

SQL Analysis

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Abstract

Numerous health risks have been associated with poor dietary patterns and low-income families are at a higher risk of developing health issues due to lack of access to healthier and affordable food options. Despite health risks associated with poor dietary patterns, majority of Americans choose poor quality diets owing to factors influencing healthier food choices such as accessibility and availability, social norms, tastes, and costs, but the main reason is that unhealthier foods costs less. The goal of this study is to answer the question “do healthier foods cost less?” Using data from Whole-foods soma’s website to compare the average price of healthy and unhealthy foods using three metrics, price per calorie, price per total secondary size and price per special diets, healthier foods were found to cost more for all metrics except for regular price and price per amount of special diets. The definition of healthy foods for this study are foods that are low in calories, and foods that have high number of special diets. Results suggests that healthier foods costs more, but price is subjective to the measurement metrics used. Since consumers do not assess costs using metrics in this study, Wholefoods-Soma could encourage their customers to purchase healthier foods by 1) changing their marketing and healthier food placement strategies to attract attention to healthier foods, 2) offering cashback rebates for healthier foods to encourage people to go for healthier foods and 3) having a tasting booth to change the assumption that healthier foods are not tasty. Due to limitations encountered in this study, further research is needed to conclude that healthier foods cost more and to better understand factors that affects healthier food choices.

Keywords: Healthier foods, unhealthy foods, unhealthier foods health issues; special diets, calories, dietary patterns.

Introduction

Numerous health challenges such as obesity, tooth decay and heart diseases have been linked to poor dietary pattern including consumption of foods with high sodium, low whole grains, high saturated and trans fats (Żarnowski et al., 2022). Poor diet quality is currently a substantial public health issue in the United States, particularly among low-income populations (Anderson et al., 2021). Low-income families are at a higher risk of developing health issues due to lack of access to healthier and affordable food options leading them to consume high sodium foods (Institute et al., 2015). High sodium foods are associated with increased risk of high blood pressure, which causes stroke and heart disease (FDA, 2021). On the other hand, healthy dietary patterns such as consumption of foods that are low in sodium, have less calories, fat-free and sugar free promote good health and increases life expectancy (Harmon et al., 2015; Guha, 2017). Eating a healthy diet is one way of preventing age-related diseases (Yeung et al., 2021).

Despite health risks associated with consumption of unhealthy foods, majority of Americans purchase foods that are high in sodium, sugar, and fats due to factors that influence healthier food choices. These factors include accessibility and availability, perception of healthier food tastes, culture or social norms and costs (Story et al., 2008) but the main reason is that healthier foods cost more than less healthy foods. This conclusion could be because numerous studies found healthy foods to cost more per calorie serving than less healthy foods (Carlson & Frazão, 2012). However, the cost of healthy and unhealthy foods depends on the unit of measure such as per energy unit or per calorie (Lee et al., 2016). Study done by (Beheshti et al., 2016) suggests that price per calorie is best when calculating price of healthy and unhealthy diets.

Objectives

The goal of this study is to answer the question “Do healthier foods cost less?” To find the answer to this question, we analyzed the data set collected from Wholefoods – Soma website by our cohort.

Methodology and Data

The main data source was from Whole Foods – Soma website. The database used was built by MBAN first year cohort. There are two definitions of healthier foods for this study.

1) Food low in calories and 2) foods with high amounts of special diets. The average prices of healthy and unhealthy foods were compared using three different price metrics. 1) price per calorie, (\$/calorie), 2) price per total secondary size (\$/total secondary size(g)), and 3) price per total amount of special diets (\$/total amount of special diets).

Results

Figure: 1 Average price per item (regular price) (Assuming healthier foods are foods with low calories)



Figure 1. This figure shows the average price of healthy food and unhealthy food per item (regular price) when assuming healthier foods are foods with low calories. The price of healthy food is higher than that of unhealthy food.

Figure 2 Correlation between price and calories per serving and correlation between price and total serving size. (Assuming healthier foods are foods with low calories)

Correlation between price and calorie per serving		
Coefficient	df	t_Value
0.03302	280	0.552831746
Correlation between price and total serving size		
Coefficient	df	t_Value
0.021	280	0.35147472

Figure 2 shows a positive correlation between price and calories per serving and a positive relationship between price per total serving size.

As the total secondary serving size increases, the price increases and as the calories increases, the price increases. Notwithstanding the correlation coefficient of this result, healthier food which has less calories have higher prices than unhealthier foods when comparing price per calories per serving. The results could be because of the limitation of this study.

Figure 3 Average prices per calorie, total serving and regular price (Assuming healthier foods have total amount of special diets ≥ 5)

Food_Category	Avg_price_per_total secondarysize	Avg_price_per _calorie	Avg_regular_ price
Healthy Food	0.06	0.24	7.31
Unhealthy	0.05	0.19	12.52

When using products with high amounts of special diets (Total ≥ 5) to define healthier and unhealthier foods, the average price of healthier foods is less than that of unhealthier foods but higher when comparing average price per calorie and average price per total serving size.

Figure 4 Correlation between price and total amounts of special diets. ((Assuming healthier foods have total amount of special diets ≥ 5)

Correlation between price and total amount of special diets		
Coefficient	df	t_Value
-0.10	280	-1.72

Figure 4 shows a negative correlation between price and the total amount of special diets.

Findings

The price of healthier and unhealthier food is subjective to the measurement metrics used.

1. Healthy food cost more when comparing price per calorie.
2. Healthy food cost less per proportion
3. Healthy foods cost more when comparing price per amount of special diets

This study shows that the price evaluation metric used can influence the assumption that healthier foods are more expensive than less healthy foods. Irrespective of the metric used, it is difficult to conclude that healthier foods are more expensive than unhealthier food due to limitation in this study. Considering that the price metrics used in this study is not the price metrics available to the consumer, we cannot conclude that costs alone influence the purchase of healthier foods. Most retail shops only display price per item or regular price.

By understanding how people compare the food prices and other factors that influences the purchase of healthier foods such as foods availability, accessibility, social norms, and taste, we can encourage people to purchase healthier foods, improve their diet quality leading to reduced public health issues. A study by (Daniel, 2020), shows that people assessed cost in relation to how much another food costs. That means other foods acts as the reference point, so based on the reference point, people found food to be affordable even when it cost more per

calorie or per serving size. Another study by (Anderson Steeves et al., 2014) proves that the food environment has a great impact on the population's health. There is another notion that healthy food does not taste as good as unhealthy food (van der Heijden et al., 2020). To encourage healthy eating habits, we must put things in place to address factors that influence the purchase of healthier foods.

Since healthier foods prices are subjective to the metrics of measurement, Wholefoods – Soma can promote healthier foods purchase by addressing other factors that influence foods sales by doing the following;

1. Change their marketing and placement of healthier food strategy
2. Offer a healthy food cashback rebate option
3. Have a tasting booth for healthier foods

Change marketing and placement of healthy food strategy

Food availability impacts dietary options. Changes to the kinds of foods available have indicated an increase in the sales of healthier foods in retail stores. A study by (Anderson et al., 2021) shows that an increase in healthy product visibility and signs in stores located in low-income neighborhood promoted the sale of healthy products. Placement of healthier food items in strategic places that draws attention to the item have been found to influence the purchase of healthier foods. A study conducted by (Foster et al., 2014) showed that instore marketing strategies such as simply placing healthier foods in counters that have cakes promoted the sale of the healthy food. Wholefoods – Soma could adopt such strategies of placing healthier foods like fruits in the desserts fridge to encourage the purchase of healthier foods.

Offer a healthy food cashback rebate option

Cultivating a healthy dietary habit plays a major role in our wellbeing but dietary habit is influenced by the prices of food and people's perception of cost. Another way to encourage the purchase of healthier foods is to offer financial incentives like cashback rebates on healthy foods. A study by (Sturm et al., 2013) showed that partaking in rebate programs for healthy foods positively impacted the purchase of healthier foods. The study also showed a decrease in the purchase of less healthy foods. This is another way wholefoods – soma can encourage their customers to eat healthy by offering cashback rebates to customers that purchase fruits and vegetables as well as foods low in sodium. This option will be best for online customers who seldom go to the physical store.

Have a tasting booth for healthy foods.

Consumers who believe that unhealthy foods taste better than healthier foods will always purchase unhealthy food despite knowing the health risks associated with unhealthy foods (Paakki et al., 2022). Social norm also plays a major role on how people perceive tastes. A study by (Burger et al., 2010) suggests that social norms impact the society's eating habit. Taste is a great factor on food choice and preferences (Liem & Russell, 2019). Retail stores offer the perfect settings that can affect consumer buying manners. Having a taste-test booth in a retail store can change the perception that healthy food taste bad. A survey done by (*Taste-Test Booth: An Innovative Tool in Health Promotion*, n.d.) demonstrated that having people try a healthy food sample increased the sale of healthy foods that were tasted. Wholefood – Soma can have a taste-test booth for some healthy foods such as low-fat cheese to encourage people to choose food with low-fats.

Conclusions

This study has demonstrated that the price metric used to measure cost and the definition of healthier and unhealthier can assume the conclusion that healthier foods costs more than less healthy food. When comparing price per calorie serving, healthier foods cost more because they have less calories. Correlation results also suggest that there is a positive correlation between calories per serving and price which indicates that the limitation in this study could play a significant role in the results. The measurement metrics used in this study is not the measurement metrics consumers use when comparing healthier food prices, therefore, to encourage healthier food purchase, we need to consider other factors that influence food choices. Having fixed prices for healthier foods, Whole foods – Soma can promote healthier food sales by changing their marketing and placement of healthier food strategy to attract more attention to healthier foods, having a tasting booth for healthier foods to change the belief that healthier foods tastes bad, and offering cashback incentives for healthy foods to encourage both online customer and walk in customers purchase healthier foods

Limitations

There are several limitations in this study, including that the database had some missing data and the restrictions placed on the database prevented modification that could help clean the data. The price metrics in this study is not readily available to consumers at the store hence this metrics may not be effective when trying to understand why consumers purchase unhealthy foods.

Based on the results and findings of this study, more research should also be done using different measurement metrics to conclude that healthier foods costs more and to understand other factors that influence food choices. Understanding factors that influences healthier food purchase will help retail stores make the necessary changes to encourage the purchase of

healthier foods which in turn will lead to a healthy dietary pattern and promote good health in Americans especially low-income populations.

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