P41 (continued)

Research Action Center released best practices for unpaid meal policies, including anti-shaming strategies.

Objective: The purpose of this study was to evaluate the strength of unpaid meal policies and examine the relationship between the policy strength and amount of debt.

Study Design, Settings, Participants: In this cross-sectional, primary data collection study, Food Service Directors (FSDs) from five states were recruited to complete an online survey. FSDs submitted unpaid meal policies and reported debt from 2017-18. Policies were reviewed and scored for strength of anti-shaming statements (0 = not present, 1 = weak, 2 = strong; 25 items scored).

Measurable Outcome/Analysis: The main outcome was the amount of school debt from full-price and reduced-price meals. Variables examined included percent of students enrolled in free and reduced-price lunch (FRL), LEA size and classification (urban, suburban, rural). Univariate statistics were summarized, bivariate relationships were examined through chi-square analysis.

Results: The sample was 59 FSDs. The FRL rate across the schools was 50.1% (± 18.6); 75% were rural schools. Few schools had strong policies; almost 40% of the sample had a score less than five. The highest frequency of school meal debt (23.1%) from full price meals was between \$1,001-\$5,000; four schools reported > \$30,000 in debt from full price meals. For debt from reduced-price meals, 46% reported \$1-\$500 in unpaid meals; 20% reported no debt from reduced-price meals. There were no significant relationships between the amount of unpaid meal and strength of policy.

Conclusion: Many schools did not have strong anti-shaming policies. Because there was no relationship between strength of policy and amount of debt, LEAs can create stronger policies without concern for its effect on increased debt.

Funding: None.

Nutrition Across the Life Cycle

P42 Age and Education are Associated with Fried Fish Consumption in the Stroke Belt

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Objective: Fish contain polyunsaturated fatty acids which are associated with decreased cardiovascular (CVD) risk. However, frying fish alters the fatty acids. Consumption of fried fish has been linked to increased risk of CVD and stroke, particularly in populations in the South's Stroke Belt. The purpose of this study was to explore characteristics associated with fried vs. non-fried fish consumption in the rural Appalachian region of the Stroke Belt.

Study Design, Settings, Participants: Volunteers (n=195) completed demographic and food frequency questionnaires (FFQ) during a community health event in rural Central Appalachia.

Measurable Outcome/Analysis: Age, gender, education, and income were assessed. Frequency of fried vs. non-fried fish consumption was calculated from the FFQ using DietCalc software.

Results: Average age was 55 years old (SD = 15.44, range: 19-95). Females comprised 69% (n=134) of sample. For 41% (n=79), high school was the highest educational level, and 41.5% (n=81) had a college degree. Income was < \$30,000 per year in 49.2% (n=96) of participants. Fried and non-fried fish was consumed at least twice monthly by 39.3% and 34.3% of participants, respectively. Advancing age was associated with a greater likelihood to consume fried fish ($\beta = .225$, $t = 3.20$, $P = .002$). Participants with more education were less likely to consume fried fish ($\beta = -.124$, $t = -1.73$, $P = .085$). Income and gender were not associated with fried or non-fried fish consumption.

Conclusion: Fried fish is popular in the South. While non-fried fish is associated with lower CVD and stroke risk, fried fish consumed more than twice weekly increases these risks by 63%. Interventions aimed at increasing the consumption of non-fried fish and reducing fried fish consumption are needed, particularly for older adults and those with lower levels of education.

Funding: NIH.

P43 Association Between Dietary Practices for Lifestyle Disease Prevention and Breakfast Habits

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Background: Healthy diets are essential for preventing lifestyle diseases. However, inadequate diet such as high fat-energy ratios and insufficient vegetable intake are observed in young adults in Japan. In addition, a large proportion of young adults skip breakfast. We hypothesized that these inadequate dietary factors are mutually related and that improvement in one effectively leads to improvement in the other.

Objective: To examine the association between dietary practices for lifestyle disease prevention and breakfast habits.

Study Design, Settings, and Participants: Hyogo diet survey 2016 is a cross-sectional survey of the stratified random sample of 32 areas (4,747 household members) in Hyogo Prefecture. Subjects included 791 adults (male, 368; female, 423) aged 20-49 years who completed the self-administered questionnaire of the survey.

Measurable Outcome/Analysis: The questionnaire included questions on breakfast frequency and dietary habits. Skipping breakfast was defined as a breakfast frequency of three days or less per week. Logistic regression

Continued on page S52

P43 (continued)

analysis was performed using the variables of subjects' dietary practices for lifestyle disease prevention (six items) as independent variables and whether or not subjects ate breakfast as dependent variable. The models were adjusted for sex.

Results: Logistic regression analysis showed significantly higher odds for skipping breakfast in subjects who did not practice the following dietary habits than those who did: "eat a lot of vegetables" (odds ratio: 1.72, 95% confidence interval: 1.19-2.49), "eat fruits" (1.65, 1.07-2.56), "restrict salt intake" (1.59, 1.07-2.37), and "control sugar intake" (1.51, 1.04-2.20).

Conclusion: Four of the six dietary practices for lifestyle disease prevention showed an association with skipping breakfast. The results suggest that improving diet for preventing lifestyle diseases may lead to eating breakfast.

Funding: None.

P44 Gastrointestinal Tolerance of Snacks Fortified with Fiber in Children with Low Fiber Intake

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Background: Fiber intakes of most US children are inadequate, increasing the risk of gastrointestinal problems, obesity, and diet-related chronic diseases. Commonly consumed foods with added fiber may be help to achieve recommended intakes in children; however, research is needed to determine if added fiber contributes to gastrointestinal (GI) side effects.

Objective: The aim was to assess the effects of fiber-fortified snacks on GI function and appetite in children.

Study Design, Settings, Participants: Children (8-15 y) were recruited for an eight-week randomized, double-blind, crossover pilot study. Following a two-week baseline, participants consumed two snacks/day fortified with or without 10g of ground pea hulls (8.5g dietary fiber) each for two-week periods separated by a two-week wash-out period.

Measurable Outcome/Analysis: Participants completed an appetite questionnaire twice per week, the GI Symptom Rating Scale (GSRS) by interview bi-weekly, and the Bristol Stool Form chart daily. ASA-24 was used to assess dietary intake. Linear mixed models were used for data analyses.

Results: Of 16 recruited, 15 participants (5 Male, 10 Female; 9.5 ± 1.2 y) completed the study. Fiber intake at baseline was 10.4 ± 4.9 g/day with no change in background fiber with interventions (12.9 ± 5.4 g/day; 11.1 ± 3.1 g/day; NS). Snacks with added fiber significantly increased fiber intake ($P < .01$). No differences were found for GSRS or appetite with snack interventions. Reported stool frequency of 1.1 ± 0.6 stools/day at baseline and did not differ with interventions (1.2 ± 0.8 stools/day; 1.1 ± 0.8 stools/day; NS), nor did percent reporting of slow,

normal or fast stool form. However, participants reported a high percentage of low transit stools ($> 60\%$) in all study periods, suggestive of constipation.

Conclusion: In children with low fiber intakes, consuming snacks with added fiber may help to increase dietary fiber intakes without significant GI side effects.

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P45 Impact of a College Nutrition Course on Nutrition Knowledge and Dietary Intake of Undergraduate Students

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Background: Nutrition education and prevention efforts targeted to college students have become an important public health initiative as students face many new dietary challenges and are establishing lifelong health behaviors.

Objective: This study examined the impact of an introductory college nutrition course (Science of Human Nutrition) on the nutrition knowledge and dietary intake of college students.

Study Design, Settings, Participants: A non-experimental, cross-sectional study was conducted at a large public Midwestern university. Participants were undergraduate college students with no restrictions on class standing, age or gender. Students were categorized based on whether they had completed or not completed a general education basic science nutrition course. An online questionnaire was developed using the Qualtrics software to collect participant's responses.

Measurable Outcome/Analysis: The participants ($n = 121$) completed a validated online questionnaire that assessed nutrition knowledge and a 24-hour diet recall form that was used to assess diet quality. The Healthy Eating Index (HEI)-2010 (a measure of diet quality in accordance with Dietary Guidelines for Americans) was used to measure diet quality. Data were analyzed using one-way Analysis of Variance and Pearson correlation.

Results: Students who had completed a nutrition course had a significantly higher mean knowledge score than students who had not completed a nutrition course ($P < .001$). The HEI scores were also significantly different between the two groups of students. Students who had completed a nutrition course had a mean HEI score of 68.3 ± 18.3 and students who had not completed a nutrition course had a mean HEI score of 55.4 ± 19.8 ($P < .001$). A significant positive correlation was observed between nutrition knowledge scores and HEI scores ($P < .001$).

Conclusion: This study demonstrated that increased nutritional knowledge contributes to better food choices and more adequate nutritional intake among college students. Future nutrition interventions to improve dietary quality in college students should focus on improving nutrition knowledge including encouraging universities to offer an undergraduate nutrition course to all students.

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