrition education is an effective tool for improving the nutrition knowledge and vegetable preference in school aged children. These results may influence clinical practice because OTs can utilize garden based activities to help students learn about nutrition and maintaining a healthy diet.
After School Program
This article describes an after-school program centered on the occupation of running that was designed and implemented by occupational therapy faculty and students. The development of this after-school program specifically aimed at increasing the amount of physical activity for children and reducing the risk of childhood obesity.

The study only shows the program output data for the first year of program implementation. The study is planning to continue onto the second and subsequent years for data collection and statistical examination. However, the data collected shows there was an increase in the mean amount of sessions attended per child (Fall: 14.3/26, Spring: 14.7/24) as well as the amount of fun run attendance over the course of two semesters in one consecutive school year (Fall: 16, Spring: 19). In addition, the authors indicate that all participants increased their level of physical activity during the course of the program. However, future research is still necessary to demonstrate that it has a positive affect on their future activity choices and improving quality of life.

Contributions of Qualitative Research
The study was a single case-study design and the purpose was to describe how a child with obesity perceived participation in play activities. The study aimed at providing important implications for health care professionals and education providers to improve the level of participation in play activities in children who are obese.

The authors utilized several different methods of data collection in order to increase accuracy and comprehensiveness of the data. The collection methods included: semi structured interviews, participant observation, and a self-assessment report called The Kid Play Profile. The observations were focused on the boy’s participation in play activities and on his relationships with classmates during play. In addition, the observations focused on the boy’s relationship with his teacher and how the teacher supported his participation in play activities. After the observations were made, the boy and the teacher were separately asked informal questions about the observed situations to either confirm or reject what had been discussed. However they did not include: the length of time spent during participant observations as well as the amount of data that was collected. In addition, a clear and complete description of the research environment (home and school) was not included.

The results from the data was coded into three different categories:

1) A wish for participation in play activities

The boy described that he participated in different play activities with friends. However, it became obvious during the interview that the boy's relationships with peers were more of a wish for friends to do play activities with rather than actual performance. He narrated that he was often ignored by his peer-group and that a lot of times he felt completely left out. When
the boy was asked whom he played with and which friends he meant in the play profile, the boy answered that he played with his imaginary friend.

2) The importance of knowing social rules in play activities

This category describes the boy's performance and participation in different play activities. The boy's play profile indicated that he was a player in different sports activities. However, the interview and the observation showed that he did not always follow the rules of the activities, which in turn ended up with him standing by the side and watching the other children play.

3) The meaning of support and encouragement.

This category describes how persons related to the boy supported and encouraged him to participate in play activities. The boy stated that he received support and encouragement at home from his mother for participation in play activities. The interviews showed that the mother supported the boy in choosing non-team play activities by telling him that he was not a team player. She considered him as being different and called him an 'outsider,' and so she encouraged him to choose play activities that she thought would protect him from being teased.

The authors concluded that many aspects influence a child with obesity with regard to participation in play activities. Support and encouragement were many times pointed out as a prerequisite for participation in play activities. The case study identified many important reasons why their study has important implications for health care professionals and educators working with children with obesity. Participation in play activities is not the responsibility merely of the child. Health care professionals, the child's family, and the school should cooperate with the child to develop successful and healthy strategies that optimize participation in play activities while considering the child's emotional, social, and physical abilities. Factors that foster participation in play activities, such as opportunities to initiate play and to choose playmates, need to be encouraged by the family, educators, school nurses, occupational therapists and other health care professionals.

**CLINICAL BOTTOM LINE:** Activity-based interventions are shown to be a positive and motivating treatment for combating the physical and psychological effects from childhood obesity. Not only has the research depicted that activity-based treatment can help increase physical fitness, it has also shown improvements in: healthy food choices, self-esteem, and family education. However, the lack of specificity in regard to what activity-based occupations are most effective remains unclear. The research shows a wide variety of activity-based interventions including: gardening, soccer, sports, dance, etc. The results from research remain positive, however more research is needed to reduce the broad spectrum of intervention options in order to provide the most effective and meaningful treatment to children suffering from obesity.
Limitation of this CAT:  This critically appraised paper has not been peer-reviewed. The writer is not an expert in the subject of the CAT and did not perform an exhaustive review of the evidence. The writer is a novice practitioner with little clinical experience.

SEARCH STRATEGY:

Terms used to guide Search Strategy:

- **Patient/Client Group**: Children with Obesity (CDC criteria of BMI >95th percentile)
- **Intervention (or Assessment)**: Occupation Based Physical Activity
- **Comparison**: Non-treatment Group
- **Outcome(s)**: Health maintenance, health education, weight loss, increased physical activity.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Key Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient/Client Population</td>
<td>Childhood, Pediatric, Children, Obesity/Obese, Overweight</td>
</tr>
<tr>
<td>Intervention</td>
<td>Occupation based, Activity Based, After School Program, Sports, Exercise, Physical Activity, Health Education,</td>
</tr>
<tr>
<td>Comparison</td>
<td>Non treatment group</td>
</tr>
<tr>
<td>Outcome</td>
<td>Weight loss, Health Maintenance, Physical Activity, Health Education</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Databases and sites searched</th>
<th>Search Terms</th>
<th>Limits used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation Reference Center</td>
<td>Childhood, Pediatric, Children, Obesity/Obese, Overweight</td>
<td>No limits were utilized in the database search</td>
</tr>
<tr>
<td>CINAHL (EBSCO host)</td>
<td>Obesity/Obese, Overweight</td>
<td></td>
</tr>
<tr>
<td>OT Search</td>
<td>Occupation-Based Play Activity</td>
<td></td>
</tr>
<tr>
<td>AOTA.com</td>
<td>After School Program Sports Exercise Physical Activity</td>
<td></td>
</tr>
<tr>
<td>CDC.gov</td>
<td>Occupational Therapy Nutrition Health Education Health Maintenance</td>
<td></td>
</tr>
</tbody>
</table>
INCLUSION and EXCLUSION CRITERIA

- **Inclusion:**
  - Peer Reviewed Journals to 2002 – 2009
  - Levels of Evidence: I, II, III, IV, & V
  - Qualitative Research
  - Expert Opinion
  - Children who are Overweight (CDC BMI > 85th – 94th percentile)
  - Children with Obesity (CDC BMI > 95th percentile)
  - Children with normal BMI for age
  - All Nationalities

- **Exclusion:**
  - Adolescents and Adults (Ages >13)
  - Co-occurring Disabilities

RESULTS OF SEARCH

5 relevant studies were located and categorised as shown in Table 1 (based on Levels of Evidence, Center for Evidence Based Medicine, 1998)

**Table 1:** Summary of Study Designs of Articles retrieved

<table>
<thead>
<tr>
<th>Study Design/ Methodology of Articles Retrieved</th>
<th>Level</th>
<th>Number Located</th>
<th>Author (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two groups, non randomized (e.g. cohort, quasi-experimental)</td>
<td>II</td>
<td>1</td>
<td>Morris, J.L., &amp; Zidenberg-Cherr, S.M., 2002</td>
</tr>
<tr>
<td>One group non randomized (e.g. pretest and post test)</td>
<td>III</td>
<td>1</td>
<td>Smallfield, S., &amp; Anderson, A.J., 2009</td>
</tr>
<tr>
<td>Descriptive Studies that include analysis</td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case reports and expert opinion, which include narrative literature</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualitative</td>
<td>N/A</td>
<td>1</td>
<td>Skar, L.K., &amp; Prellwitz, M., 2008</td>
</tr>
</tbody>
</table>
BEST EVIDENCE

The following study/paper was identified as the ‘best’ evidence and selected for critical appraisal. Reasons for selecting this study were:


This study was chosen based upon the rigorous study design (randomized controlled trial) and strict methodology in regards to: trained professionals and researchers, validity of assessment tools, and good representative sample of participants. In addition, this study was directly related to the focused clinical question for occupational therapists as indicated by soccer being an occupation-based and client-centered.

SUMMARY OF BEST EVIDENCE

Table 2: Description and appraisal of a Pilot Randomized Controlled Trial by (Weintruab et. al, 2008)

**Aim/Objective of the Study/Systematic Review:** The purpose of this study was to evaluate the feasibility, acceptability, and efficacy of an after-school team sports program for reducing weight gain in low-income overweight children.

**Study Design:** Pilot Randomized Controlled Trial.

The study lasted for six months and was a 2 arm parallel-group design. The data collectors were not blinded at follow-up assessments of participants due to the limited staff. The outcomes were measured prior to randomization (at baseline), 3-month follow-up, and 6-month follow-up.

**Setting:** The study took place in a low-income community in Northern California, USA. The intervention group had access to a soccer field at a local school district.

**Participants:** Twenty-one fourth and fifth grade children were enrolled in the study: 9 to the soccer intervention and 12 to the health education intervention. Children were recruited through primary care physician offices and clinics, schools, and community centers. Two children in the soccer group had a BMI at or above the 85th to the 94th percentile, and 7 had a BMI at or above the 95th percentile. All 12 children in the health education group had a BMI at or above the 95th percentile.

Six of 9 families in the soccer group (67%) and 9 of 12 families in the health education group (75%) had total household incomes less than $40 000. Six of 9 families in the soccer group (67%) and 7 of 12 families in the health education group (58%) had a highest parent or caregiver level of education of high school graduate or below. Self-reported ethnicities were 8 Hispanic/Latino and 1 black or African American in the soccer group and 10 Hispanic/Latino, 1 black or African American, and 1 Native Hawaiian or other Pacific Islander in the health education group.

No drop-outs were reported in this study.
**Intervention Investigated** (provide details of methods, who provided treatment, when and where, how many hours of treatment provided)

*Control:* Children in the active placebo condition received a 25-session, state-of-the-art, information based nutrition and health education intervention consisting of weekly after-school meetings conducted by trained volunteer Stanford University undergraduate and medical students under the guidance of the investigators. Program content included materials and activities promoting healthful nutrition and physical activity produced by federal health agencies and national nongovernmental health organizations.

*Experimental:* A co-ed soccer was chosen as the team sport based on participant preferences and past clinical research. The soccer program was initially offered 3 days per week but was increased to 4 days a week during month 5 of the study at the request of participating children and parents. One day per week was game day, with the other days being practice days. Sessions were approximately 2 ¼ hours long and started with a homework period, followed by approximately 75 minutes of activity. The activity period began with a supportive, teambuilding check-in followed by 15 minutes of warm-up and stretching. The remainder of practice was devoted to learning soccer skills in the context of fun skill-building exercises and concluded with a scrimmage. Shin guards, uniforms, and water bottles were provided to each player. Each practice ended with a celebratory cheer and recognition of individual players’ efforts and teamwork. Matches involving the children, their parents, and the coaches were held quarterly. At the conclusion of the program, Children received certificates of accomplishment and medals. Trained Stanford University undergraduate and medical students served as volunteer coaches and homework tutors. All coaches and tutors completed training and certification in the Protection of Human Research Subjects and the Health Insurance Portability and Accountability Act, as well as training in youth development, group management, and the soccer curriculum.

**Outcome Measures** *(Primary and Secondary)* Give details of each measure, maximum score for each measure and range, administered by whom, where

All assessments were performed by trained members of the research team. The outcome measures included:

1) BMI/BMI z scores
   - Age and sex standardized BMI was calculated using the LMS method from the CDC

2) Total Physical Activity Minutes
   - Moderate Physical Activity Minutes
   - Vigorous Physical Activity Minutes
   - Physical activity was assessed on 6 consecutive days using accelerometers worn on belts at the right hip. Mean daily counts per minute, minutes of moderate physical activity, and minutes of vigorous physical activity between 7AM and 10PM

3) TV and Other Screen time
   - Self-Report

4) Depressive Symptoms
   - 10 item Children’s Depression Inventory

5) Over-concerns with Weight
- The Over-concerns with Weight and Shape subscale of the McKnight Risk Factor survey was used to assess weight concerns

6) Self-esteem
- 10-item Rosenberg Self-Esteem Scale

**Main Findings:** (inset table of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc where provided – if you need to calculate these data yourself put calculations here and add interpretation later, under ‘critical appraisal’ on next page).

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**Original Authors' Conclusions** *(paraphrase as required. If providing a direct quote, add page number)*

The authors of this study concluded that an after-school team soccer program for overweight children could be an effective intervention for weight control. This conclusion was appropriate
given that the main purpose of this pilot study was to determine how it could be implemented in a full-clinical trial

**Critical Appraisal:**

**Validity** *(Methodology, rigour, selection, bias, provide PEDro score/ PEDro partitioned score and sub-test items 1-10 for RCTs; other study designs, follow headings used in critical appraisal checklist forms. Comment in missing information in original paper)*

Several important factors of the presented CAP need to be addressed. First, the statistical analysis methodology for this study is under criticism. Intervention effects were assessed by comparing the follow-up values of treatment and control groups with analysis of covariance (ANCOVA), with the baseline values as its sample mean, as a covariate. The appropriateness of this analysis is questionable because it adjusts for baseline values of the treatment and the control group; which does not show how the participant’s behaviours changed over time. For example, children in the treatment group and control group increased their BMI over the course of the study. However, it proved statistically significant because the treatment group’s BMI did not increase as much as the control group. Therefore, with the ANCOVA, the authors were able to skew the results to the author’s liking. In addition, recall bias could occur through self-report outcome measurement tools such as: participants might not be able to remember the amount of television minutes watched or the participants could skew the results towards what researcher favoured outcomes.

Secondly, the authors of this study measured a wide variety of outcomes; which can be a limiting factoring in specifying the area of interest for this study. The majority of assessments used were reliable and valid including: BMI, Children’s Depression Rating-Scale, Rosenberg Self-Esteem Scale. However, the Rosenberg Self Esteem Scale is not developed for children under the age of 13 years old. Therefore, the results of the Rosenberg may not be valid.

Finally, as a pilot study, the main limitation was the small sample size. Another limitation of this study was its length. Children were followed up for 6 months. Although testimonials suggest that program participants remained active after the conclusion of the study, longer follow-up periods are needed to determine whether team sports (soccer) is effective for longer periods

**Interpretation of Results** *(Favourable or unfavourable, specific outcomes of interest, size of treatment effect, statistical and clinical significance; minimal clinically important difference – some of which you may have calculated yourself. Email original authors for information needed such as additional data needed to calculate confidence intervals.)*

As a pilot study, the results were promising. Compared with children receiving health education, children in the soccer group had significant decreases in body mass index z
scores at 3 and 6 month follow up and significant increases in total daily, moderate, and vigorous physical activity at 3 month follow up. Furthermore, the results that may provide the most beneficial outcomes is that at the 6-month follow-up 8 of 9 children (89%) in the soccer program stated that they would like to continue to play on a soccer team. And, parents reported that SPORT helped their children by improving their weight and eating habits, increasing physical activity, and increasing confidence and self-esteem.

The results of this study demonstrated favourable outcome for using sports (soccer) as an intervention for children with obesity. Although the data analysis is questionable; the results show that the treatment group demonstrated a significantly lower BMI z and increased physical activity compared to the control group, the kids in the study reported they were motivated to continue to play soccer in the future. These findings demonstrate implications regarding the power of client-centered activities and how to motivate children with obesity to participate in physical fitness opportunities.

Summary/Conclusion:
The outcomes from this study are not meant to be conclusive but illustrate the importance of future research regarding how sports can positively impact children’s health and wellness. The implications for occupational therapists are that soccer is a motivating intervention for children who are obese and overweight to learn healthy lifestyle habits. The authors noted that this study was one of (if not the only) study of its kind to explore the role that sports can play in reducing the rates of childhood obesity. Although the limitations include the small sample size and that this study was only developed to be a test-run for future clinical trials, the results show promising implications for future research.

Repeat this table as needed for additional studies included in the CAT.

If more than one paper is included a further table that provides a comparative summary of each paper may be added.
### Table 3: Characteristics of included studies

<table>
<thead>
<tr>
<th>Intervention investigated</th>
<th>Comparison intervention</th>
<th>Outcomes used</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study 1</strong> (Robinson, et al, 2003) RCT – Pilot Study</td>
<td>The treatment intervention consisted of an after-school dance class (GEMS Jewels dance classes) at 3 community centers 5 days a week in addition to a 5-lesson television reduction program (START – Sisters Taking Action to Reduce Television) delivered in participant’s homes. The participants were obese African American female children.</td>
<td>1) BMI 2) Waist Circumference 3) Physical Activity – total minutes 4) Moderate to vigorous physical activity – total minutes 5) Self-reported previous day moderate to vigorous physical activity 6) TV, videogame and videotape use 7) Total household TV use 8) Ate dinner with TV on 9) Ate breakfast with TV on 10) Total dietary calorie intake 11) Percent of dietary kilocalories from fat 12) Physical activity liking 13) Number of activities ever tried 14) Over concerns with weight and body shape 15) Body Shape Dissatisfaction</td>
<td>The findings of the pilot study had some positive results in regard to physical and behavioural changes. Specifically, at follow-up the girls in the treatment group has a trend towards a lower BMI, increased total physical activity, reduced TV, videotape, and videogame use, less concerns about weight and improved schools grades.</td>
</tr>
<tr>
<td><strong>Study 2</strong> (Smallfield, S., &amp; Anderson, A.J., 2009) Cohort Design</td>
<td>The investigated intervention was an after school running and walking program. The study was a cohort design with pre and post-test data. Therefore,</td>
<td>1) The number of children enrolled in the program and present at each session 2) The number of children present at the</td>
<td>The findings show there was an increase in the mean amount of sessions attended per child as well as the amount of fun run attendance.</td>
</tr>
</tbody>
</table>
Occupational therapy faculty and students directed the program. The program was open to volunteers from the community and lasted for one school year over fall and spring semester at a community location. No comparison intervention group was involved. Final celebration ceremony at the end.

3) The mean distance travelled per session

| Study 3 (Morris, J.L., & Zidenberg-Cherr, S.M., 2002) | Quasi-Experimental Design | 1-year comprehensive nutrition program for recruited 4th grade students. The curriculum included: in-class nutrition lessons and hands-on gardening activities. | 2 comparison groups were used: 1) Control Group 2) In-class nutrition lessons only | Two outcome measures were used: 1) Knowledge of nutrition 2) Preference of vegetables | Measures included: 1) Nutrition Knowledge Questionnaire 2) Self-Report on Likert Scale | The study found that exposure to the in-class nutrition lessons in addition to hands-on gardening significantly increased student preference for certain vegetables in fourth graders. Furthermore, the students who received in class nutrition lessons had significantly greater nutritional knowledge when compared to the control group. Therefore, this study found favourable results for using occupation-based intervention for increasing healthy food choices and consumption in children. |
| Study 4 (Skar, L.K., & Prellwitz, M., 2008) | **Qualitative Study** – The authors investigated a single case study to determine how a child with obesity perceived participation in play activities. | N/A | Parent, teacher, and child semi-structured interview; participant observation; self report - The Kid Play Profile. All researchers coded the data that was all communicative acts from the participants regarding play activities. The study helped to identify the multi-dimensional aspects that influence children with obesity to participate in play activities. Specifically, the factors that fostered play participation included: parent/teacher support and encouragement and provided opportunities to initiate with peers. The factors that prevent participation include: social alienation and lack of knowledge regarding social rules. This has important implications for healthcare professionals because it exemplifies how a child with obesity may want to be an active participant in activities; but feel unsupported by their peer group or adult figures. Therefore, addressing the environmental and social factors influencing participation is a critical component to facilitating participation. |
IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

Without a doubt, the rates of childhood obesity in the United States are continuing to rise. Regardless of race, gender, or socio-economic status, the prevalence of this life threatening illness is growing. The current aims of reducing childhood obesity have yet to prove effectiveness. Therefore, occupational therapists have a duty to take part in the fight against childhood obesity. The unique qualities that occupational therapists can offer can truly make an impact. The literature shows favourable results in utilizing occupation-based interventions in not only reducing BMI rates, but the psychological effects of childhood obesity as well. However, one must not assume conclusive evidence of the presented research. The limitations as well as promising aspects of research presented in the following CAT require discussion due to the implications they have on clinical practice.

Limitations throughout the presented research have an impact on the influence the conclusive findings. The most powerful studies presented (Robinson, et al, 2003; Weintraub, et al, 2008); which demonstrated rigorous study design, appropriate outcome measures, and true representative sample populations were merely pilot studies. The sample sizes were small and the studies were only in its developing stages. Therefore, further research is required to follow-up on the results of the full-scale clinical trials. Additionally, the Level III study(Smallfield, S., & Anderson, A.J., 2009); which followed a cohort of obese children in an after-school running program, was also in its first phase development. The study lacked sampling and statistical details. Finally, Skar and Prellwitz’s study (2008) was conducted in a different region of the world (Scandinavia); which can skew the results due to cultural differences.

The pragmatic details throughout all presented research further magnifies the clinical limitations. None of the studies were conducted within a clinical setting. Instead, they required collaboration with the community, school districts, teachers, and families. The studies could not be easily replicated without a number of partnerships within the community.

Despite the various shortcomings throughout the research, there are also contradicting strong points. Two of the studies were operated and executed by occupational therapists (Skar, L.K., & Prellwitz, M., 2008; Smallfield, S., & Anderson, A.J., 2009); which further emphasizes that occupational therapists play a role in the fight against childhood obesity. In addition, (Robinson, et al, 2003; Smallfield, S., & Anderson, A.J., 2009; Weintraub, et al, 2008) research found positive results in physical as well as emotional health. What’s more, and maybe most important, is children were motivated to participate in physical fitness and healthy activities; which according to the Model of Human Occupation “Volition (i.e., the cycle of thoughts and feelings that reflect one’s personal causation, values, and interests) has pervasive influence on occupational life. It shapes: how people see opportunities and challenges, what people choose to do, and how they experience and make sense of what they have done.” (Kielhofner, 2009) Therefore, motivation may be the key to get children active and healthy.

The continuing trend throughout the presented research indicates that these studies indicate that occupation based activities have strength in childhood obesity treatment. However, more research is required to show conclusive evidence. The broad category of “occupation-based” activities is not enough for clinicians to put into practice. As healthcare professionals dedicated to facilitating participation throughout all areas of occupation, it is our duty to continue to study and seek the evidence to keep our children happy and healthy.
REFERENCES


