P174 Classroom Nutrition Education Combined With USDA's Fruit and Vegetable Snack Program Improves Children's Fruit and Vegetable Intake

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Objective: This study tests the effectiveness of a school-based intervention and curriculum, Go Wild with Fruits and Veggies! (GWWFV), on fruit and vegetable (FV) intake. GWWFV curriculum is a 7-lesson curriculum created for 3rd - 5th graders, including taste-testing, classroom activities, take-home challenges, and parent newsletters.

Design, Setting and Participants: A randomized control trial tested self-reported FV intake in children. Volunteer schools were randomized into control (12 schools, n = 325 children), or intervention (14 schools, n = 337 children). Extension educators administered the curriculum within intervention schools.

Outcome Measures and Analysis: Children completed 2 validated pre/post-intervention surveys: a food behavior checklist and FV intake survey. Control group took the surveys over the same pre/post time-period. Access to the federal Fruit and Vegetable Snack Program (FVSP) and taste-testing within GWWFV were also measured. Baseline nutritional behaviors in children according to enrollment in USDA snack program were analyzed using descriptive statistics. Behavior change according to enrollment in GWWFV and taste test intervention were analyzed using relative risk and t-tests.

Results: Students with access to the FVSP consumed significantly more fruits ($p < .01$) and vegetables ($p < .0001$). Students who participated in the FVSP and GWWFV with taste-testing consumed more fruits and vegetables ($p < .05$) compared to students who participated in the FVSP and GWWFV without taste-testing, and the control group.

Conclusions and Implications: The FVSP and GWWFV with taste-testing demonstrated a greater positive influence on FV intake. Environmental and educational strategies form a comprehensive approach to improving children's diets. Offering hands-on nutrition education curricula alongside the FVSP may result in greater FV intake in children.

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P175 Relationship Between Mothers' Concerns for Lunch Boxes, Children's Lunch Boxes Contents and Children's Preferences in Japan

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Objective: Japanese kindergarten children usually bring a lunch box (LB), which their mothers usually make. The contents may be influenced by the mothers' food concern. We investigated the relationship between mothers' concern, children's LB contents and children's preferences.

Design, Setting and Participants: LBs of 210 children were digitally photographed 4 times over the course of a school year at a private kindergarten in Japan. The amounts of rice, main dishes, vegetables and fruits were then estimated by measuring the area in photograph. At the end of the investigation, a questionnaire, including questions about mother's concern and children's preferences, was given to the mothers.

Outcome Measures and Analysis: Data were analyzed together by Fisher's exact test and Mann-Whitney U test.

Results: Percentages of estimated amounts of rice, main dishes, vegetables and fruits in LBs were $37.9 \pm 9.2\%$, $37.3 \pm 10.0\%$, $11.9 \pm 7.8\%$ and $8.9 \pm 7.9\%$, respectively. The estimated vegetable amount was less than the Japanese dietary reference intake. Mothers' concerns for children's LBs were significantly related to vegetable amounts in the LBs ($p < 0.01$). When vegetable amounts were estimated to be over 11%, (1) the number of foods which children disliked was less, (2) the mothers reported a higher rate of mindfulness toward vegetables, and (3) a lower rate of frozen food usage and thought they made balanced LBs, compared with when below 11% ($p < 0.01$, each). Thus, vegetable amounts in children's LB estimated by photograph may predict mothers' food concerns and children's balanced/unbalanced diets.

Conclusions and Implications: Vegetable amounts in LB may be related to the mothers' concern for vegetables and children's preferences.

Funding: None.

P176 Food and Drink Free Lists Document Home Environments and Create Content for Messages to Parents of Middle-School Children

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Objective: Recent formative research among parents of middle-school children suggests that getting children to try new vegetables and fruits, eat a variety of vegetables, and choose water over sugar-sweetened beverages is particularly challenging. To provide parents with relevant information and feasible strategies to support children in making healthful choices, a better understanding of current food and drink exposure is needed. This study explored reported fruit, vegetable, and drink variety at home.

Design, Setting and Participants: In-depth interviews were conducted with 17 parents (1 M; 16 F) of middle-school children and 21 middle-school children (11 M; 10 F). A modified free listing technique was used to record current fruits, vegetables, and drinks consumed or available to respondents.

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Outcome Measures and Analysis: Free lists were analyzed for total number and most commonly listed items.

Results: Exploratory analysis revealed a wide range for total numbers of foods and drinks listed by each food group and individual respondents. For children, 2-12 fruits, 3-13 vegetables, and 3-13 drinks were listed, whereas parents listed 1-19 fruits, 6-24 vegetables, and 4-13 drinks, respectively. Apples, bananas, oranges, fruit juices, and water were listed by over half of both groups, and while many vegetables were listed by over half of parents, only carrots were listed by more than half the children.

Conclusions and Implications: These data include a wider variety of foods and beverages than anticipated based on formative work, and will help inform a parent messaging intervention targeted at improving eating behaviors among middle-school children by providing insight into potential foods and drinks, as well as recipes, to recommend to parents.

Funding: USDA.

P177 Fuel for Fun Impact Study Affirms Positive Effect on Fruit and Vegetable Preference and Approach to Cooking in School Age Youth

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Objective: To examine impact of Fuel for Fun (FFF), a school-based experiential cooking intervention on self-efficacy (SE) and attitude (AT) toward cooking and on fruit and vegetable preference (FVP).

Design, Setting and Participants: Controlled study of students ($n=767$; 75% white, 51% boys, mean BMI z-score $.24 \pm 1.1$) in 23 4th or 4/5th grade classrooms, in 8 schools over 2 years with Cohort 1 (C1; $n=415$) as control and Cohort 2 (C2; $n=352$) participating in FFF over the academic year. C1 and C2 were surveyed at the start (T1) and end of the school year (T2) and start of the next school year (T3). Study personnel administered a tested, reliable survey set in classrooms.

Outcome Measures and Analysis: FVP (18 items); cooking SE (8 items); AT toward cooking (6 items), cooking experience (CE); GLM using repeated measures.

Results: Surveys were completed at 3 times by 73%; T1 completer scores did not differ from attriters. T1 to T3 SE, AT, FVP scores did not differ by gender. Those with CE ($n=532$) scored significantly higher on all surveys. Change over time was significant for all measures with > increases in C2 for SE ($P=0.001$), AT ($P=0.003$); this pattern continued when controlling for CE for SE and AT. FVP tended ($P=0.09$) to increase for C2 when controlling for CE and school district. T1 to T2 changes remained improved at T3.

Conclusions and Implications: Controlled study over 12 months revealed FFF increased FVP and SE and AT toward cooking. Evidence-base of this program is reaffirmed

in a mostly white sample and supports use in school-based nutrition education.

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P178 Assessment of Fruit and Vegetable (FV) Intakes and Dietary Patterns of Preadolescents Ages 8 to 14 Years

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Objective: To assess fruit and vegetable intakes and dietary patterns of preadolescents ages 8 to 14 years.

Design, Setting and Participants: A total of 327 preadolescents (age: 11.0 ± 1.3 years) in a Midwestern metro area participated in the study. Each participant completed a 41 item food frequency questionnaire and an additional demographic survey in their regular classroom settings.

Outcome Measures and Analysis: Participants were clustered into three groups defined by variables related to fruit and vegetable intakes using cluster analysis. Mean dietary intakes of total fruit, vegetables, protein, whole grains, milk, and sweetened snacks (e.g., cookies, donuts) were compared between the clusters using ANOVA.

Results: Overall, large portions of preadolescents reported that they consumed tomato (91.1%), lettuce salad (78.5%), green bean or pea (86.7%), or other vegetables (52.5%) less than three days per week. 26.0%, 42.5%, and 27.5% of the participants were classified into low (FV score: 8.3 ± 3.9), medium (FV: 14.2 ± 4.5), and high (FV: 20.7 ± 5.6) FV groups, respectively. High FV group had higher protein, whole grain, and lower sweetened snack intakes compared to low FV group ($P < 0.05$). No differences in milk consumption between the clusters were observed ($P=0.28$).

Conclusions and Implications: Results indicate that dietary fruit and vegetable intakes of preadolescents in our study were positively associated with total protein and whole grain and inversely associated with sweetened snack intakes. Our findings that many preadolescents had low vegetable consumptions, warranting strategic interventions to improve healthy-eating.

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P179 iCook 4-H: Report of the Accelerometer Derived Physical Activity in 9-10 Year Old Children From Baseline to Post

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