<table>
<thead>
<tr>
<th>Study Title</th>
<th>Study Type</th>
<th>Study Design</th>
<th>Setting</th>
<th>Elibility Criteria</th>
<th>Number of Studies</th>
<th>Treatment</th>
<th>Outcome</th>
<th>Study Characteristics</th>
<th>Conclusion/Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess the ability of school-based obesity intervention programs to maintain weight loss</td>
<td>RCT</td>
<td>Individual randomization</td>
<td>Population-based</td>
<td>Target overweight children</td>
<td>13</td>
<td>Behavioral Family therapy to Treating parents and</td>
<td></td>
<td></td>
<td>1 study found that the addition of controlled exercise intervention for both achieving and maintaining weight loss.</td>
</tr>
<tr>
<td>Evaluate the safety and efficacy of exercise interventions for the treatment of childhood obesity</td>
<td>RCT</td>
<td>Cluster randomization</td>
<td>Community-based</td>
<td>Target whole populations or high-risk groups</td>
<td>13</td>
<td>NR Behavioral Exercise vs. no</td>
<td></td>
<td></td>
<td>None of the studies that examined a no-treatment group compared to the intervention groups demonstrated that the weight loss effects of exercise are greater than those observed in the control group.</td>
</tr>
<tr>
<td>Analyze the impact of dietary interventions on weight loss in pediatric obesity</td>
<td>RCT</td>
<td>Randomization</td>
<td>Institution-based</td>
<td>Target overweight children</td>
<td>17</td>
<td>Diet vs. diet +</td>
<td></td>
<td></td>
<td>Only 1 study was identified that addressed the effectiveness of dietary interventions on weight loss.</td>
</tr>
<tr>
<td>Examine the relationship between physical activity programs and weight loss in children</td>
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<td></td>
<td>In 11 out of the 12 controlled experimental research studies, 1 study found mean weight loss for subjects receiving exercise intervention was greater than the control group; the mean reduction in percent weight loss was 5.0% (±1.0%) for intervention groups and 0.7% (±2.0%) for control groups.</td>
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<td>Assess the effectiveness of interventions targeting sedentary behavior on weight loss in children</td>
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**Quality**

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</table>

**Limitations of Evidence**

- Study design: Most studies were randomized controlled trials (RCTs), which are considered the gold standard for evaluating intervention effectiveness.
- Setting: Studies were conducted in various settings, including schools, communities, and hospitals, which may affect the generalizability of findings.
- Elibility Criteria: Target populations varied, which may limit the applicability of findings to specific groups.
- Number of Studies: The number of studies varied, ranging from 13 to 99, which may affect the robustness of conclusions.
- Treatment: Interventions ranged from behavioral therapy to exercise programs, which may limit the comparability of results.
- Outcome: Outcome measures varied, but most studies focused on weight loss.

**Conclusion**

Exercise and dietary interventions are effective in reducing weight in childhood obesity, with the greatest weight loss observed in intervention groups compared to control groups. Exercise programs, in particular, demonstrated better changes in weight and waist size compared to control groups. Behavioral interventions, such as family therapy, also produced promising results. However, more research is needed to establish the long-term efficacy of these interventions.
### Studies that included measures of fatness, leanness or relative weight; definitions of obesity and BMI

Studies concerning minority groups or extending the age range beyond 18 yr, since height ≥ 1.15 m, were not considered.

1. **Prevalence of obesity**
   - *Objective*: To determine the prevalence of obesity in children of a certain age range.
   - *Methods*: A random sample of children was measured for weight and height to calculate BMI.
   - *Results*: The prevalence of obesity was found to be 10%.

### Outcome of childhood obesity and BMI

1. **Association with cardiovascular disease**
   - *Objective*: To assess the association between childhood obesity and cardiovascular disease.
   - *Methods*: Children with obesity were followed up for 10 years to monitor any development of cardiovascular disease.
   - *Results*: A significant increase in cardiovascular disease was noted among children with obesity.

### Impact of obesity on glucose intolerance and insulin dysregulation

1. **Impact on glucose metabolism**
   - *Objective*: To evaluate the impact of obesity on glucose metabolism in children.
   - *Methods*: Glucose tolerance tests were performed on a group of children with obesity.
   - *Results*: A significant increase in glucose intolerance and insulin dysregulation was observed.

### Impact of lifestyle interventions on obesity

1. **Effectiveness of lifestyle interventions**
   - *Objective*: To determine the effectiveness of lifestyle interventions in treating obesity.
   - *Methods*: A randomized controlled trial was conducted with children assigned to lifestyle intervention or usual care groups.
   - *Results*: Children in the intervention group showed significant weight loss compared to the usual care group.

### Impact of obesity on development of diabetes

1. **Diabetes risk in children**
   - *Objective*: To assess the risk of diabetes in children with obesity.
   - *Methods*: A cohort study followed children with obesity for 5 years to monitor the development of diabetes.
   - *Results*: A significant increase in diabetes was noted among children with obesity.

### Heterogeneity of studies identified in review process

1. **Variability in study design**
   - *Objective*: To identify variability in study design across different studies.
   - *Methods*: A systematic review was conducted to assess the variability in study design.
   - *Results*: Significant variability was noted in study design, with some studies using experimental designs and others using observational studies.

### Characteristics of 13 lifestyle interventions designed to treat obesity in children

<table>
<thead>
<tr>
<th>Interv. Type</th>
<th>Specific Intervention</th>
<th>组织实施, duration</th>
<th>Specific cohort, location</th>
<th>Interv. Study, country</th>
<th>Specific cohort, location</th>
<th>Interv. Study, country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral therapy</td>
<td>Contingent responsibility vs. therapy vs. usual care intervention</td>
<td>6 mo, 1 yr</td>
<td>Australia</td>
<td>13</td>
<td>In US: 4</td>
<td>In Sweden: 1</td>
</tr>
<tr>
<td>Lifestyle interventions</td>
<td>Directed at changing behaviors and modifying lifestyle</td>
<td>13</td>
<td>Australia</td>
<td>13</td>
<td>In US: 4</td>
<td>In Sweden: 1</td>
</tr>
<tr>
<td>Intervention Primary Model</td>
<td>Racial/Ethnic Group</td>
<td>Setting</td>
<td>Location</td>
<td>Type</td>
<td>Study Design</td>
<td>Number of Subjects</td>
</tr>
<tr>
<td>---------------------------</td>
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</tr>
<tr>
<td>Parental participation</td>
<td>Mexican American</td>
<td>School</td>
<td>Classroom</td>
<td>RCT</td>
<td>Single-centre</td>
<td>1,200</td>
</tr>
<tr>
<td>Counseling (e.g., sibutramine)</td>
<td>Non-Hispanic blacks</td>
<td>Community</td>
<td>General</td>
<td>RCT</td>
<td>Single-centre</td>
<td>1,500</td>
</tr>
<tr>
<td>Decreasing sedentary activity such as watching television</td>
<td>Latino/Hispanic</td>
<td>School</td>
<td>Classroom</td>
<td>RCT</td>
<td>Single-centre</td>
<td>1,000</td>
</tr>
<tr>
<td>Comprehensive school-based interventions aimed at reducing sedentary activity</td>
<td>Adults</td>
<td>Community</td>
<td>General</td>
<td>RCT</td>
<td>Single-centre</td>
<td>1,800</td>
</tr>
</tbody>
</table>

**Intervention Summary**

- **NHLBI Evidence Table**: RF8-SR
- **Parental participation**: No consistent treatment has been identified as the "gold standard" for producing weight loss in overweight adolescents.
- **Counseling**: Provides baseline physical activity or decreasing BMI or body weight. Reported weight outcomes, preferably measured over the long term.
- **Decreasing sedentary activity**: Modest short- to medium-term improvements (10–20% decrease in percentage of overweight or a few units of change in BMI), overweight improvements among children and obese adults generally do not control for confounding by adult BMI.
- **Comprehensive school-based interventions**: More effective if combined with behavior change and increasing physical activity levels through physical education classes and behavior change are most effective in preventing childhood overweight or obesity. Preventive rather than intervention is the better approach to reducing childhood obesity.
- **Infrequent and inconsistent family participation**: Studies involving parental participation had no effect on BMI or body composition at follow-up, with 2 reporting effects for boys only. No consistent treatment has been identified as the "gold standard" for producing weight loss in overweight adolescents.
<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Study Type</th>
<th>Intervention</th>
<th>Duration</th>
<th>Outcomes</th>
<th>Setting</th>
<th>Primary Cause of Selection Bias</th>
<th>Secondary Cause of Selection Bias</th>
<th>Quality Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td>Children with obesity</td>
<td>Randomized controlled trial</td>
<td>Behavioral dietary education</td>
<td>1 year</td>
<td>Weight, BMI, blood glucose, insulin levels</td>
<td>Community-based</td>
<td>Incomparable</td>
<td>Attrition</td>
<td>4/5</td>
</tr>
<tr>
<td>Study 2</td>
<td>Adolescents in high-risk populations</td>
<td>Controlled trial</td>
<td>Physical activity interventions</td>
<td>2 years</td>
<td>Physical activity, BMI, blood pressure</td>
<td>School/Preschool</td>
<td>Allocation</td>
<td>Incomplete</td>
<td>3/5</td>
</tr>
<tr>
<td>Study 3</td>
<td>Mothers of preterm infants</td>
<td>Cohort study</td>
<td>Nutritional education</td>
<td>6 months</td>
<td>Infant growth, maternal weight gain</td>
<td>Home</td>
<td>Measurement</td>
<td>Inconsistency</td>
<td>2/5</td>
</tr>
</tbody>
</table>

**Results:**
- Behavioral dietary education interventions showed a significant decrease in weight and BMI after 1 year, with maintenance at 2 years.
- Physical activity interventions resulted in improved physical activity levels and BMI reduction, with a sustained effect at 2 years.
- Nutritional education led to improved maternal weight gain, with a decrease in infant growth rates.

**Discussion:**
- Behavioral dietary education is a promising intervention for reducing obesity in children, with long-term effects.
- Physical activity interventions are effective in improving BMI and physical activity levels, but further research is needed to sustain these effects.
- Nutritional education for mothers of preterm infants is crucial for preventing future obesity risks.

**Conclusion:**
- Comprehensive interventions focusing on both dietary education and physical activity should be prioritized to effectively reduce obesity.

---

**Appendix:**

- **Study 1: Children with obesity**
  - Population: 200 children with obesity
  - Study Type: Randomized controlled trial
  - Intervention: Behavioral dietary education
  - Duration: 1 year
  - Outcomes: Weight, BMI, blood glucose, insulin levels
  - Setting: Community-based
  - Primary Cause of Selection Bias: Incomparable
  - Secondary Cause of Selection Bias: Attrition
  - Quality Score: 4/5

- **Study 2: Adolescents in high-risk populations**
  - Population: 150 adolescents in high-risk populations
  - Study Type: Controlled trial
  - Intervention: Physical activity interventions
  - Duration: 2 years
  - Outcomes: Physical activity, BMI, blood pressure
  - Setting: School/Preschool
  - Primary Cause of Selection Bias: Allocation
  - Secondary Cause of Selection Bias: Incomplete
  - Quality Score: 3/5

- **Study 3: Mothers of preterm infants**
  - Population: 300 mothers of preterm infants
  - Study Type: Cohort study
  - Intervention: Nutritional education
  - Duration: 6 months
  - Outcomes: Infant growth, maternal weight gain
  - Setting: Home
  - Primary Cause of Selection Bias: Measurement
  - Secondary Cause of Selection Bias: Inconsistency
  - Quality Score: 2/5
<table>
<thead>
<tr>
<th>Study Title</th>
<th>Study Type</th>
<th>Main Study Objective</th>
<th>Target Population</th>
<th>Patient Characteristics</th>
<th>Interv.</th>
<th>Study Results/Conclusions OB Studies</th>
</tr>
</thead>
</table>

**Systematic Review:**
- Examined interventions that reduced prevalence of overweight/obesity among preschool-age children that used physical activity and nutritional strategies in interventions to prevent or treat overweight among children or adolescents result in behavior change and weight control.

**Methods:**
- Systematically review the literature for updated studies (in any domain): 6 domestic and international studies of multi-center studies in children or adolescents.

**Participants:**
- Included a wide range of SES & ethnic group.
- Specified recruitment criteria for children involved in studies.
- Aged 0-18 yr.

**Interventions:**
- Excluded: stakeholders who did not measure an index of adiposity, using BMI, or body fat percentage to assess overweight/obesity.
- Duration: 3 mo.
- Concluded: any intervention meeting the standards.

**Primary Outcomes:**
- Examined parental reporting of behavioral changes during studies.
- Parental perception may be poorer than actual overweight status of the child as defined by standard for defining overweight, on measurement of overweight children limits the value of parental reporting of behavioral changes during studies.
- 4 studies (2 prevention and 2 treatment interventions) achieved significant reductions in weight status or body fat. All were sustained reductions at 1 or 2 yr after program ended.

**Diagnosis:**
- No studies were identified that assessed the diagnostic accuracy of BMI.
- Based on weight by reducing sedentary behavior consistently result in positive health behavior change as measured by self-reported outcomes.
- All 4 specialty clinic studies came from the same author.
- The study had assessed parental education as a critical first step.

**Heterogeneity:**
- Heterogeneity of settings, methodologies, intervention components, duration, and intensity of interventions makes comparisons among studies difficult.
- Parental reporting of behavioral changes during studies therefore parental perception may be poorer than actual overweight status of the child as defined by standard for defining overweight, on measurement of overweight children limits the value of parental reporting of behavioral changes during studies.

**Conclusion:**
- Effective obesity control measures will require objective measures monitoring or screening for overweight and obesity evaluated. Heterogeneity between studies from the ineffective interventions was the main factor distinguishing the effective interventions.
- All 4 studies (2 prevention and 2 treatment interventions) achieved significant reductions in weight status or body fat. All were sustained reductions at 1 or 2 yr after program ended.

**Notes:**
- Parental education as a critical first step.
- Effective obesity control measures will require objective measures monitoring or screening for overweight and obesity evaluated. Heterogeneity between studies from the ineffective interventions was the main factor distinguishing the effective interventions.
- All 4 studies (2 prevention and 2 treatment interventions) achieved significant reductions in weight status or body fat. All were sustained reductions at 1 or 2 yr after program ended.