ASK THE QUESTION

Question 1: In pediatric patients (ages 2-17) seen for well child checks, does counseling with 5-2-1-0 message compared to usual counseling or no counseling improve BMI?

Objective: To critically evaluate the evidence on the effectiveness of lifestyle recommendations to improve BMI percentiles for pediatric and adolescent patients presenting to MUSC Pediatric Primary Care clinic.

Background: In the United states, 31% of children 2-19 years old are overweight, defined as above the 85%tile for body mass index (BMI), and 16.9% are obese, defined as BMI above the 95%tile (Tucker et al., 2013). Diseases previously seen primarily in adults such as diabetes, hypertension, heart disease, hyperlipidemia, reproductive problems, asthma, and sleep disorders are now being observed in overweight children (Tucker et al., 2013).

The pediatric primary care team is well-positioned to provide effective interventions to promote healthful behaviors among families of young children (Taveras et al., 2011). Obesity counseling has been a long-standing component of well-child anticipatory guidance; however, more clear, consistent, and consolidated recommendations are needed to make clinical counseling more useful. In response, the Main Youth Overweight Collaborative initiated a 5-2-1-0 campaign. Applying this pneumonic: 5 or more servings of fruits and vegetables, < 2 hours of screen time (TV, computer, video games), at least 1 hour of physical activity, and no (0) sugar-sweetened beverages (Foltz, et al., 2011).

SEARCH FOR EVIDENCE

Search strategies included articles published in English, publications within past 10 years, research-based articles, and pediatric patients (2-19 years of age).
Databases included PubMed, CINHAL, Scopus, PsycINFO, and Google Scholar

Key words/terms included pediatric obesity or overweight, 5-2-1-0, primary health care, counseling, body mass index

CRITICALLY ANALYZE THE EVIDENCE

Question 1: In pediatric patients (ages 2-17) seen for well child checks, does counseling with 5-2-1-0 message compared to usual counseling or no counseling improve BMI?

Practice Recommendation: 5-2-1-0 message should be used for counseling. Weak Recommendation, Moderate Quality Evidence.

Nine studies were found evaluating the effectiveness of 5-2-1-0 counseling for improving BMI percentiles for pediatric patients. The results for most studies were similar but often not statistically significant.

One quasi-experimental study of 140 children 4-18 years old with BMI 85th-95th%tile in a pediatric community practice tested the Let's Go 5-2-1-0 message delivered through motivational interviewing at well-child visits versus standard care. Mean change for BMI was -1.4 for the control group versus -2.7 for the intervention group (p = 0.46). Limited by insufficient power and missing data.

A RCT of 72 children 4-8 years old with BMI ≥85%tile evaluated the lowest intensity component of the recommended staged approach for childhood obesity treatment. There was a decrease in BMI z-score in 55% of control and 70% of intervention (95% CI -0.07 to 0.39).

A cluster randomized controlled trial involving 475 children ages 2-6 years with either BMI ≥ 95%tile or ≥85%tile if at least one parent was overweight of a multisite group practice. Assessed the extent to which a primary care-based intervention, compared with usual care, resulted in smaller increase in BMI and improvement in obesity-related behaviors. There was a significant decrease in BMI amongst girls (-0.38, CI -0.73 to -0.03, p = 0.03) and in families with annual income $50,000 or less (-0.93, CI -1.6 to -0.25, p = 0.01).

An experimental study including 382 residents assessed the feasibility of training residents in brief behavioral counseling using the 5-4-3-2-1 Go! Message. More patients of trained residents reported positive changes in behaviors which have been associated with lower obesity rates: increased intake of fruits and vegetables (28% vs 16%, P<.01), increased intake of water (30% vs 19%, P<.01), increased physical activity (40% vs 29%, P<.03), and decreased television time (36% vs 24%, P<.01). Goals for decreasing soda/juice were more common among patients of control residents (15% vs 15% p 0.97). Patients of trained residents more likely to report they had been successful (36% vs 19% p <0.03).
Lastly, a randomized trial including 182 children 4-9 years of age with BMI ≥85%tile that assessed the efficacy of US primary care pediatric obesity recommendations. Children were recruited for two separate trials, Trial 1: reducing snack foods and sugar sweetened beverages [DECREASE] and increasing fruits, vegetables, and low-fat dairy [INCREASE]; Trial 2: decreasing sugar sweetened beverages and increasing physical activity. Trial 1: significant (p < 0.01) increase in fruits and vegetable consumption from 0 to 6 months, while snack food intake significantly (p < 0.01) decreased from 0 to 6 months. For sugar sweetened beverage in DECREASE group, intake was significantly reduced (p < 0.01) from 0 to 6 months. Energy intake significantly (p < 0.05) decreased from 0 to 6 months and 0 to 12 months. Trial 2: energy intake significantly (p < 0.05) decreased from 0 to 6 months, with no difference found between the interventions. A significant (p < 0.05) main effect of group was found for low-fat milk, with SUBSTITUTES consuming more low-fat milk than GROWTH MONITORING. No change in sugar sweetened beverage intake was found. There were no changes in any leisure-time variables found.

<table>
<thead>
<tr>
<th>PICO Question # 2: In pediatric patients (ages 2-17) seen for well child checks, does counseling with 5-2-1-0 message compared to usual counseling or no counseling improve BMI?</th>
<th>Lower Quality Rating if:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author/Dates/Journal</strong></td>
<td><strong>Purpose of Study</strong></td>
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<tr>
<td>Sharon J. Tucker, PhD, RN et al, 2013, Journal of Pediatric Nursing</td>
<td>Test the Let’s Go 5-2-1-0 program delivered through motivational interviewing by nurses with 4-18 year-old overweight children and parents in primary care</td>
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<td>Primary variables: BMI, BMI %tile, healthy habits (measured by age-specific Healthy Habits Survey developed by Maine Youth Overweight Collaborative)</td>
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<td>Phase 1: enrollment of control group</td>
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<td>Phase 2: enrollment of intervention group</td>
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<td>Follow up at 6 and 12 months</td>
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<td>Steven D. Stovitz, MD et al, 2014,</td>
<td>Address questions related to pediatric obesity research in</td>
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<tr>
<th>Childhood Obesity</th>
<th>To assess the extent to which a primary care-based intervention, compared with usual care, resulted in a smaller increase in BMI and improvement in obesity-related behaviors among children 2-6 years of age at elevated risk of obesity (First year of planned 2 year trial with 6 contacts per year)</th>
<th>Ten pediatric practices (Multisite group practice in Massachusetts)</th>
<th>Intervention: practice received restructuring and families received motivational interviewing. Goals: &lt;1hr/d television/video viewing, removing TV from room where child sleeps, 1 serving/wk fast food, 1 serving/d or less of sugar-sweetened beverages</th>
<th>Primary outcome: change in BMI from baseline to 1 year</th>
<th>□ Lack of allocation concealment □ Selective reporting of measures □ Large losses to F/U □ Insufficient sample size □ Lack of blinding □ Stopped early for benefit □ Lack of allocation concealment □ Selective reporting of measures □ Large losses to F/U</th>
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<tr>
<td>Elsie M. Taveras, MPH et al, 2011, <em>Archives of Pediatrics and Adolescent Medicine</em></td>
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<td>Method: 5 pairs of practices (matched on size and patient pop.) randomly allocated by computer to either control or intervention 475 children ages 2-6 with either BMI ≥ 95th or ≥ 85th if at least one parent was overweight Exclusion criteria: non-English or Spanish speaking, chronic medical condition, planning to leave practice, deemed inappropriate by physician</td>
<td>Intervention: practice received restructuring and families received motivational interviewing. Goals: &lt;1hr/d television/video viewing, removing TV from room where child sleeps, 1 serving/wk fast food, 1 serving/d or less of sugar-sweetened beverages</td>
<td>Primary outcome: change in BMI from baseline to 1 year</td>
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<td>Amy van Grieken, et al, 2013, <em>PLoS ONE</em></td>
<td>Assess the effect of an overweight prevention protocol on child BMI and waist circumference at age 7 years</td>
<td>Nine youth health care centers in the Netherlands</td>
<td>Intervention: parental information re: overweight prevention and healthy lifestyle choices using MI at well-child visit and 3 f/u counseling sessions per year - play outside 1+ hr, daily breakfast, ≤ 2 sugar-sweetened beverages, ≤ 2hr</td>
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<td>□ Lack of allocation concealment □ Selective reporting of measures □ Large losses to F/U □ Insufficient sample size □ Lack of blinding □ Stopped early for benefit □ Lack of allocation concealment □ Selective reporting of measures □ Large losses to F/U</td>
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<td>Denise E. Willey, et al, 2007, <em>Health Psychology</em></td>
<td>Use meta-analytic techniques to quantitatively evaluate the efficacy of lifestyle interventions in the treatment of pediatric overweight by comparing lifestyle interventions with wait-list/no-treatment control groups or information/education-only control groups</td>
<td><strong>Meta-analysis</strong></td>
<td>14 RCTs of lifestyle intervention focused on weight loss or weight control for youth age 19 or younger (527 participants analyzed)</td>
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<td>Inclusion criteria: English, treatment duration at least 4wks, participants overweight at baseline</td>
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<td>Good homogeneity</td>
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<td>“active” treatment defined as lifestyle intervention involving any combination of diet, physical activity, and/or behavioral treatment recommendations</td>
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<td>Lifestyle intervention vs. no intervention: weighted mean effect sizes, fixed-effect model at end of treatment (g = 0.75, p &lt; 0.001) and follow-up (g = 0.6, p &lt; 0.001)</td>
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<td>- positive effects of the intervention</td>
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<td>Lifestyle intervention vs information-only: weighted mean effect sizes, fixed-effect model at end of treatment (g = 0.48, p &lt; 0.01) and follow-up (g = 0.91, p &lt; 0.01)</td>
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<td>Trend toward larger effect sizes associated with longer treatment periods and for decreasing effect sizes as follow-up moves further from baseline</td>
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**Systematic Review**
- Review did not address focused clinical question
- Search was not detailed or exhaustive
- Quality of the studies was not appraised or studies were of low quality
- Methods and/or results were inconsistent across studies
- Additional limitations: Insufficiencies in reporting RCT design

<table>
<thead>
<tr>
<th>Christiane Stahl et al, 2011, <em>Clinical Pediatrics</em></th>
<th>Assess feasibility of training residents in brief behavioral counseling using 5-4-3-2-1 Go! Message</th>
<th><strong>Experimental Study</strong> (Non random controlled study)</th>
<th>Sample: Eligible pts presenting to COC’s interviewed by participating residents (n=382)</th>
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<td>1. Residents who underwent training: 64</td>
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<td>2. Control Residents: 45</td>
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<td>3. 216 out of 281 pts were interviewed from the trained residents group</td>
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<td>4. 167 out of 228 pts</td>
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<td>Counseling Effects: More patients of trained residents reported positive changes in behaviors which have been associated with lower obesity rates: increased intake of fruits and vegetables (28% vs 16%, P&lt;.01), increased intake of water (30% vs 19%, P&lt;.01), increased physical activity (40% vs 29%, P&lt;.03), and decreased television time (36% vs 24%, P&lt;.01). Goals for decreasing soda/juice more common among pt of control residents (15% vs 15% p 0.97), pt of trained resident more likely to report they had been successful</td>
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</table>

**Non-Experimental/Observational Studies (case-control, cohort, cross sectional, longitudinal, descriptive, epidemiologic, case study/series, QI, survey)**
- Insufficient sample size
- Sample not representative of patients in the population as a whole
- Variables (confounders, exposures, predictors) were not described
- Outcome criteria not objective or were not applied in blind fashion
- Insufficient follow-up, if applicable
| Eating and physical activity | were interviewed from the control residents group. (36% vs 19% p <0.03). **Resident Training:** Residents performed better on post test compared with pretest after web based training. | For prognostic study, sample not defined at common point in course of disease/condition  
For diagnostic study, gold standard not applied to all patients  
For diagnostic study, no independent, blind comparison between index test and gold standard  
**Additional Limitations:**  
1. Possibility of selection bias (as pts were not randomized to intervention or control groups)  
2. Log sheets for process data were incomplete making it impossible to quantitate missed counseling opportunities  
3. Relationship of short term changes with changes in BMI percentiles was not assessed. |
|---|---|---|
| **HA Raynor et al., 2011, Pediatric Obesity** | **Assess the efficacy of US primary care pediatric obesity recommendations within two randomized trials** | **Randomized Trial**  
Sample size: 182: recruited for two separate trials and randomized within trial to a 6-month intervention.  
1. Each trial had one intervention that increased child growth monitoring frequency and feedback to families (GROWTH MONITORING).  
2. Each trial also had two interventions, combining GROWTH MONITORING with an 8-session, behavioral, parent-only intervention targeting two energy-balance behaviors (Trial 1: reducing snack foods and sugar sweetened beverages [DECREASE] and increasing fruits, vegetables, and low-fat dairy [INCREASE]; Trial 2: **Trial 1:**  
   **Baseline:** No differences between conditions were found for baseline characteristics or anthropometrics  
   **Dietary Intake:**  
   Child: significant (p < 0.01) increase in fruits and vegetable consumption from 0 to 6 months, while snack food intake significantly (p < 0.01) decreased from 0 to 6 months. For sugar sweetened beverage in DECREASE group, intake was sig reduced (p < 0.01) from 0 to 6 months. Energy intake significantly (p < 0.05) decreased from 0 to 6 months and 0 to 12 months.  
   Parent: Snack food intake significantly (p < 0.05) decreased from 0 to 12 months and sugar sweetened beverage intake significantly (p < 0.05) decreased from 0 to 6 months. Energy intake significantly (p < 0.01) decreased from 0 to 6 months and 0 to 12 months.  
   **Trial 2:**  
   No differences between conditions were found for baseline characteristics or anthropometrics  
   **RCT & Quasi-Experimental**  
   ✗ Insufficient sample size  
   ✗ Lack of blinding  
   ✗ Stopped early for benefit  
   ✗ Lack of allocation concealment  
   ✗ Selective reporting of measures  
   ✗ Large losses to F/U  
**Additional Limitations:**  
1. lack of a no-intervention control.  
2. homogenous sample.  
3. Enrollment limited to parents who could read English,  
4. Participating families predominantly had an overweight/obese parent—may not be reflective of the general population. |
2: decreasing sugar sweetened beverages and increasing physical activity

[TRADITIONAL] and increasing low-fat milk consumption and reducing TV watching [SUBSTITUTES]. Child ZBMI and energy intake were assessed at 0, 6, and 12 months.

**Inclusion:** Child ren aged 4 to 9 years, ≥ 85 Th percentile for body mass index (BMI) and having no dietary or physical activity restrictions

**Exclusion:** participating parent could not read English, had a psychological disorder that would impair ability to participate, or if the family was planning to move out of the area during the program.

**Child:** energy intake significantly (p < 0.05) decreased from 0 to 6 months, with no difference found between the interventions. A significant (p < 0.05) main effect of group was found for low-fat milk, with SUBSTITUTES consuming more low-fat milk than GROWTH MONITORING. No change in sugar sweetened beverage intake was found. There were no changes in any leisure-time variables found.

**Parent:** energy intake significantly (p < 0.01) decreased from 0 to 6 months, and 0 to 12 month. A significant (p < 0.05) main effect of group was found for energy intake, with TRADITIONAL consuming less than SUBSTITUTES. SUBSTITUTES significantly (p < 0.01) increased low-fat milk consumption from 0 to 6 month. No change in sugar sweetened beverage intake was found. There were no changes in any leisure-time variables found.

**J Foltz, 2011, Clinical Pediatrics**

Cross-sectional analysis of US adolescents (12-19 years) included in the 1999-2002 National Health and Nutrition Examination Survey (NHANES) to determine who would have met each goal prior to dissemination of the 5-2-1-0 recommendations.

**Sample:** 12-19 yr old adolescents included in NHANES

**Setting:** A stratified multistage probability sample with oversampling of Mexican Americans, non-Hispanic blacks, and adolescents to improve estimates for these groups was performed. NHANES included a household interview of the subject conducted by a trained interviewer and a health examination in a mobile

1. 0.4% of US adolescents reported behaviors that would have met all four 5-2-1-0 criteria, 2.7% would have met 3 criteria, 16% would have met 2 criteria, 40% would have met 1 criterion, 41% would not have met any.
2. Males would have been more likely than females to meet criteria for fruit/vegetable consumption (adjusted odds ratio [AOR] 1.4) and physical activity (AOR 1.8), but less likely to meet criteria for screen time (AOR 0.8) and sugar-sweetened beverages (AOR 0.6).
3. Black adolescents would have been less likely to meet criteria for the fruits/vegetables AOR 0.7, screen time AOR 0.7, and sugar-sweetened

**Study Limitations =**

- None
**Non-Experimental/Observational Studies (case-control, cohort, cross sectional, longitudinal, descriptive, epidemiologic, case study/series, QI, survey)**
- Insufficient sample size
- Sample not representative of patients in the population as a whole
- Variables (confounders, exposures, predictors) were not described
- Outcome criteria not objective or were not applied in blind fashion
- Insufficient follow-up, if applicable
- For prognostic study, sample not
examination center. Analysis was limited to youth older than 12 years because detailed physical activity data were not available for younger subjects.

beverages AOR 0.7 goals compared with white adolescents.

4. Mexican American adolescents, compared with white adolescents, would have been less likely to meet criteria for physical activity (AOR =0.7) and sugar-sweetened beverages (AOR =0.7).

5. Other demographic factors: Higher income (AOR =1.5) and insured (AOR =1.6) adolescents would have been more likely to meet the physical activity goal than were lower income adolescents. Those with insurance would have been more likely to meet the screen time goal (AOR =1.4.)

6. No significant relations were noted between routine place for healthcare and individual goals.

Strengths:
1. use of a nationally representative sample composed of a large number of adolescents.

defined at common point in course of disease/condition

For diagnostic study, gold standard not applied to all patients

For diagnostic study, no independent, blind comparison between index test and gold standard

APPLY THE EVIDENCE

- The 5-2-1-0 message should be used for counseling during well-child primary care visits to reduce BMI percentile.
- The results of the studies were similar, albeit often not statistically significant, suggesting that usual lifestyle counseling may also be effective.

EVALUATE THE EVIDENCE

Outcome & Process Measures:
- Percent of pediatric patients diagnosed with overweight or obesity
- Percent of patients receiving 5-2-1-0 counseling at well-child visits
- Change in BMI percentile
- Frequency of follow up for weight checks
- Percent of patient receiving recommended laboratory evaluation

Implementation Plan:
- Revise Pediatric Overweight and Obesity Prevention and Management Policy
- Develop education roll-out for pediatric residents
- Present evidence summary to key stakeholders
- Perform chart review after implementation of Order Set to assess effectiveness of implemented changes
REFERENCES


