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**A Narrative Review of Grocery Store Interventions on Improving
Healthy Food Purchases**

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ABSTRACT:

A Narrative Review of Grocery Store Interventions on Improving Healthy Food Purchases

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Objective: The objective of the literature review was to understand and review current research in the area of grocery store interventions to improve purchasing of healthy foods. **Methods:** PubMed and web-based searches were done for original research literature that looked at supermarket and grocery store interventions promoting healthy food choices. The literature could include qualitative and quantitative data. Keywords that were used include: “grocery store,” “interventions,” “healthy eating,”

“supermarket,” “healthy foods,” “store intervention,” “food retail intervention,” “convenience store.”

Results: The review showed that there are studies on supermarket interventions. Interventions that showed positive outcomes were those that had direct customer benefit, participation, and engagement. These interventions included nutrition education programs that reported improvement in overall diet quality as well as customer satisfaction, a nutrition label education program that had high levels of satisfaction and positive changes in confidence and knowledge regarding nutrition labels, a coupon program that led to an increase in healthy food purchased, and an evaluation of marketing techniques such as placement, promotion, and pricing of products which did indicate its influence in customer purchases.

Conclusions: Many different factors can influence the impact of grocery store interventions. These factors include the location and financial position of the grocery store, the products they choose to purchase, how they choose to display the products, slotting fees, and any promotions they get from distributors. The interventions are also impacted by the customer’s readiness and willingness to make behavior change for any of the nutrition education interventions. Evidence suggests that certain interventions have been shown to improve the healthfulness of purchases for customers as well as increase their knowledge of healthfulness.

A Narrative Review of Grocery Store Interventions on Improving Healthy Food Purchases

Introduction:

Promoting healthy dietary behaviors within the grocery store setting is beneficial for increasing communities' health and wellbeing. Grocery stores have an opportunity to impact family members of all ages. They, therefore, are an optimal setting for interventions related to food purchasing decisions made by consumers. Grocery stores, convenience stores, and specialty stores account for 63.3% to 70.3% of food purchased for energy intake in the U.S. diet.¹ Many smaller grocery stores in low-income communities are limited in their healthy food options. For members of a rural community, this may be their only access to food. According to the 2000 USDA census, the U.S. population that now lives further than a mile from a grocery store and is in low-income neighborhoods has reached 23.5 million.² Grocery stores in low-income communities may face difficulties stocking healthier options like fresh produce and perishable foods as it would increase the operating cost to run the store.² Implementing interventions in rural communities to increase the purchasing of and improve the accessibility of healthy foods could have the potential for improved health outcomes for the residents. Different interventions can be done in the grocery store setting to improve healthy food consumption of consumers. All interventions should aim to improve healthy choices made by consumers.

Impacts made through grocery store interventions should not be overlooked as their success could lead to positive health changes for the customer and community. Helping grocers maximize interventions will work towards improving fruit and vegetable consumption, increasing nutrition knowledge, and promoting healthy shopping. An understanding of effective interventions provides guidance for grocers to see the range of available opportunities. It allows them to use this information to utilize interventions that fit the needs of their shoppers and their store. Furthermore, knowing effective interventions through this study will provide further evidence to potential funders that may help financially support any desired interventions.

Dietary factors influence the risk of chronic disease, and those who consume suboptimal diets are at a higher risk of developing diseases such as heart disease, stroke, and diabetes.³ Consuming fruits and

vegetables every day is an essential part of having a balanced and healthy diet. Two cups of vegetables and two and a half cups of fruit consumed each day is the recommendation from the Dietary Guidelines for Americans.⁴ They also recommend making half of all grains consumed “whole” or “unrefined.”⁴ Other recommendations include low-fat dairy, lean protein, and limiting salt and sugar intake.⁴

According to a USDA study done in 2012, Americans Healthy Eating Index Score was 56.4, with the max being 100.⁵ A score of 100 would indicate full adherence to the Dietary Guidelines recommendations.⁵

The purchasing of healthy food varies among geographic regions of the United States (U.S.). Consumers located in the Northeast and West purchased healthier foods in comparison to those located in the Midwest and South.⁵ Poor diets not only lead to personal health issues, but they are also a public health issue. Grocery stores can shape purchasing on a population level, reducing diet-related disease.⁶ Drewnowski and Rehm looked at energy intake by location of food purchased for U.S. children and adults.¹ The most common locations where food was purchased included grocery stores, supermarkets, convenience stores, specialty stores, quick-service restaurants (QSR), full-service restaurants (FSR), school cafeterias, and gifts from someone else.¹ According to the study, in the U.S., people purchase 63.3% to 70.3% of their consumed dietary energy from stores such as grocery, convenience, and specialty.¹ This represents a significant opportunity for impact. All locations where food can be purchased, including stores, restaurants, and schools, play an important role in societal health. Working to impact the health of a community by first impacting the health of the individual and their family is a step towards making large-scale changes within a population.

Grocery store purchasing habits affect not only the individual making the purchase but also the other members of the household and the community altogether. Addressing customer health at the point of purchase could have benefits that extend beyond the health of just that customer. There is a need to understand what grocery store interventions will work in persuading customer purchases. This information will help grocery stores influence the purchase and consumption of healthier alternatives, affecting the customer’s long-term health. With these possible outcomes in mind, the question, “does

implementing different health interventions in the grocery store setting increase the number of healthy foods purchased by the customer?” was asked.

Methods:

There is some available research on interventions that can be done in store settings (grocery, convenience, gas stations, etc). The articles included in this review focused on the following topics: technology-based nutrition education, podcasts, grocery store tours, games, personal shoppers, nutrition counseling, and modifying marketing techniques to reach customers and impact what they are putting in their grocery carts. It has also looked at how the grocery store promotes its healthful foods by distributing coupons, offering specials, availability, ready-to-eat foods, labels and signs on shelves, and the product’s packaging and labeling.⁷ Limitations include the amount of information presented on this topic.

PubMed and web-based searches were done for research literature that looked at supermarket and grocery store interventions promoting healthy food choices. The literature could include qualitative and quantitative data. Keywords that were used include: “grocery store,” “interventions,” “healthy eating,” “supermarket,” “healthy foods,” “store intervention,” “food retail intervention,” “convenience store.” Only English-written articles were included. The article abstract was reviewed by the primary author, Serie, and if it was relevant, the full text was reviewed.

Review of Literature:

In this essay, the terms *grocery store* and *supermarket* are used interchangeably. They are defined as “a store that sells food and household supplies,”⁸ and “self-service retail market selling specialty foods and household merchandise”⁹ respectively. The term *intervention* used in this research paper is used to define an “act of interfering with an outcome.”¹⁰ In this case, referring to interventions that can be made to impact the outcome of foods purchased in grocery stores or supermarkets. *Healthy* is defined as “good health,” “free from disease,” or “beneficial to one’s physical state.”¹¹ The definition of *healthy food* differs across the literature. This essay will refer to healthy food as food that focuses on whole grains,

fresh fruits and vegetables, high-quality proteins, and dairy.¹² These terms will help define the locations studied in the literature and the objectives of the studies. It is important to understand the meaning of “healthy” and “healthy food” to understand what is viewed as “unhealthy” or “less healthful” regarding disease prevention and health promotion. The reviewed studies ranged from 1974 to 2019 and were put into two categories: direct interventions to the customer and indirect interventions to the customer.

Results

Table 1: Summary of Studies and Reviews Found on Grocery Store Interventions. Direct interventions to the customer were interventions that affected the customer directly and that the consumer had to participate in. Indirect interventions were indirectly made to the consumer but would still impact their purchasing choices.

Author (s); Year; Reference	Type of Intervention	Objective	Main Outcomes
Lewis KH, Roblin DW, Leo M, Block JP.; 2015; 14	Direct	“Test the feasibility and preliminary efficacy of a store-based dietary education intervention against traditional clinic-based advice.”	“Both groups reported improved diet quality at the end of the study. Participants enjoyed the store-based sessions. Grocery store-based visits offer a promising approach for dietary counseling.”
Dukeshire S, Nicks E, Ferguson J.; 2014; 16	Direct	“To describe and provide recommendations for the implementation of an evaluation for an already existing, in-store Nutrition Label Education Program (NLEP).”	“The evaluation was successful in demonstrating high levels of satisfaction with the NLEP as well as positive changes in participant confidence and some increased knowledge in using nutrition labels”.
Assema van P, Brug J, Glanz K, Dolders M, Mudde A.; 1998; 18	Direct	“Assess the adoption and implementation of maintenance of a nutrition education program. Also aimed to assess factors associated with program adoption and implementation.”	“Most PHs that organized tours indicated their intent to continue implementation. It would be more successful if it was less complex and required less manpower.”
Thompson K, Silver C, Pivonka E, Gutschall M, McAnulty; 2015; 20	Direct	“The aim was to use pilot data gathered from dietetic intern tour leaders and student participants at the initial tour site, to develop a peer-on-peer grocery store tour training kit to accompany a grant funding opportunity that was to be offered by the PBH Foundation to dietetics education programs nationwide.”	“Post-tour surveys indicated that 69% of students reported they would definitely eat more fruits and vegetables as a result of the tour and 50% of students tasted a new fruit or vegetable for the first time. Comments from the post-tour surveys demonstrated that many students recalled the tour’s key learning messages.”
Schultz J, Litchfield R.; 2016; 21	Direct	“Compare grocery store traditional aisle demonstrations (AD) and technology-based (TB) nutrition education treatments.”	“Both nutrition education treatments elicited similar shopper awareness; however, greater AD engagement suggests consumer preference. Despite equivalent content, TB lessons may not provide equivalent engagement opportunity/experience.”
Bangia D, Palmer DM.; 2014; 22	Direct	“To assess if shoppers enjoyed listening to a podcast, regarding how to increase the consumption of omega-3 (n-3) rich foods, as they shopped.”	“The podcast was well received. Most shoppers said they liked it (86%) and found it easy to use (79%). Nearly all (96%) said the information presented was clear and easy to understand.”
Moore L V, Pinard CA,	Indirect	“To examine nine features in grocery stores that shoppers reported motivated them to	“44% of respondents indicated at least one feature motivated them to purchase more

Yaroch AL.; 2014; 7		<i>purchase more healthful foods in the past month.”</i>	<i>healthful foods. Enhancing the visibility and appeal of more healthful food items in grocery stores may help improve dietary choices in some populations but additional research is needed to identify the most effective strategies for interventions.”</i>
Castro IA, Majmudar A, Williams CB, Baquero B.; 2018; 23	<i>Indirect</i>	<i>“Review experimental studies in the marketing literature to examine factors influencing customer purchase intentions and choice for food products in retail stores.”</i>	<i>“Specific marketing techniques related to shelf display and product factors, pricing and price promotions factors, in-store and customer-specific factors have been shown to influence purchase intentions.”</i>
Balsam A, Webber D, Oehlke B.; 1994; 27	<i>Indirect</i>	<i>“The program was conceived to create new direct marketing opportunities for small farmers, while at the same time introducing people at nutritional risk to farmers' markets.”</i>	<i>“The coupons achieved high levels of usage and an increased attraction of new customers to the market.”</i>
Anliker JA, Winne M, Drake L.; 1992; 28	<i>Indirect</i>	<i>“Evaluate the Connecticut Farmers' Market Project. Hypotheses were that the distribution of Farmers' Market coupons would lead to increased use of farmers' markets and increased frequency of consumption of fresh fruits and vegetables.”</i>	<i>“Participants who received Farmers' Market coupons were significantly more likely to go to farmers' markets, but the use of coupons was not significantly associated with differences in the overall consumption of fresh produce.”</i>
Rao M, Afshin A, Singh G, Mozaffarian D.; 2013; 29	<i>Indirect</i>	<i>“Conduct a systematic review and meta-analysis of prices of healthier versus less healthy foods/diet patterns while accounting for key sources of heterogeneity.”</i>	<i>“Among food groups, meats/protein had largest price differences: healthier options cost \$0.29/serving (95% CI \$0.19 to \$0.40) and \$0.47/200 kcal (\$0.42 to \$0.53) more than less healthy options.”</i>

Direct Interventions to the Customer: This review includes six different direct interventions that were found to have an impact on customer purchases that belong in the category of nutrition education.

Nutrition Education: Nutrition education given directly to the customer is one approach that grocery stores use to promote health and wellness. Nutrition education is defined as “any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and wellbeing.”¹³ In the grocery store setting, nutrition education can be given to customers through a variety of avenues: grocery store tours, on-site dietitians, games, podcasts, etc.

Nutrition education and counseling from dietitians have typically been performed in a clinic setting. More recently, however, counseling has taken place in the supermarket setting.¹⁴ In the supermarket setting, dietitians can impact customers through one-on-one nutrition education sessions, grocery store tours, community events, and educational material provided throughout the store. Their knowledge of nutrition can significantly impact the dietary choices that customers make and therefore

impact behavior change of the customers. Jobs as a dietitian in the supermarket setting continue to be a growing field of employment for dietitians.¹⁵

As there are more opportunities to work with clients in the grocery store setting, research that looks at the impacts made through education in this setting is imperative. During a randomized trial comparing clinic-based dietary advice and store-based dietary education, patients with obesity (n=55) received counseling from a registered dietitian in either the clinic setting or grocery store setting.¹⁴ They received the same intervention strategies and received counseling on the following curriculum topics: “food groups, portion control, label reading, nutrition facts, and food preparation.”¹⁴ Improvements in diet quality were shown with both groups. However, knowledge increases were shown to be greater in the grocery store participants (P= 0.04).¹⁴ This study had limitations in sample size and accurate representation of all societal groups. Food frequency questionnaires (FFQ) were used to measure baseline and post food consumptions which have limitations within themselves. FFQ relies upon the client to recall foods that they commonly eat. Issues with food frequency questionnaires are a common and well-understood area in dietary interventions. Another component of nutrition education that is available is education on reading nutrition labels. Dukeshire, Nicks, & Ferguson piloted a program that implemented an in-store Nutrition Label Education Program (NLEP).¹⁶ The study displayed positive satisfaction with the program with increased confidence in using nutrition labels for those who participated.¹⁶ However, a limitation is that the study lacked in the number of participants who followed up.¹⁶

Dietitians often use grocery store tours as a way to familiarize customers with product locations and healthy alternatives. Most fruits and vegetables consumed are purchased at grocery store locations,¹⁷ therefore, it is critical that customers are familiar with their locations and what is offered. Promoting and emphasizing healthy shopping and healthy food consumption is an essential effort that grocery stores can make while leading grocery store tours.¹⁸ With the consumption of fruits and vegetables being sub-optimal by Americans,¹⁹ educating and preparing upcoming dietitians on how to lead grocery store tours is a valuable skill that should be taught. The Produce for Better Health Foundation (PBH) funded one study that offered nutrition education programs focusing on fruits and vegetables in grocery store tours

for dietetic interns.²⁰ The interns completed the education programs and then led grocery store tours. The study focused primarily on reaching college-aged students and found that 69% of them reported they would consume more fruits and vegetables following the tour.²⁰ The experience offered education to both dietetic interns and customers of college-age and suggested that grocery store tours could lead to an increase in fruit and vegetable consumption.²⁰ The study lacked participant pre and post test data of the actual consumption of fruits and vegetables before and following the tour.²⁰

With technological advances, the increasing use of technology-based interventions seems a natural approach to take. However, it is essential not to overlook customer interaction during traditional aisle demonstrations.²¹ Schultz and Litchfield performed a 4-month study looking at dietitians engaging customers during aisle demonstrations (A.D.) and technology-based (T.B.) nutrition education.²¹ They measured “awareness, touch, engagement, nutrition knowledge, and dietary behaviors.”²¹ The engagement of customers during the traditional aisle displays was a significant difference from 90% for A.D. and 13% for T.B. with ($P < .001$).²¹ The results state improvements in a majority of the measurements (touch, engagement, nutrition knowledge, and dietary behaviors), suggesting that grocery store customers prefer traditional A.D. rather than T.B. displays.²¹

Along with improvements in technology comes increased access to other forms of information and ways to increase knowledge, such as podcasts. In an attempt to improve grocery shoppers' experience, Bangia & Palmer conducted a study to have the shoppers listen to a podcast regarding omega-three fatty acid (n-3) rich foods while doing their grocery shopping.²² Quantitative and qualitative data were gathered regarding ease of use and how informative it was. Overall, 86% of shoppers stated they enjoyed it and 79% found that it was easy to use.²² Most all of the shoppers, 96%, stated: “the information presented was clear and easy to understand.”²² Podcasts present another avenue at which customers can be reached at the point-of-purchase.²²

Indirect Impacts to the consumer: This review includes five different indirect interventions that were found to have an impact on customer purchases that belong in the categories of marketing, promotion, and advertising, availability, packaging, and labels.

Marketing, Promotion, and Advertising: Customers purchase foods based on many different factors. A study looking at the four marketing techniques: pricing, placement, promotion, and product found that coupons and specials were the leading motivator (20.1%) for purchasing healthy foods.⁷ This was then followed by ready-to-eat foods (18.8%), labeling and advertising (15.2%), and signs on shelving (14.6%).⁷ Grocery stores hold a lot of power when it comes to influencing their customers' purchasing intentions. Health practitioners can work with food retailers to provide an environment that encourages choosing more healthful foods.²³ Castro et al. put influencing purchases into three major categories: "shelf display and product factors, pricing and price promotion factors, and in-store and customer decision-making factors."²³ Understanding purchasing intentions could translate into future recommendations that policy writers could make regarding customer behavior around the purchasing of food.²⁴

Grocery stores can use a variety of methods such as shelf display and signage to promote food choices. Point-of-purchase or POP interventions typically use posters, brochures, and shelf labels to promote the foods they want to be sold.²⁵ POP interventions are easy to implement and can be feasible for low-income communities as well.²⁵⁻²⁶ POP displays and shelf talkers can display messages that allow customers to absorb the information.

Pricing is another strategy grocery stores can use to promote the purchasing of certain foods. Pricing interventions can reduce the cost of "healthy food" items or provide discount coupons for purchasing them. One study offered coupons for healthy foods at a Farmer's Market and achieved high levels of usage and an increased attraction of new customers to the market.²⁷ Additionally, another study offered coupons to use at the Farmer's Markets but found that the impact on their consumption was insignificant.²⁸ However, Moore, Pinard, and Yaroch found that those who shopped more frequently

indicated that the coupons did motivate them to purchase healthier foods when compared to those who shopped less frequently ($p < .001$).⁷

The use of coupons could help with the costs associated with purchasing healthy foods. When comparing the cost of healthy food versus unhealthy food, a meta-analysis found that healthier diets cost \$1.48 more per day.²⁹ Meat and protein had the highest differences per serving. Grains, dairy, snacks, sweets, fats, oils, and juice had more minor price differences.²⁹ The review had strengths because it looked at the different food groups, adjusted for inflation, and included studies from 10 different countries.

Availability: The availability of healthy foods offered in grocery stores is associated with customers reporting greater healthfulness.³⁰ In minority communities, there are a reduced number of grocery stores. One study found that low-income areas had 25% ($p < 0.01$) fewer chain supermarkets when compared to middle-income communities.³¹ It also found that there were 1.3 times as many convenience stores.³¹ Communities that were predominantly African American were found to have 52% ($P < 0.01$) of the number of supermarkets when compared to communities that are predominantly caucasian.³¹

The reduction in grocery store numbers could be associated with some of the nutrition-related health disparities among minority communities.³² Curhan studied adding “bonus space” to stores to improve the location of healthy foods.³³ The study has its limitations as it was done in 1974, but the concepts could still prove to be effective.³³ Moore et al. stated, “enhancing the visibility and appeal of more healthful food items in grocery stores may improve dietary choices in some populations.”⁷

Packaging and labels: Packaging of food products has an impact on customer purchasing and trends; however, it is not something all grocery stores have the ability to change. Many big corporations have engaged in efforts to attract their customers through these avenues, leading to another area that needs attention in grocery store interventions.³⁴ Color, packaging material, design and font style, and the printed information are all factors that influence customers buying behaviors.³⁴ These factors have the

opportunity to set the products apart from other food products. The product shape, size, and color can affect the purchasing intention of the customer as well.²³ One study found that labeling on the front of the package influenced children's choices as well. For example, if the package stated "cereal that's good for you," children were likely to choose a more unhealthy choice.²³ This study shows how labeling could have a negative impact when kids choose food.

Barriers:

Direct Impacts to Consumer:

Grocery store demos: Although having a grocery store dietitian can prove to be beneficial, it does come with hiring costs. The cost may be feasible for larger grocery stores, but smaller stores may not have the financial capabilities to make this happen. Although grocery store tours are beneficial when educating customers, having a dietitian or a trained individual to lead the tour could present barriers to some grocery stores. Studies demonstrate this to be a valuable way to increase customer knowledge of products the store offers and an easy way to teach about nutritious foods.²⁰ However, the data on whether this actually leads to more consumption of healthy foods has not yet been completed.²⁰ Offering food samples can be one way to introduce customers to healthier food options, and one study confirmed this.³⁵ Contrarily, offering customers samples of unhealthy foods also led to an increase in consumption of those foods.³⁵ Barriers are present when nutrition education is given through podcasts or other technological methods. Although it presents a fresh way to approach education and reach customers, it is important to recognize that not all shoppers may have access to these forms of engagement. The lack of understanding of podcasts on long-term behavior change leaves this option as a less feasible method for educating customers.²²

Indirect Impacts to Consumer:

Marketing, Promotion, and Advertising: Although grocery stores can use shelf displays and signage to promote foods, their motivation to do so can be fueled by outside factors. Many grocery stores have

“slotting fees” or fees that manufacturers will pay to host their food in specific locations on the shelves.³⁶ The shelf space is often looked at as a competitive tool for some products to gain more exposure. With the reduction of prices for healthy food, the studies show that it did increase the amount of healthy food purchased.²⁷ However, there is insufficient evidence as to whether the food was consumed or not. Evaluating this can prove to be complicated.²⁷

Availability: Having healthy food available and in well-displayed aisles could increase consumption of these foods. Larger grocery stores may have the ability to offer a more extensive variety of healthy products; however, in minority communities, there are a limited number of grocery stores for customers to choose from.² With smaller and fewer stores, there may be less shelving space and availability for healthier items.

Packaging and labels: Customers are comfortable with buying familiar brands that they know. If grocery stores did start carrying newer and private labels that are healthier, there could be a risk for customers choosing to purchase familiar brands.²³ Another significant barrier when trying to emphasize purchasing healthier foods and food products includes finances.³⁷ Without proper nutrition education on how to read nutrition facts labels, customers are unable to interpret the information on the products.²³

Facilitators:

Direct Impacts to Consumer:

Nutrition Education: Nutrition education given by dietitians has been done in the clinic setting in most cases but is now expanding to retail locations. With this approach, dietitians can reach clients whom they may not have had the opportunity to meet with otherwise. Offering nutrition education in the retail setting brings greater access to this education. Dietitians offer a multitude of ways to provide interventions in the grocery store setting. Just a few include one-on-one nutrition education and counseling, grocery store tours, advice on purchasing, marketing, and promotion of healthy foods to the

grocery store, and community education sessions on topics such as label reading, portions, food preparation, and much more.¹⁴ Nutrition education in the form of more advanced technology leads to the opportunity of reaching many more people than just one-on-one educational sessions.

Indirect Impacts to Consumers:

Marketing, Promotion, and Advertising: Grocery stores have an immense opportunity to affect their shoppers' purchasing choices through marketing, promotion, and advertising. Just by utilizing shelf displays and signage, they can promote healthy food choices.³⁸ This is a reasonably easy intervention that does not have much additional cost to the grocery store itself. Placing healthy items in high trafficked areas is easy and takes a little rearranging of products.³⁸

Availability: Offering nutrition education through different forms such as grocery store tours, nutrition counseling, shelf-talkers, and podcasts could prove to be beneficial in influencing customer's choices. Providing in-person demonstrations for healthy products that are offered could spark healthy purchases as well as changing how food is advertised and where it is placed has an influence. All of these prove to be a successful intervention to increase healthy food purchases.

Discussion:

The objective of the literature review was to understand and review current research in the area of grocery store interventions to improve purchasing of healthy foods. The review showed that there are studies that have been done on supermarket interventions. Some interventions proved better outcomes than others, with most to all interventions showing some beneficial outcome. The interventions focused on different areas that can all be applied in the grocery store setting. Some take a different approach to persuade consumer purchases and consumption from less healthy food to healthier alternatives.

Grocery stores need to understand their role in consumer purchases and their effect on the consumer's health. With 63.3 to 70.3% of the total energy intake in the U.S. diet coming from grocery, specialty, and

convenience stores, grocery stores have an obligation to their customers and community members to provide healthy food and opportunities for learning.¹ Although what is being purchased is the customer's choice, grocery stores impact this through the foods they offer, how they promote, advertise, and place certain foods. By making a few small and potentially more extensive changes, the products purchased by consumers could shift to healthier alternatives.

Nutrition education can be given by dietitians in the supermarket setting and has been a growing field for dietitians.¹⁵ When compared to clinic-based dietary education, the education given in the grocery store setting proved to still show improvements in diet quality and even more so in knowledge.¹⁴ According to the literature, there are advantages in grocery store dietitians, specific technological tools for education, and grocery store tours that affect and influence patient health and customer choices.^{13-14, 16, 19-20, 22} Hiring a dietitian may not be feasible for all grocery stores. However, there could be some potential to hire a registered dietitian to consult part-time or even a few times a month to help with nutrition interventions and educating staff. There were no studies found on this, but it is something that could prove to be a beneficial alternative in the future for those who cannot afford to hire a dietitian full time.

Newer ways of providing education through the form of podcasts are readily available and free to access. If one has a smartphone, they have unlimited access to information through podcasts. It is also important to mention that just because there is endless information via this technological avenue, not all the people providing the information have credentials in what they are discussing.

Marketing, promotion, advertising, pricing, and placement are techniques used by producers and grocery stores to influence customers' purchasing decisions. By modifying shelf space, offering reduced prices and coupons, and advertising healthy food, customers can be influenced to purchase more healthful food items.⁷ This approach also works oppositely, leading to the notion that staff needs to be educated on what is considered healthy and what is not considered healthy. Increasing availability of healthy foods and placing them in high-trafficked areas are marketing strategies that could be used to promote these foods. Placing fruits and vegetables in certain areas that are more highly trafficked could affect if they are purchased or not.³⁸

Packaging and labels also affect customer purchasing and trends but cannot be easily changed and implemented by grocery stores. Labeling not only influences the customer, but it is influencing their families as well.²³ If labeling has this much power over what choice is being made, having grocery stores offer education to customers through one-on-one methods, signage, and shelf talkers will be an important intervention.

Many barriers will need to be overcome for both the direct and indirect interventions that can be done in the grocery store setting. If a dietitian is hired, they face barriers of their own. Having clients show up for appointments and signing up for the grocery store tours could be challenging unless the client is otherwise motivated. If the grocery store does not have a dietitian, the staff will need to be competent in what “healthy” and “unhealthy” foods are to provide samples of the healthier choices.

Barriers are present when nutrition education is given through podcasts or other technological methods. Although it presents a fresh way to approach education and reach customers, it needs to be recognized that not all customers may have access to these forms of engagement. Although podcasts present a way to create an experience and educate the customer, the feasibility of making this a success is low. The grocery store would have to assume that all customers have a smartphone where they could listen to the podcast. Another barrier with this form of nutrition education would be the monetary expense to the grocery store to provide headphones to listen to the podcast. The grocery store has to assume that not all customers will have headphones on them and therefore will not have access to listen to the podcast while grocery shopping.

Conversely, many facilitators make the interventions easier to accomplish. For example, recording a podcast is a relatively easy task and needs an educated individual on the topic to record it. Although there are some barriers with this option, it also presents an opportunity. If grocery stores offer this option, they could play snippets of the podcast on the overhead for customers to hear and promote it via signage available to their shoppers. Having a dietitian or a nutrition professional record the podcasts also gives the podcast more credibility. This could be a straightforward approach that can be done with a bit of help from outside for the grocery store. With help from nutrition professionals and education to owners and

employees in the grocery stores, interventions that can help lead to increased purchasing of healthy foods can be done.

Conclusions:

Many different factors can influence the impact of grocery store interventions. These factors include the location and financial position of the grocery store, the products they choose to purchase, how they choose to display the products, slotting fees, and any promotions they get from distributors. The interventions are also impacted by the customer's readiness and willingness to make behavior change for any of the nutrition education interventions. Evidence suggests that certain interventions have been shown to improve the healthfulness of purchases for customers as well as increase their knowledge of healthfulness.

The research is lacking in the number of studies that have been done on grocery store interventions. The studies that have been done suggest positive outcomes. Future research needs to better evaluate if increased purchasing of healthy foods leads to the consumption of these healthier foods and, in turn, better health outcomes. It could do this by completing follow-up studies on customers by performing dietary recalls and completing health screenings. There is a potential for much more research to be done and conclusions to be made on interventions for customers' healthy purchases.

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