

SALAD BARS IN SCHOOLS AND FRUIT AND VEGETABLE SELECTION AND CONSUMPTION: A REVIEW OF RECENT RESEARCH

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ABSTRACT:

Peer-reviewed research on the effectiveness of salad bars for increasing fruit and vegetable (F/V) intake is limited. This commentary discusses current evidence regarding the effectiveness of salad bars in increasing F/V selection and consumption, thereby reducing food waste. Key findings from this review of the research are that salad bars in schools: (1) are increasing in prevalence; (2) are more prevalent in schools participating in assistance and resource programs; (3) increase selection of F/V; and (4) have an inconclusive effect on F/V consumption and waste. To maximize potential for salad bars in schools to positively influence F/V consumption, additional strategies have been recommended. These strategies include encouragement for F/V intake via marketing, education, signage, and family/peer support. The use of salad bars as a strategy to improve F/V selection and consumption should be continuously evaluated to determine efficacy and identify potential improvements.

Key words: salad bars, fruit and vegetable consumption, plate waste, school lunch.

INTRODUCTION

Adequate nutrition is essential for child growth and development. According to the 2015–2020 Dietary Guidelines for Americans, a healthy eating pattern consists of whole grains, lean proteins, dairy, oils, fruits and vegetables (U.S. Department of Health and Human Services and U.S. Department of Agriculture [USDA], 2015). Among children aged 2-18 years, 93% did not meet recommendations for vegetable intake and 60% did not meet recommendations for fruit intake (Centers for Disease Control and Prevention [CDC], 2014). In response, nutrition standards established by the Healthy, Hunger-Free Kids Act of 2010 required schools participating in the National School Lunch Program to increase the amount and variety of fruit and vegetables (F/V) offered (USDA Food and Nutrition Services [FNS], 2017). One strategy used to fulfill this requirement is implementation of salad bars (SBs) in school cafeterias (USDA FNS, 2013).

Peer-reviewed research on the effectiveness of SBs for increasing F/V intake is limited, possibly because SBs in schools have only recently been encouraged by health initiatives/campaigns such as First Lady Michelle Obama's Lets Move! and the Salad Bars to Schools campaigns beginning in 2010; not all schools have salad bars; or other reasons. However, the available peer-reviewed research provides a base for knowledge and suggestions for future research. This commentary discusses the current evidence to determine salad bars' effectiveness in increasing selection and consumption of F/V, and thus, subsequent reduction of food waste.

Prevalence of SBs

Prevalence of SBs in schools may be influenced by budgets, equipment availability, staff, and more. The limited data on the prevalence of SBs suggests that SBs are on the rise. Bruening, Adams, Ohri-Vachaspati, and Hurley (2017) found that 61.1% of schools (all grade levels) in Arizona (648 schools), had a SB. A survey of middle and high schools found that 62% reported having a SB in 2011 and 67% in 2014 (VanFrank, Onufrak, & Harris, 2018). Significant increases in SB access were seen in Midwestern youth (58-72%), non-Hispanic other race youth (60-85%), and youth aged 12-14 years (56-69%) (VanFrank, et al., 2018).

Ohri-Vachaspati, Turner, Adams, Bruening and Chaloupka (2015) examined 3,956 elementary schools participating in the NSLP and found that the prevalence of SBs increased from 2006-2007 (17.1%) to 2012-2013 (29.6%). The study also found that prevalence of SBs increased significantly among schools participating in technical assistance programs such as Team Nutrition, and resource programs such as the Fresh Fruit and Vegetable and Farm to School programs. According to the study, these programs may improve a school's ability to try new approaches to increasing F/V consumption by improving access to fresh F/V through funding and facilitating connections with local farmers (Ohri-Vachaspati et al., 2015; Ohri-Vachaspati, Turner, & Chaloupka, 2012; Ohri-Vachaspati, Turner, & Chaloupka, 2013).

Fruit and Vegetable Selection and Consumption

Implementing SBs in schools may increase the selection and consumption of F/V among school-age youth. In a literature review, Adams, Bruening, and Ohri-Vachaspati (2015) concluded that available research could not support (nor refute) a positive effect of SBs on F/V consumption.

Bean et al. (2018a) compared F/V selection before and after implementation of SBs in elementary school cafeterias in Virginia. After implementation, more types of F/V were self-selected by students; however, intake of F/V decreased significantly from 2.02 cups to 1.70 cups (by 0.65 cups; $p < .001$) because students chose smaller portions. In the survey portion of this study, 85% of students ($n=1,193$) reported enjoying that they could choose their own F/V from

the SB. These findings suggest that other factors, such as serving style (e.g. pre-portioned vs. self-serve) may increase F/V consumption.

Food preferences have been shown to predict F/V intake among school-age children. Moreno-Black and Stockard (2018) observed food selection habits of students (n=2,672) at seven elementary schools (grades 1-5) with SBs over a three-year period. They found that students selected fruits more frequently than vegetables and that the vegetables chosen were typically canned corn or fresh carrots. Girls were more likely than boys to take both a fruit and vegetable. Students in lower grades were more likely to take vegetables. Students were more likely to take F/V when they were offered both on the serving line (separate from hot line items) and the SB, though not necessarily the same food items (Moreno-Black, Stockard, 2018). The findings suggest that additional interventions, such as nutrition education and item line placement, along with the SB may help improve F/V consumption.

Adams, Bruening, Ohri-Vachaspati, and Hurley (2016) found that SBs located within the serving line resulted in 98% of middle school students self-serving F/V, whereas 22% of students self-served F/V in schools with SBs outside the serving line. The study also found that consumption of any fresh F/V by students was greater when the SB was located inside the serving line (90.6% vs. 20.7%) The authors concluded greater selection and consumption of F/V from the SB located inside the serving line may result from increased visibility and convenience.

Similarly, a study of five high schools in Montana found that increasing SB visibility helped increase the amount of F/V selected (Shanks, Bark, & Stenberg, 2017). Researchers found that expanding SB offerings, marketing, and signage contributed to increased F/V selection. The CDC's Promoting and Supporting School Salad Bars Action Guide (2015) likewise stresses the importance of presentation on usage. The SB should include signage, bright colors, and creative names for foods. Additionally, the SB should include quality F/V items and finger foods for enhanced appeal.

Anderson et al. (2015) surveyed students in grades 7-12 (n=702 of 1069) at schools with SBs in New Orleans and found that 40% reported low levels of encouragement from family/peers to consume F/V. Salad bar usage was found to be significantly related ($p < .05$) to encouragement from family/peers. This study also found that students with a reported stronger preference for healthy food were over two times more likely to use the SB. These results suggest that attitudes towards nutrition and F/V consumption play a role in the acceptance of SBs. The CDC (2015) found that SBs are most effective at increasing F/V selection and consumption as a component of a nutrition education program that also involves exposure to new foods, participation in education, and adults acting as role models for healthy eating.

Plate Waste

Salad bars in schools may also reduce food waste by allowing students to choose the types and amount of F/V, but the evidence is inconclusive. Plate waste data can be obtained via observation, weighing, or digital imagery (Bean et al., 2018b). In Montana schools, Shanks et al. (2017) found no statistically significant differences in the amount of SB food waste before and after implementation of Smarter Lunchroom strategies. Conversely, Adams et al. (2016) found that SBs within the serving line increased F/V selection, but increased food waste. Students threw away about 42% of self-served F/V selected from SBs located within the serving line, whereas about 12% of the food self-served was thrown away from schools with SBs outside the serving line (Adams et al., 2016).

The study of Virginia elementary schools using Offer versus Serve found that F/V waste in schools with self-serve SBs was decreased from baseline when F/V were pre-portioned (vegetables 0.59 to 0.35 cups; $p < .001$; fruits 0.23 to 0.16 cups; $p = .02$) (Bean et al., 2018a). This

finding should be interpreted with caution because the study noted that F/V portion sizes decreased. Therefore, more research regarding plate waste from SBs in schools is needed.

CONCLUSION

Despite limited peer-reviewed evidence on the influence of SBs in schools on F/V selection and consumption, sufficient evidence supports the continued use of SBs in schools to achieve the goal of improving F/V consumption. Key findings from the current literature are that SBs in schools: (1) are increasing in prevalence; (2) are more prevalent in schools participating in assistance and resource programs; (3) increase selection of F/V; and (4) have an inconclusive effect on F/V consumption and waste.

It should be noted that there are several reasons school nutrition directors are not supportive of SBs, including cost, available staff, time for students to self-serve, and food safety concerns (CDC, 2015). Prevalence of SBs in schools may also be impacted by the climate in which schools are located and therefore, availability of fresh produce. However, this review focused on current evidence and the potential for SBs to improve F/V selection and consumption.

To increase F/V consumption in schools, additional strategies are recommended including encouragement for F/V intake via marketing, education, signage, and family/peer support (Shanks et al., 2017; Anderson et al., 2015; CDC, 2015). These strategies apply to the use of SBs, as well as other tools used to increase F/V consumption (e.g. school gardens). Other recommended strategies include improving visibility and convenience of SBs as well as altering student attitudes and influencing their preferences for F/V (Moreno-Black et al., 2018; Shanks et al., 2017; Anderson et al., 2015).

Salad bars in schools have been shown to introduce school-age children to more types of F/V, and to improve selection of F/V. SBs should continue to be implemented in schools as part of nutrition education programs, but should be continuously evaluated to determine efficacy and identify potential improvements. One recommended method for SB evaluation is the Tulane Prevention Research Center's five-step "utilization focused" evaluation model (Johnson, Spruance, O'Malley, Begaliev, & Myers, 2017). This model involves data collection across multiple levels and includes problem identification, goal setting, choosing methods, action plans, in addition to ongoing assessment. Data collection methods might include direct observation of SB use, identification of F/V offerings, and assessing presentation of the SB. Surveys of students, nutrition/lunchroom staff and administrators regarding perceived food preferences, attitudes/beliefs, and SB use (Johnson et al., 2017) are also effective methods of evaluating efficacy of this service approach for F/V, and identifying potential improvements.

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