



Question: What is the impact of obesity prevention approaches in early care and education programs on weight status of children two to five years of age?

Overview Tables: Relationship Between Early Care and Education Programs and Weight Status

Table 1. Summary of systematic review examining the relationship between early care and education programs and weight status (page 1)

Author, Year AMSTAR Score* Number of Included Studies	Purpose of Review Subject Population Location of Included Studies	Independent Variable Outcomes	Results
<p>Zhou, 2013</p> <p>AMSTAR score: 9/11</p> <p>15 controlled trials:</p> <ul style="list-style-type: none"> • 13 with dietary components <ul style="list-style-type: none"> ○ 12 cluster randomized trials ○ 1 cluster controlled trial • 12 cluster randomized trials with physical activity components 	<p>Reviewed controlled trials of obesity prevention interventions in childcare settings</p> <p>Pre-school children, age 2-6y at baseline</p> <p>Location:</p> <p>5 studies in US 3 studies in Israel 2 studies in Germany 1 study in France 1 study in Scotland 1 study in Australia 1 study in Switzerland 1 study in China</p>	<p>Independent variables: Education or games that addressed nutrition, physical activity, sedentary behaviors; aerobic activity; fresh fruit and vegetable snacks and non-sugared beverages; parental education via take-home materials, internet sessions, or workshops; childcare faculty/staff training.</p> <p>Outcomes: Weight status (overweight, obese), adiposity, BMI z-score.</p>	<p>Weight-Related Outcomes</p> <p>7 studies saw improvements:</p> <ul style="list-style-type: none"> • All included both nutrition and physical activity components • 6 completed follow-up at or after 9mo. <p>8 studies did not see an effect:</p> <ul style="list-style-type: none"> • 5 included only nutrition or physical activity components, not both • 3 included both nutrition and physical activity components yet did not see improvements in weight-related outcomes: <ul style="list-style-type: none"> ○ 2 of short duration (i.e., 14wks) ○ 1 with variable follow-up: 12-20mo for sample 1 (N=1,340), 3-9mo for sample 2 (N=1,318). <p>Interventions including only nutrition or physical activity components achieved significant improvements in behaviors related to their target:</p> <ul style="list-style-type: none"> • 6 of the 13 interventions with dietary components reported improved intake or eating behaviors • 8 of the 12 interventions with physical activity components reported improved activity levels or fitness.



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*Quality assessed by Assessment of Multiple Systematic Reviews ([Shea, 2007. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews.](#))



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Table 2. Summary of primary studies examining the relationship between early care and education programs and weight status (pages 3-9)

Author, Year Study Design Location Risk of Bias*	Sample Size Age Gender Race/Ethnicity SES	Description of Intervention	Results
<p>Alkon, 2014</p> <p>Cluster randomized trial</p> <p>US</p> <p>Risk of bias: 6/26</p>	<p>N=211</p> <p>3.9y; 3-5y</p> <p>45.7% female</p> <p>White 45.5%, African American 16.4%, Hispanic/Latino 17.1%, Asian 14.0%, Other 6.9%</p> <p>Parent education: Less than high school (34.1%), high school or more (65.9%)</p> <p>Government subsidies: Receive any subsidies (49.8%), food stamps (15.9%), WIC (19.6%), Medicaid (23.2%), child support (8.2%), Temporary Assistance for Needy Families (2.5%), Housing (4.5%), Other (7.8%)</p> <p>Family poverty: <100% of federal poverty guidelines (28.4%), 100-200% (32.3%), >200% (39.3%)</p>	<p>Intervention: Child care health consultants provided five 1-hr workshops on childhood obesity, healthy eating and physical activity for young children, personal health and wellness and working with families to promote healthy behaviors to child care center child care providers and staff; centers received pre-study and monthly on-site consultations for updating center nutrition and wellness policies and parents at 7 of 9 centers received a "Raising Healthy Kids" workshop.</p> <p>Control: Delayed intervention.</p>	<p>Change in BMI z-score</p> <p>Intervention vs. control:</p> <p><i>Individual-level:</i> $\beta=-0.14$ (SE=0.06, 95% CI: -0.26, -0.02; P=0.02)</p> <p><i>Center-level:</i> $\beta=-0.26$ (SE=0.1, 95% CI: -0.47, -0.04; P=0.02)</p> <p><i>Non-significant (NS):</i> Within group change in BMI z-score; prevalence of underweight, healthy weight, overweight or obese.</p>



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Cespedes, 2013a Cluster randomized trial Colombia Risk of bias: 8/26	N=578 3.72y (SD=0.69); 3-5y 47.0% female Race/ethnicity: Not reported SES status of preschool neighborhood, low (1) to high (6): 1-2 (58.5%), 3-4 (41.5%)	Intervention: Focused on healthy eating and physical activity in 3 areas (body and heart, nutrition and physical activity), children received 1hr/d interactive classroom educational activities, a 1-hr "healthy family day" workshop and weekly health notes; parents received 3 nutrition/activity workshops and weekly nutrition/activity newsletters; teachers received three 2-hr group training sessions, 4hr/month personalized training and a teacher's guide. Control: Delayed intervention implemented over the 8mo, after the initial 5-mo study ended.	BMI at 6mo and 18mo: <i>Intervention vs. control, Model 1: NS</i> Weight status at 6mo and 18mo: <i>Intervention vs. control, Model 1: NS</i>
Cespedes, 2013b Non-controlled trial Colombia Risk of bias: 6/26	N=540 3.72y (SD=0.69); 3-5y 47.0% female Race/ethnicity: Not reported SES status of preschool neighborhood, low (1) to high (6): 1-2 (58.5%), 3-4 (41.5%)	Intervention: Focused on healthy eating and physical activity in 3 areas (body and heart, nutrition and physical activity); children received 1hr/d interactive classroom educational activities, a 1-hr "healthy family day" workshop and weekly health notes; parents received 3 nutrition/activity workshops and weekly nutrition/activity newsletters; teachers received three 2-hr group training sessions, 4hr/mo personalized training and a teacher's guide. Delayed-intervention: "Similar" to intervention, implemented over the 8mo after the initial 5-mo RCT ended.	Prevalence of underweight: <i>Baseline vs. 36mo, Model 1: 15.48% vs. 3.33%, P≤0.001</i> Prevalence of normal-weight: <i>Baseline vs. 36mo, Model 1: 62.11% vs. 75.00%, P≤0.001</i> NS: Prevalence of underweight and normal-weight, baseline vs. 18mo; prevalence of overweight and obese, baseline vs. 18mo and vs. 36mo
DeBock, 2012 Cluster randomized trial	N=348 4.3y (SD=0.78); 3-6y 46.8% female	15 standardized, 2-h nutrition sessions, conducted once weekly over a 6-mo period, 5 sessions actively involving parents by targeting them alone (discussions on parents modeling role and nutritional needs of children) or together	NS: BMI, waist-to-hip ratio, total body fat



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<p>Germany</p> <p>Risk of bias: 7/26</p>	<p>Race/ethnicity: Not reported</p> <p>Maternal education (defined by International Standard Classification of Education levels): <i>Low (level 1, 2, 3): 16.3%, middle (level 4): 55.7%, high (level 5, 6): 21.2%, missing: 6.6%</i></p>	<p>with their children; activities consisted of familiarizing with different foods and preparation methods and cooking and eating meals together.</p>	
<p>DeCoen, 2012</p> <p>Cluster randomized trial</p> <p>Belgium</p> <p>Risk of bias: 16/26</p>	<p>N=1,102</p> <p>4.95y (SD=1.31); 3-6y</p> <p>50% female</p> <p>Race/ethnicity: Not reported</p> <p>Community-level SES: 33% low, 33% medium, 33% high</p> <p>School-level SES: 52% low, 29% medium, 19% high</p> <p>Individual-level SES: 48% low, 26% medium, 26% high</p>	<p>Intervention: Goals included increasing water, milk, fruit and vegetable intake, decreasing soda and savory snack intake and increasing physical activity.</p> <p>Community: Organizations and non-profits were approached to support intervention and provide publicity; yearly brochures/posters were distributed.</p> <p>School: Received 7 manuals each describing objectives and implementation strategies for separate intervention components (i.e., school and classroom implementation, diet and physical activity policy changes, educational strategies for parents), were requested to implement ≥5hr/year of classroom time and activities devoted to intervention components, received support from regional health boards, teachers received 3 meetings/year to discuss implementation and troubleshoot.</p> <p>Parents: Received a poster, 5 mailed letters, personalized advice on their child's eating habits</p>	<p>Mean BMI z-score</p> <p>Low-SES intervention vs. low-SES control Post-intervention=0.00 (SD=1.11) vs. 0.16 (SD=0.88), P≤0.01.</p> <p>NS: BMI z-score, intervention vs. control for total sample and within medium-SES and high-SES groups.</p>



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		based off of FFQ, access to website describing intervention topics. Control: NR	
Herman, 2012 Before-after study US Risk of bias: 2/26	N=412 adults; not reported for children Staff: 40.1y (SD=12.7); Parents: 33.9y (SD=11.2); Children: 3-5y Staff: 96% female; Parents: 84.3% female; Children: NR Staff: White (56%), Hispanic/Latino (17.5%), African-American (14.3%), Asian/Pacific Islander (1.4%), Native American (3.6%), Other (2.4%); Parents: White (33.3%), Hispanic/Latino (32.4%), African-American (14.8%), Asian/Pacific Islander (1%), Native American (9%), Other (2.5%); Children: Not reported Staff Education: Less than high school (1.4%), high school graduates or GED (15%), associate degree (17%), Bachelor's degree (65%); Unknown (1.6%) Employment: Full time (4%), part time (91%), unemployed (0%), missing data (5%)	Low-health literacy training program for obesity prevention ("Eat Healthy, Stay Active") included materials on MyPyramid, food groups, portion control, shopping on a budget and integrating physical activity into daily life; Staff, parents and children were trained using the same curriculum; Head Start staff were trained using 3 webinars over a 6-mo intervention period and provided with technical assistance; Staff members were trained first and then conducted parent education sessions on evenings and weekends during the initial 3 months; Parents were exposed to a minimum of 6hr of activities; Classroom lessons for the children were aligned by topic with the parent lessons and conducted concurrently; Children were exposed to a minimum of 1 activity per day.	Mean BMI Overall: Baseline=30.1 (SD=7.3), Follow-up=29.2 (SD=6.8), Pre/post difference=-0.9 (95% CI: -1.1, -0.8; P≤0.001) Staff: Baseline=29.5 (SD=7.4), Follow-up=28.7 (SD=6.7), Pre/post difference=-0.8 (95% CI: -1.0, -0.6; P≤0.001) Parents: Baseline=31.2 (SD=7.1), Follow-up=30.1 (SD=6.7), Pre/post difference=-1.2 (95% CI: -1.4, -0.9; P≤0.001) Children: Baseline=17.0 (SD=2.4), Follow-up=16.6 (SD=2.2), Pre/post difference=-0.4 (95% CI: -0.6, -0.2; P≤0.001). % Obese Overall: Baseline=45.1, Follow-up=39.8, Pre/post difference=-5.3 (P≤0.001) Staff: Baseline=41.4, Follow-up=36.8, Pre/post difference=-4.6 (P≤0.001) Parents: Baseline=51.7, Follow-up=45.0,



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	<p>Parents</p> <p>Education: Less than high school (16.2%), high school graduates or GED (40.4%), associate degree (7.3%), Bachelor's degree (35.2%); Unknown (0.9%)</p> <p>Employment: Full time (17%), part time (29%), unemployed (47%), missing data (7%).</p>		<p>Pre/post difference=-6.7 (P≤0.001)</p> <p>Children: Baseline=30.4, Follow-up=20.5, Pre/post difference =-9.9 (P≤0.001).</p> <p>Effect on weight change</p> <p>Obese at baseline: OR=-7.66 (95% CI: -9.11, -6.21; P≤0.001); Male (vs. female), OR=-3.70 (95% CI: -6.71, -0.68; P=0.03)</p> <p>Diet behaviors: OR=-13.19 (95% CI: -18.43, -7.96; P=0.002)</p> <p>NS: Age, parent vs. staff, race/ethnicity, education, employment, change in knowledge, physical activity</p>
<p>Natale, 2014</p> <p>Cluster randomized trial</p> <p>US</p> <p>Risk of bias: 13/26</p>	<p>N=239 (6mo); 185 (12mo)</p> <p>3.9y; 2-5y</p> <p>49% female</p> <p>Intervention</p> <p>Race: Non-Hispanic White (33.6%), Non-Hispanic Black (33.6%), Asian (0.4%), Other (18.5%), Unknown (13.9%)</p> <p>Ethnicity: Hispanic/other (35.7%), Hispanic/Cuban (24%), Hispanic/Puerto Rican (3.8%), Hispanic/Mexican (2.1%),</p>	<p>Intervention used multidimensional approach with a teacher-based component, family-based component and environmental changes vs a visit from an injury prevention educational mobile at the control center</p> <p>Teachers: Two trainings on rationale, implementation and lesson plans for the Healthy Inside-Healthy Outside (HI-HO) program; weekly technical assistance to ensure implementation of a low-fat, high fiber diet including more fruits and vegetables</p> <p>Parents: Monthly educational dinners where nutrition and physical activity were discussed;</p>	<p>BMI percentile baseline vs. 12 months</p> <p>Total sample: 97% of normal-weight children remained normal-weight, 4% overweight to normal-weight, N=2 obese to overweight.</p> <p>NS: Change in weight z-score or BMI z-score, intervention vs. control from 0mo to 3mo, 6mo and 12mo; association between BMI z-score at baseline, 6mo or 12mo and parent attendance, parent perception of helpfulness, newsletters read by parents, parent perception of newsletter helpfulness, at-home activities</p>



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	<p>African American (19.3%), Haitian (1.3%), Other Caribbean Black (2.5%), Caucasian (0.8%), Other (4.2%), Unknown (6.3%)</p> <p>Control</p> <p>Race: Non-Hispanic White (33.3%), Non-Hispanic Black (42.0%), Asian (0%), Other (15.9%), Unknown (8.7%)</p> <p>Ethnicity: Hispanic/other (20.3%), Hispanic/Cuban (27.5%), Hispanic/Puerto Rican (1.5%), Hispanic/Mexican (1.4%), African American (30.4%), Haitian (7.5%), Other Caribbean Black (0%), Caucasian (4.4%), Other (1.5%), Unknown (5.8%)</p> <p>Centers served low-income children; County high-school graduation rate: 45%</p>	<p>monthly newsletters; recommendations for in-home activities</p> <p>Centers: Received assistance in developing policies to increase physical activity and healthy eating assistance of a nutritionist to develop USDA-compliant menus; drink policy (water is primary beverage, juice and sweetened beverages available 1x per week, change milk from whole to 1%); snack policy (substitute healthy snacks, like fruits and vegetables, for less healthy snacks, like cookies and high-fat snack) and physical activity policy (increase to >1hr/d, decrease TV viewing to <60min 2x per week).</p>	<p>completed, parent perception of at-home activities helpfulness.</p>
<p>Yin, 2012</p> <p>Non-randomized controlled trial</p> <p>US</p> <p>Risk of bias: 8/26</p>	<p>N=338</p> <p>4.1y (SD=0.6); 3-5y</p> <p>52% female</p> <p>Hispanic: 90%</p> <p>Centers located in "economically disadvantaged neighborhoods"</p>	<p>Center-based intervention: Centers received gross motor skills development program including recommendations to provide ≥60min/d physical activity and materials for developing gross motor skills, supplemental classroom materials/activities including audiovisual/print materials for 9 healthy eating and physical activity modules based on the Sesame Street Workshop Healthy Habits for Life resource kit and food-tasting activities; center staff received a 6-hr pre-intervention training and 4hr of follow-up trainings focused on intervention</p>	<p>Mean difference in weight z-score change: <i>Center- and home-based intervention vs. control, Model 2: -0.06; P<0.04</i></p> <p>Mean difference in weight and BMI z-score change: <i>Center- and home-based intervention vs. control, Model 2: NS</i></p> <p>NS: Mean difference in weight, weight z-score, BMI z-score, center-based intervention vs. control.</p>



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		<p>implementation and developing healthy literacy and teaching skills, health education newsletters, and access to a voluntary wellness program (>75% participation in all wellness program components); parents received 8 newsletters about intervention activities and tips for supporting healthy habits at home.</p> <p>Center- and home-based intervention: Included all components of the center-based intervention plus parents received 6 optional peer educator-led educational poster sessions providing information on obesity, physical activity and healthy eating (80% participation) and take-home materials including healthy snacks and intervention-related in-home activities.</p> <p>Control: Post-study training and materials relating to intervention.</p>	

*Risk of bias as determined using the Nutrition Evidence Library Bias Assessment Tool