

Vending Machines: A Narrative Review of Factors Influencing Items Purchased



Sophia V. Hua, MPH; Jeannette R. Ickovics, PhD

ARTICLE INFORMATION

Article history:

Submitted 3 December 2015

Accepted 24 June 2016

Available online 18 August 2016

Keywords:

Vending machines

Snacking

Vending intervention

Narrative review

Overweight and obesity

2212-2672/Copyright © 2016 by the Academy of Nutrition and Dietetics.

<http://dx.doi.org/10.1016/j.jand.2016.06.378>

ABSTRACT

Vending machines are a ubiquitous part of our food environments. Unfortunately, items found in vending machines tend to be processed foods and beverages high in salt, sugar, and/or fat. The purpose of this review is to describe intervention and case studies designed to promote healthier vending purchases by consumers and identify which manipulations are most effective. All studies analyzed were intervention or case studies that manipulated vending machines and analyzed sales or revenue data. This literature review is limited to studies conducted in the United States within the past 2 decades (ie, 1994 to 2015), regardless of study population or setting. Ten articles met these criteria based on a search conducted using PubMed. Study manipulations included price changes, increase in healthier items, changes to the advertisements wrapped around vending machines, and promotional signs such as a stoplight system to indicate healthfulness of items and to remind consumers to make healthy choices. Overall, seven studies had manipulations that resulted in statistically significant positive changes in purchasing behavior. Two studies used manipulations that did not influence consumer behavior, and one study was equivocal. Although there was no intervention pattern that ensured changes in purchasing, price reductions were most effective overall. Revenue from vending sales did not change substantially regardless of intervention, which will be important to foster initiation and sustainability of healthier vending. Future research should identify price changes that would balance healthier choices and revenue as well as better marketing to promote purchase of healthier items.

J Acad Nutr Diet. 2016;116:1578-1588.

VENDING MACHINES PROVIDE EASY ACCESS TO sugar-sweetened beverages, candy, chips, and other snacks that have a long shelf-life and little nutritional value.¹⁻³ Bryd-Bredbenner and colleagues² describe characteristics of more than 2,600 snack machine slots, noting that most snack portions are nutrient-sparse, high in sugar and fat, low in fiber, and average >200 kcal/serving. Vending machines are found in many public settings, including, but not limited to, worksites, schools, health care facilities, municipal buildings, and parks.⁴

Vending machines contribute to our toxic food environment.⁵ Characterized by constant exposure and access to high-fat, high-sugar, and high-sodium foods, this toxic food environment augments the obesity epidemic by making it difficult for people to make healthier choices.⁶ Increased availability of sugar-laden foods and beverages in vending machines accompanies the increased prevalence of snacking in our culture.⁷ Children and adolescents consume nearly 25% of their daily caloric intake from snacks.⁷⁻⁹ Among adults, results from a 2012 systematic review¹⁰ demonstrate an association between snacking and excess weight gain. Excess weight gain over many years may contribute to overweight and obesity.¹¹

Recently, there have been efforts to regulate snacks and beverages offered in vending machines via policy action.¹² Under the Healthy Hunger-Free Kids Act of 2010,¹³ Smart Snacks guidelines restrict foods and sugary beverages in all schools that receive federal funds from the National School Breakfast and/or Lunch Programs. However, the influence of these guidelines on students' eating habits has yet to be determined.

Other vending interventions have targeted worksites. As part of the Iowa Community Transformation grant, vending machines in worksites promoted healthier choices by adding indicator labels for the healthier snacks.¹⁴ Surveys indicated that although many employees noticed the signs, behavior change was inconsistent. Guidelines that recommend access to healthier vending snacks and beverages can be an effective way to enact product change, although such guidelines rarely reach 100% compliance across sites.¹⁵⁻¹⁸ Even when access to healthier snacks and beverages is achieved, sales revenue may decline, threatening long-term sustainability.¹⁹ In other words, vending companies and institutions (eg, schools and worksites) that host these machines rely on sales revenue, and if sales decline they may be pressured to include the best-selling items regardless of nutritional value.

The objective of this narrative review is to identify factors that contribute to altering consumer purchases of unhealthy vending items. A recent review examined nutrition interventions at point of sale (ie, foods positioned near cash registers).²⁰ This review focuses on empirical studies that actively manipulate vending machines (eg, food selection and price) in an attempt to influence consumer behavior. Results may have implications for vending machine policies and practices in schools and worksites, and may inform future public health interventions aimed at promoting a healthier diet.

METHODS

Inclusion and Exclusion Criteria

This literature review is limited to studies conducted in the United States within the past 2 decades (1994 to 2015), regardless of study population or setting. All studies analyzed were intervention or case studies that manipulated vending machines and analyzed sales or revenue data.

Search Methods

PubMed was used to identify eligible articles. The following key terms or their combinations were used: *healthy* (or *healthier*), *vending machines* (or *vending*), *intervention*, *guidelines*, *price change*, *education*, *nutrition*, *snacking*, *candy*, *chips*, *water*, *sports drinks*, and *sugar-sweetened beverage*. This resulted in 406 citations. At the title level, 73 results were selected and 333 articles were eliminated. Elimination of an article by title was done if it was evident from the title alone that the article did not have empirical data, or that the study was not conducted in the United States. Based on abstracts, 42 articles were eliminated for lack of empirical data (eg, a policy brief), geographic location, or no focus on vending machines. Twenty-one articles were duplicate results. In total, 10 articles met the inclusion criteria.

RESULTS

Study Descriptions

Characteristics of the 10 studies that met inclusion criteria are presented in Table 1 and described in more detail in Table 2. The majority of the studies were interventions (80%), with two case studies. One case study analyzed vending changes made in Chicago parks as part of a citywide healthy vending initiative²¹; the other analyzed purchasing response to an increased proportion of healthier products in three Delaware state agency buildings.²² Regarding methodologic quality: 40% of studies reviewed were conducted for 5 months or fewer; 60% of studies included <20 vending machines; and, of the eight interventions, five used randomization.

Among the 10 studies reviewed, seven demonstrated desired outcomes; that is, increased purchases of healthier items, decreased purchases of unhealthy items, or success in replacing unhealthy items for healthier items.^{21,23-28} Two studies did not document a positive change: either consumers continued to purchase unhealthy items in the vending machines or the intervention did not change the proportion of healthy items purchased.^{29,30} The remaining study had mixed results,²² showing that even after healthier items were identified, the unhealthy items remained best-sellers at some locations.

Table 1. General characteristics of healthy vending machine interventions and case studies from the past 20 years (N=10)

Characteristic	Result
	% (n)
Study design	
Intervention	80 (8)
Case study	20 (2)
Location^a	
Secondary schools	27 (3)
College or university campus	36 (4)
Worksite	18 (2)
Other (eg, parks and state buildings)	18 (2)
Study duration (mo)	
<2	20 (2)
2-5	20 (2)
6-12	40 (4)
>13	20 (2)
No. of vending machines	
1-5	10 (1)
6-10	40 (4)
11-20	10 (1)
≥21	40 (4)
Manipulations	
Signs or labels identifying healthier options	6
Greater availability of healthier items	6
Price	5
Sign encouraging healthier choice	4
Marketing or educational campaign	2
Advertisement sleeves on vending machines	1

^aLocations do not sum to 10 studies because the study by French and colleagues²⁷ was conducted in two locations.

Increased Healthier Purchases, Decreased Unhealthy Purchases, and Successful Health Swaps

French and colleagues²³ conducted the first intervention within the time period reviewed. They labeled low-fat snacks and reduced prices of these snacks by 50% at vending machines on a university campus. Although the number of snacks sold throughout the study did not change, the proportion of low-fat snacks purchased increased from 25.7% at baseline to 45.8% during the intervention, suggesting that consumers were purchasing healthier snacks. However, post-intervention (when prices were raised to baseline prices), sales of low-fat snacks returned to baseline levels.

In another study, French and colleagues²⁷ targeted vending machines in secondary schools and worksites by increasing availability of low-fat foods, imposing price restrictions on these low-fat foods, and including promotional signs. As prices were reduced (by 10%, 25%, or 50%), sales of low-fat

Download English Version:

<https://daneshyari.com/en/article/5568957>

Download Persian Version:

<https://daneshyari.com/article/5568957>

[Daneshyari.com](https://daneshyari.com)