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Awareness and Advertisement of Red Meat Carcinogens in Low Income Grocery Stores

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ABSTRACT

Previous studies regarding the association between increased cancer rates and socioeconomically challenged locations have not pinpointed specific products that contribute the most toward the risk of cancer. This study aimed to find a few of the most highly advertised carcinogenic products in one area, and how they may be generalized to a larger scale. In this project, multiple methods of data collection were performed; a census map of the counties in central Texas was used and a rural, socioeconomically impoverished was chosen as the site for this study. Personal perceptions of products and product placement in a few randomly selected stores as well as interviews with store employees were some of the research methods used to collect data. Overall, the three most advertised products were beef jerky (coming in assorted flavors and sizes), instant noodles, and sausages/meat sticks. Other products were also found to be advertised, however, not to the extent of these products, and not to the rate of successful purchase as well. With elevated cancer levels around the world, it is important to increase awareness of the risks that certain common foods may pose, but go unnoticed due to the details involving long, unknown chemical names and terms. The results of this study might shine light upon some of the most commonly advertised products containing carcinogens so that customers can be more aware of what they are purchasing before consuming them.

Introduction

Of the hundreds of types of cancers, the most common type of cancer in low-income neighborhoods is gastric, mostly due to the lack of healthy, nutritious food substituted by processed foods (National cancer institute, 2021). Additionally, “stomach (gastric and colorectal) cancer ranks fourth in incidence worldwide, but because of its lethality, second among causes of cancer death”, which makes it even more serious in areas where access to such information is limited (Sloan, Gelband, 2007). The connection between low-income neighborhoods and stomach cancer rates has been researched before– and contributes greatly toward this study as well (Ferro, Rosato, et al. 2020). To narrow the broad topic that is “food items in low-income grocery stores that contribute towards stomach cancer,” this study specifically focuses on red meat in its various processed, packaged, and/or frozen forms, which are known carcinogens. For the sake of simplicity, processed/packaged/frozen red meat is referred to as “CRM” or “Carcinogenic Red Meat.” Additionally, gastric and colorectal cancers are used interchangeably due to the similar effects that CRM has on both types of cancers, which are also, by nature, similar to one another and interconnected closely.

One aspect of the motivation to buy CRM red meat products (other than a lack of options for healthy/fresh food or groceries) is product placement– a behavioral phenomenon that leads consumers to be easily influenced or attracted to products based on the consumer’s attention span and focus, the product’s location in the store relative to entry, and other attractive features such as bright colors, discount tags or large advertisements (Gebauer, Laska, 2011). Previous research– including works that have been published in the Journal of Urban Health, American Journal of Public Health, Nutrition Review, Frontiers in Nutrition, etc.– has proven how effective it can be in influencing customers into making choices that benefit the product brands more than the consumer themselves. When this is applied to the scenario of low-income neighborhoods, the advertisement of red meat products could contribute to their increased rates of purchase.

Research Gap

Pre-existing research (that is discussed in the following literature review) addresses the connections between red meat and stomach cancer and the availability of healthy/fresh food vs quick meals and fast foods (and the effects of product placement on consumer purchases). However, it does not establish the core contributors to the prevalence of red meat product advertisements in low-income grocery stores that ultimately lead to increased carcinogen intake. This is important to research and determine because common misdirection by customer ignorance of harmful products and substances could possibly contribute to rising rates of stomach cancer. Hence, this study can assist customers in recognizing some of the products they commonly buy to be carcinogenic and possibly consider other food options for similar prices, which are discussed later in this study. To analyze the prevalence of highly popularized red meat products in low-income grocery stores, this study follows the leading question: What are the most prominently displayed and advertised red meat products in low-income grocery stores around Austin, Texas? (In relation to rising colorectal and gastric cancer rates and lower socioeconomic neighborhoods).

Search Method and Process

The sources used in this paper were found by using various databases such as EBSCOhost and Google Scholar with the limits of being peer-reviewed or part of an academic journal to ensure the credibility of the data and analysis retrieved from it. Some key phrases and words that were used to find sources include carcinogens, low-income, grocery store, and product placement.

Link between Red Meat Consumption and Cancer Rates

Many respected studies and researchers– including Dr. Karen Emmons of Harvard University, and Angela Himlers, Chief Scientist for the Training Programs in Epidemiology and Public Health Interventions Network– have come to agree on the idea that there is a direct relationship between the consumption of red meat, in its packaged/processed/frozen forms and increased risk of cancer (which include, but are not limited to breast, colorectal, stomach and liver cancer). Red meat contains multiple human carcinogens such as heme iron, N-nitrosamines, and heterolytic amines which are all chemicals that are attributed to lowering the telomere length of leucocytes. These chemicals can take on more potent, harmful qualities when found as CRM (Kasielski, et al. 2016). An international study conducted by Union for Cancer Control called the Stomach Cancer Pooling (StoP) project, was conducted in 2019, and aimed to quantify the association between gastric cancer, specifically, and meat consumption through a data meta-analysis from individual participation. It was found from this project that an increased risk for cancer was statistically significant for red meat consumption. The StoP project went further to observe that the most significant difference across a stratified analysis of different meats– including white, red, processed, and total meat– was found in the association between American/European studies and processed meat consumption. (Ferro et al. 2019). By linking these results from the StoP project and previous research regarding the link between red meat consumption and increased risk of cancer, it is possible to focus on a specific region in the United States to examine another possible relationship: low-income diets and cancer rates.

Resource scarcity in low-income neighborhoods contributing to unhealthy diets

As revealed by the StoP project, the highest distribution of consumption of CRM was seen in America and Europe but presented higher levels of consumption in individuals of low socioeconomic status in the United States (Ferro et al. 2019). The difference between the availability of “healthy” versus “unhealthy” foods when comparing neighborhoods of low income versus high income is significant, and customers who shop at non-chain grocery stores pay a separate

premium. A study conducted in Minneapolis and later published in the Journal of Consumer Affairs revealed that these low-income neighborhoods have less access to chain grocery stores, and usually shop for groceries at the neighborhood corner store or grocery (Chung, Myers, JR. 1999). When prices of items add up in coalition to the "non-chain" premium placed on the products, customers of lower socioeconomic status often turn to cheaper food items and compromise on the quality and ingredients of the items in favor of cheaper prices (Poorolajal et al. 2020). These cheaper food items often include fast food, frozen meats, packaged meats, and snack foods– all of which typically contain a high number of preservatives including nitrosamines, which were previously discussed to be human carcinogens, or high salt contents, which can also affect the risk of cancer.

However, the price might not necessarily be the only reason for increased CRM consumption in low-income communities. A lack of awareness and health implications affected by the quality of education provided in this area could also determine the frequency of purchasing "unhealthy" items. Nevertheless, this study did not ignore the population of the high socioeconomic class of citizens who also indulged in high red meat consumption, almost to the degree of low-income consumers. However, according to Chung and Myers Jr., the main difference between the higher risk of cancer in low-income neighborhoods despite similar levels of consumption can be attributed to the type of red meat being consumed by the two socioeconomic levels: high-income populations have the luxury of being able to afford "lean carcasses" which will usually not have additional substances that increase shelf life (such as preservatives), or enhance flavors (Emmons et. al 2005). These types of meats are usually fresher and less contaminated by possible carcinogens, which helps to keep the risk of cancer at bay. However, since the poor often do not have this option, the preferred type of red meat is often processed, packaged, or frozen.

The results of both the StoP project and the Minneapolis meta-analysis link the ideas that citizens in low-income neighborhoods have an increased risk of cancer due to high levels of red meat consumption in their diets which is affected by the availability of affordable and healthy food items in local grocery stores.

The effect of product placement on the unknowing purchase of carcinogenic items

Choice Architecture, a Behavioral Economic concept, is more commonly known as Product Placement, and can lead people to purchase unhealthy foods even when they have the necessary information and skills to make healthy dietary choices (Gebauer, Laska, 2011). The two researchers conducted a study (in association with the School of Public Health, Division of Epidemiology and Community Health at the University of Minnesota) surrounding the product placement of foods in convenience stores surrounding secondary schools in Minneapolis. The study revealed that "less healthy snacks were more widely advertised, had better placement in stores, and were provided in a consistent and extensive selection in virtually all stores." These less healthy foods often included sodas, sugary drinks, corn chips, and meat jerky– most of which contain a high salt or food coloring content. In fact, food coloring in itself has research to support its cancerous properties; more specifically, "Three dyes (Red 40, Yellow 5, and Yellow 6) have been found [in this review] to be most contaminated with benzidine or other carcinogens" A thorough set of experiments were conducted to determine that "This review finds that all of the nine currently US-approved dyes raise health concerns of varying degrees" (Kobylewski, Jacobson, 2013). These unhealthy foods take preference over healthier foods in grocery stores due to cheaper costs, popularity among customers, and repurchase rates, so they are more conveniently located around stores and are found in larger quantities (Gebauer, Laska, 2011). This theory is evident, especially in low-income neighborhoods, where fresh food and produce are not only difficult to purchase, but also difficult to store and transport due to the lack of connectivity surrounding the areas and food deserts (Hilmers et al. 2012). Using product placement, grocery stores are able to influence consumers to purchase cheaper and more accessible items, which often express carcinogenic properties.

Summary

Multiple studies have agreed that low-income neighborhoods are at higher risk of consuming carcinogenic items (Chung, Myers, JR. 1999). Other works have specifically focused on the carcinogen content of processed, packaged, and frozen red meat (Ferro et al. 2019). The evidence that product placement in low-income neighborhood grocery stores may play a role in increasing the consumption of carcinogenic products was presented in some other studies (Gebauer, Laska, 2011). However, these studies did not directly address the specific products that could cause the most harm due to their abundance in advertisement and purchase.

To connect the prior findings and to fill a gap in the research, this study determines the most commonly advertised red-meat products in the grocery stores of low-income neighborhoods in Austin.

Research design

This paper focuses on the rising rates of gastric and colorectal cancer in low-income neighborhoods and its direct relationship with commonly advertised red meat products– which are known carcinogens. The goal of this research is to inform people of the effects of the products they buy regularly, and hopefully encourage them to choose healthier options or alternative grocery stores without sacrificing their budgets. This study is vital because packaged, processed, additive-containing, artificial, and manipulated substances are increasing. For the general public, it could be challenging and inefficient to learn to identify CRM chemicals specifically; instead, it is much simpler to identify commonly advertised products that are widely known, so that consumers are able to know immediately if their product contains CRM or not, with little to no prior knowledge on the specifics of CRM chemicals. Raising awareness about the danger these products pose when consumed regularly could help decrease rates of gastric and colorectal cancer in low-income neighborhoods.

A two-part study was conducted using both qualitative and quantitative data to help collect details and intricacies that would have excluded important aspects of the research from the results. The two methods used to gather data were a qualitative interview with employees of grocery stores, and content analysis of product placement in various locations in each store (Figure 1). As previously mentioned in the literature review, other studies and researchers have used government-funded projects or reputed databases concerning cancer rates and have conducted observational studies on the effect of product placement, but did not address the product placement of red meat specifically, using an interview/content analysis approach such as this one. The chosen method for this study effectively utilizes consumers' perspectives on product placement–as seen through my eyes– along with officials who oversee the effects of advertisements on their customers regularly.

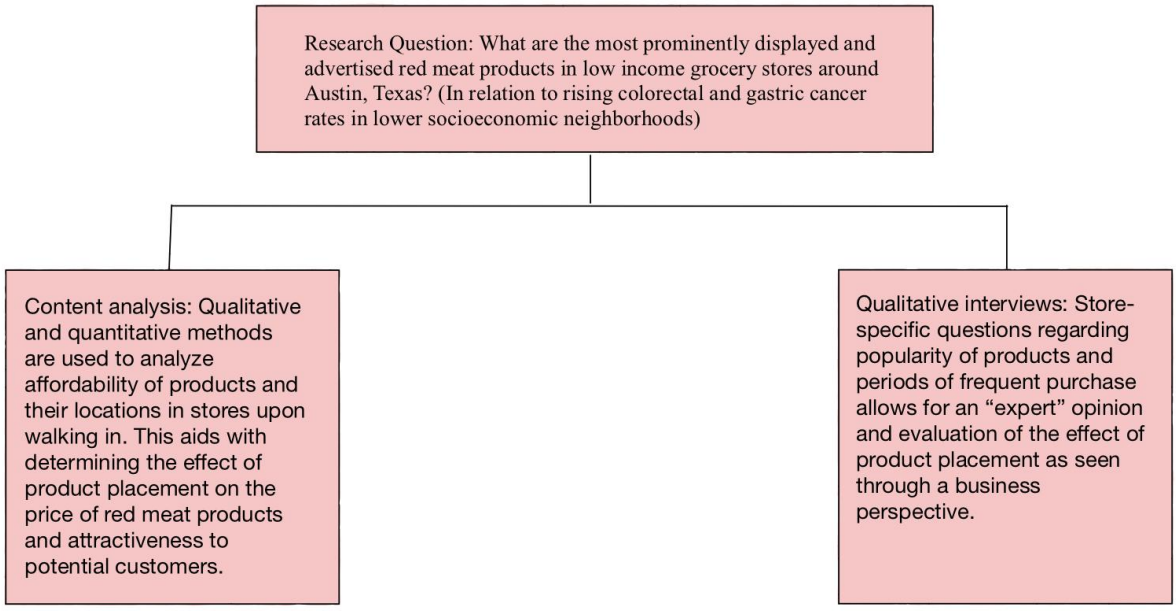

Figure 1: Triangulation process of research design

Participants

The subjects of this study were employees of the grocery stores in low-income neighborhoods that I collected data from. They consisted of store managers, owners, and part-time employees. This group of participants was the most useful to my research because they provided a professional, more holistic viewpoint on my topic; they are much more knowledgeable about the trends and patterns that are seen in the store, which I– as a "customer"– cannot gauge from one visit. Some of these patterns include store inventory, seasonal purchases, the demographic of customers for each product, etc. To find these subjects, a list compiling all the low-income grocery stores in the city of study in central Texas was created and 6 stores were chosen to be inspected. There were certainly difficult limitations to choosing the site of the grocery stores, mainly due to the accessibility of information from multiple cities, each containing many stores. Due to this, I chose a city with a local income that was below the average annual income per family in two of the largest counties in central Texas (Austin, Texas, 2021). Upon arrival at each store, I sought out an experienced employee (determined by working experience at each particular store of 6 or more months), and if none were present, the checkout employee was interviewed. They were made aware of the circumstances of their interview and its contribution to my research; I sought their permission and ensured the protection of their private information before beginning my interviews.

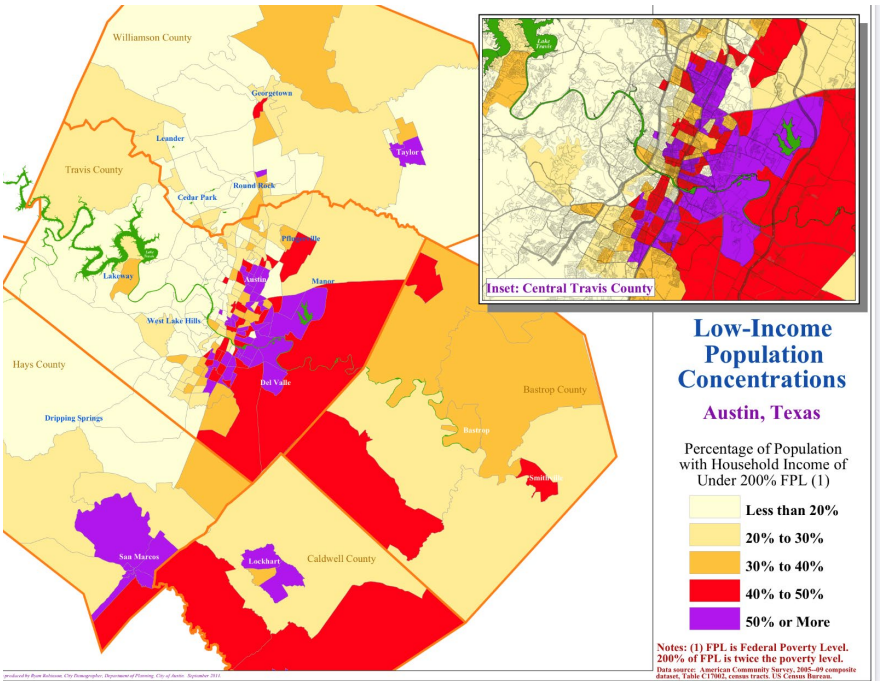

Figure 2: Map of Counties surrounding Austin, Texas used to determine area of study

Research Instruments, Strategies, and Procedure

The questionnaire concerns employees' professional opinions on the most commonly advertised red meat items at their stores. This was measured by the "popularity" of the products among customers, which was affected by how commonly purchased they were. (more sales of a certain product results in more advertising). Another limitation of my research is being able to pinpoint accurate sales on each product, due to customer and store management privacy. The information from the interviews was compiled qualitatively and the data from my personal inspection was organized quantitatively. The interview responses were categorized into 5 questions:

Table 1: Interview Question Set List

Question One	Question Two	Question Three	Question Four	Question Five
In the entire store, which products are most popular among your customers?	Out of these items (that I selected based on my analysis), which three products are the most popular?	What time of the year is each of these products most advertised and purchased?	During those times of the year (refer to Question Three), do you change the location of the products so they are more accessible?	What is the age demographic of consumers who frequent the store to purchase one of these items? (refer to question 2)

Each question was asked to target different aspects of my research question from a qualitative approach. Question 1 was asked to set the basis for consumer patterns in each store specifically, and Question 2 was used to follow up once certain items that could have been answers to Question 1 were filtered out using the criteria of containing CRM.

Questions 3 and 4 were asked to address the limitations of the timing of my data collection, which was shortly before Christmas and the Holiday season. This likely resulted in a skew in the data due to seasonally preferred foods, which would be seen in my data as highly advertised; however, these high levels of advertising may be caused by the increase in purchases specifically during winter months, so Questions 3 and 4 aim to highlight this possibility. Lastly, Question 5 was asked to determine the age group that most commonly succumbed to the advertisements of CRM and whether this age group would greatly contribute to the rising gastric cancer rates in the future.

Additionally, my quantitative research was done by observing my first impression of red meat products. As stated in my literature review, previous research has been conducted to prove that packaged or processed red meat contains carcinogens such as N-Nitroso. I carefully chose items based on exactly one glance, and looked for telltale marketing characteristics; these included bright colors, large text on labels, and accessibility upon entering the store. After choosing 10 items from each store, I compared them together based on price and categorized them into Group 1 (< $6.00) or Group 2 (>$6.00). A separate sub-category was made in each group for discount items. The purpose of the quantitative categorization of products was to analyze the effect of price ranges on product placement in the store. In this study, all of the questionnaires were also approved by the Institutional Review Board without the need for modifications.

Summary

The main limitations to the data collection in this research are accessibility to a large number of stores (subject sites) and access to private store records of customer purchases. The effect of these limitations might be seen in the results and analysis of information, since the socioeconomic standing of the chosen town in central Texas, varies from other cities under the poverty line around Austin, Texas. Additionally, the data collection on the red meat products was conducted shortly before Christmas, which could lead to skewed results in favor of certain products over others, which might not be supported year-round. To address this particular challenge, I asked Question Three, to ensure that any bias in the information was accounted for by seasonal patterns and trends. The potential implications of this study include expanding research into low-income neighborhoods throughout the country and interpreting the level of risk of gastric cancer posed by the advertisement and sales of red meat products.

Results

Store Content Evaluation Using Product Placement as a Consumer

To determine the effect of product placement on the impulse to buy certain products in the stores, I used myself as a subject. It must be acknowledged that as both the researcher and the subject, there is definitely to a certain extent, some bias. To minimize this bias, an ideal experiment would have used a blinded analysis where the consumer did not know which products they were searching for and rather chose what caught their eyes, fitting the description of product placement. However, I was not able to recreate this scenario; to minimize bias, (in my case, the bias would involve second-guessing my choices due to my previous understanding of my own research), I spoke aloud the first products that came to mind and recorded them to collect evidence that I was not changing my choice due to indirect bias. Using this method, a first impression was taken of the stores upon entering. Due to my role in data collection as both a consumer and an analyst, I was careful with the perspective through which I looked at the store. During the first round I made around the facility, I collected items containing red meat in frozen, packaged, or processed form. I divided the hypothetical locations for red meat products to be advertised into 5 sections: checkout counter, quick meals section, canned goods section, meat section, and the freezer (listed in order from closest to farthest in distance from the entrance of a store). This list was created based on my observation of a certain “store model” that all of the sample stores seemed to follow. To further clarify certain terms, the “quick meals” section was defined as a set of aisles ($1 \leq n \leq 3$)

that contained food items that required less than five steps to be ready to serve. This includes food such as instant noodles, microwave burritos, instant coffee, etc. Additionally, the "meat section" consisted of aisles ($1 \leq n \leq 2$) dedicated to unrefrigerated meat and its sub-products that were still composed of at least 70% of its original meat form, i.e beef jerky, sausages, meat sticks, etc. in their assorted flavors. At each store, at least seven products containing red meat were selected based on observation and first glance. Additionally, I noted the relationship between the approximate distance from the door and the prevalence of discounts or sales among the products. The results of my content analysis as a potential customer of the store (and therefore a target for product placement) can be seen in Table 2. The availability of a certain type of product in a particular store is represented by "*".

Table 2: Distribution of RMC products across 6 stores

Type of product	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6
Jerky	*		*			*
Meat Stick	*	*	*	*	*	
Chili	*		*	*		*
Canned sausage	*	*			*	*
Sausage stick	*	*	*	*		
Instant noodles	*	*		*	*	*
Burrito		*			*	
soup/ stew		*	*			*
Packaged meal		*			*	
Frozen meat				*	*	

Graph 1 provides a comparison of cost and location for the same products; the 5 different locations mentioned above are abbreviated for sake of simplicity: checkout counter= CC, freezer= F, meat section= M, quick meal section= Q, and the canned goods section= CG. Each dot in the distribution represents one product, its location, and its price. Dots that are right above each other are of roughly the same price (and are oriented as they are due to aesthetic and organizational purposes). The y-axis is arranged so that the distance from the entrance– based on the approximate store model mentioned earlier– increases as "y" increases. For example, a dot on the coordinate ($4.50, Q) represents a product containing red meat found in the "quick meals" aisle and costs $4.50.

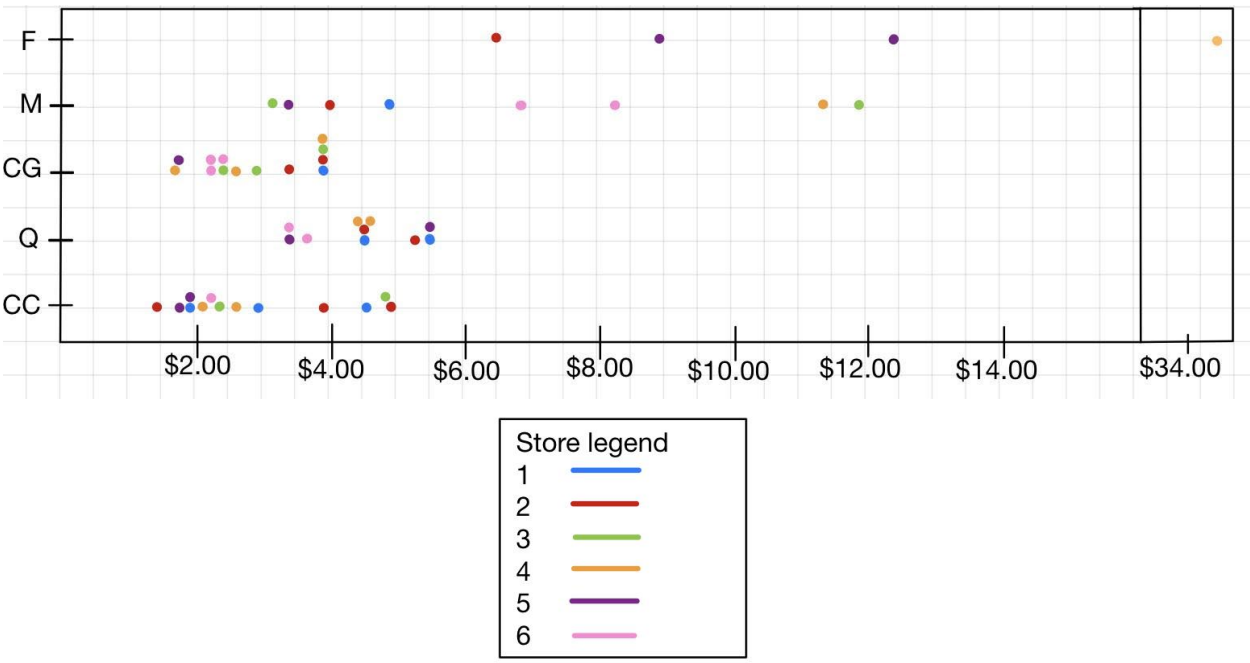

Figure 3: Distribution of product prices versus store location

From this distribution, an analysis of affordability (<$6.00 or >$6.00 per item) and a composition of products in each section of the store was conducted. The results are shown below.

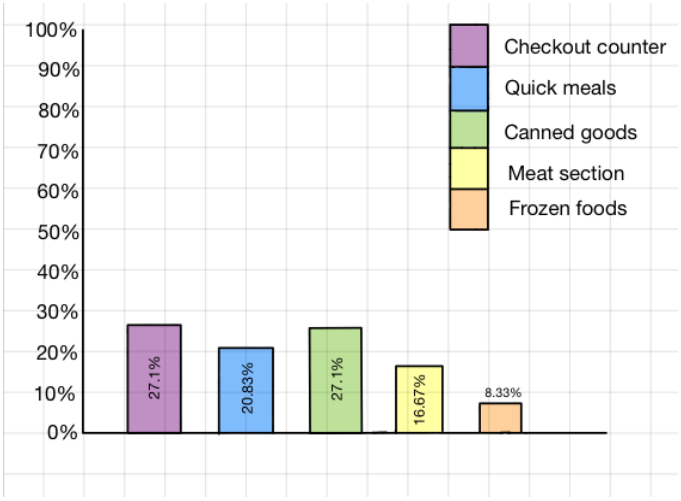

Figure 4: Composition graph of analyzed products in each location

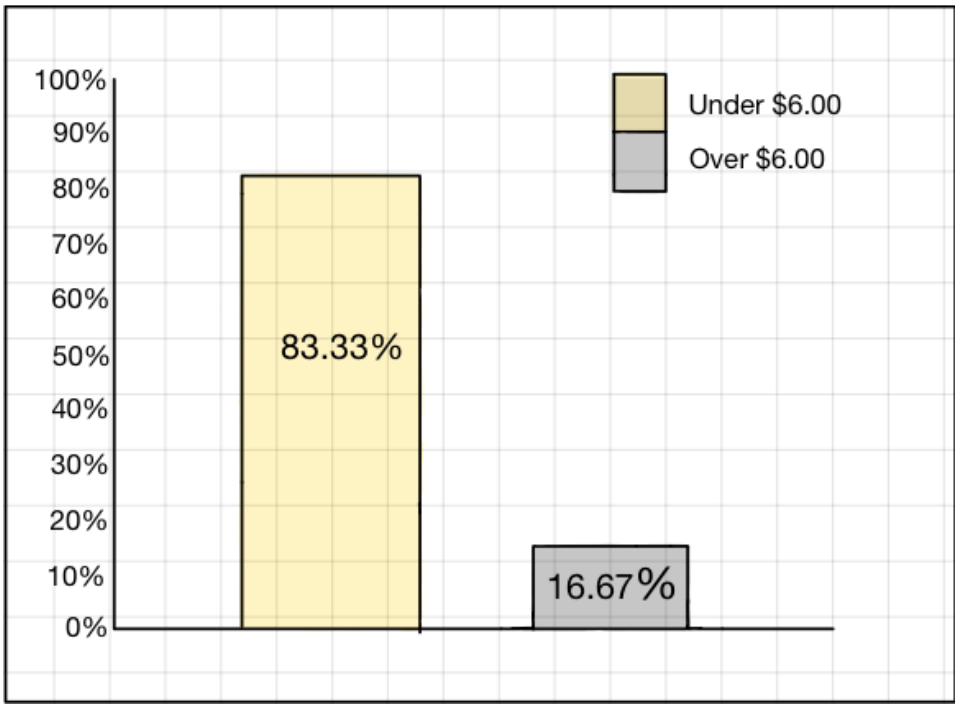

Figure 5: Price Point Comparisons and Overall Affordability of Analyzed Products

Qualitative interview responses

The five questions were asked in person at each store that was visited (refer to questions in Table 1). First, the interviewees were approached, introduced, and made aware of the circumstances of the questions. They were told of their right to anonymity within this study and the contribution of their responses to the field and the research as a whole. Once they had asked any other administrative questions, the interview began. The responses to each question by all six stores are shown below.

[redacted] - Store 1
Question 1: "Throughout the whole store? Well, probably the sodas, candy, chips, jerky, and instant noodles."
Question 2: "The Maruchan Pork Noodles and the Beef ones too. Also, the chili is pretty popular."
Question 3: "Usually the Winter. It's pretty cold out so people want to eat more proteins. For many people, one packet of jerky is like eating 2 full meals."
Question 4: "Yes. We move some of the packets of beef jerky near the checkout counter."
Question 5: "Mostly just adults."

[redacted] - Store 2

Interview Responses:
Question 1: "Mostly just drinks, meat sticks, jerky, protein bars, chips, you know?"
Question 2: "The most popular ones would be the instant noodles, meat sticks, and the packaged meal like this salisbury steak here."
Question 3: "Winter mostly."

Question 4: “Yes, we move some things to the front of the store.”
Question 5: “Mostly adults, but a lot of teenagers come in for the junk food.”

[redacted] - Store 3

Interview Responses:
Question 1: “We have the most advertisements for chips, meat sticks, our fresh pizza and candy.”
Question 2: “From these foods, I would say the Chili, Meat Sticks, and Soup are the most popular”
Question 3: “Fall. We start advertising early to prepare for the winter.”
Question 4: “Some of them yeah. We provide coupons for the chili and the soup in the front of the stores.”
Question 5: “Mostly Teenagers, there’s a park nearby and this is their stop before going home.”

[redacted] - Store 4

Interview Results:
Question 1: “From the full store, I would say the canned beans, noodles and jerky”
Question 2: “For the three most popular, it would be the jerky, sausage sticks and the beef brisket, even though it’s expensive.”
Question 3: “Fall and winter mostly.”
Question 4: “Yes”
Question 5: “Adults come here about once a week and buy stuff in bulk for the next week.”

[redacted] - Store 5

Interview Results:
Question 1: “From the full store the most popular products are I think water, um, a lot of people get lots of water. Also, they buy burritos, meat sticks, and sausages.”
Question 2: “Oh from these, I would say it's the sausages, burritos, and meat sticks that are the most popular.”
Question 3: “We advertise our products more during the winter.”
Question 4: “Yes, we move the burrito and sausages closer to the entrance/exit of the stores.”
Question 5: “We get a lot of teenagers, probably because the store is right next to [redacted]School, but we also get adults.”

[redacted] - Store 6

Interview Results:
Question 1: “From the full store? Oh, it would definitely be the chips and candy. But also the jerky and instant noodles.”
Question 2: “If I had to pick from these, I would say the Pork and Beans sausages, instant noodles, and the beef stew.”
Question 3: “Winter”
Question 4: “Yes, we know that more people want cheap food that will keep them full for a long time so we move up the more heavy foods and ready-to-meals closer to the fronts of the store.”

Question 5: “We get teenagers and adults both.”

In Relation to Age Demographics

The results of the interviews aligned with existing research (as mentioned in the Lit Review) suggesting that “ 75% of adolescents shop at convenience stores at least weekly.” (Gebauer, Laska, 2011). Both Store 1 and Store 5 mentioned having “regulars” who frequented the store and usually left after purchasing the same or similar products. While Store 1 reports higher rates of young adults rather than adolescents normally, Store 5 most commonly transacts with the youngest generations; this could be due to the fact that the store is near a school and maybe a common stop on the way home for many of them. Store 2, 3, and 4 all mentioned that the age demographic of customers that often visited their store to buy the carcinogenic products from the list provided to them was “anywhere between 10 to 65”, as the manager of Store 3 said. And lastly, Store 6 reported having a majority of its customers who purchased those certain items to be over the age of “35, at least.”

Product Popularity

The results of Question 1 yielded fairly consistent results to each other. 6 out of 6 stores reported that drinks (including fountain, soft, and soda), and chips were some of the most popular products among customers and were frequently purchased. Only tied for second in consistency with cigarettes, 5 out of 6 stores also mentioned candy and sweets to be part of the list of commonly advertised (and purchased as a result of said advertisement) products. However, the most important result from this question can be seen in the report that 4 out 6 stores claimed instant noodles (specifically beef or pork flavored), and jerky to be a part of this list as well.

Product Popularity from chosen items

The results from this question were the most closely aligned with each other of all the interview question results. 6 out of 6 stores mentioned beef jerky, and 5 out of 6 mentioned both meat sticks and instant noodles. Shockingly, the brands of these products were also very similar, with almost all products being the same brand but having a small variation such as size or flavor. For instance, the checkout employee in Store 4 mentioned that the “Maruchan Instant Noodles in the Beef Flavor is very popular”, and the response from the manager of Store 6 was nearly identical.

Seasons of Advertisement

Questions 3 and 4 were asked in tandem so that the response to Question 4 could be answered in the context of Question 3. When asked what time of the year the items presented to them were most advertised and purchased, 4 out of 6 stores stated that “Winter is (was) when we have the most sales for these items” (as quoted by a Store 3 employee). The manager of Store 2 claims this trend to be explained by the colder temperatures and availability of cooking facilities; “people want quick meals that don’t require a whole kitchen or fancy plates. This bag of jerky can last someone 2 full meals full of protein and carbs”.

However, when asked about the movement of advertisements for products during the winter months, only 3 stores mentioned new forms of advertisement. Store One put up a poster for Jack Links– a beef jerky and meat stick brand– on the front door of the store. Similarly, the manager of Store 5 elaborated on the “switch” they perform with some popular products during the winter. The store claims to move jerky strips to the checkout counter and move the “counter clutter” elsewhere until the end of the season. Meanwhile, store 4 applied a discount strategy to lure customers all the way to the back of the store, where the freezer section contained some of the most expensive products in the whole store. The discount strategy used by Store 4 reveals how products that are furthest away from the entrance

often experienced the largest discounts to entice customers to walk through the entire store to purchase the discounted items; during the walk to the goal product, customers are often enticed by others along the way, a marketing strategy that it used to sell products that aren't the end goal under the pretext of "going to it" (Gebauer, 2011).

Findings

After analyzing the results from the study, it is possible to narrow down the most prominently displayed and advertised red meat products in the facilities that were selected to be Beef Jerky (assorted flavors and sizes), instant noodles, and meat sticks. This is directly derived from the results of my study that indicate the high frequency of availability of these products across most stores (Table 2). Common traits shared by all three types of products that led to this conclusion included proximity to the front of the store, price, flavoring/size variability, package design, etc. Most importantly, all three types of foods were found within 15-20 feet of the entrance of the store as seen in Graph 1. Both the sausage and jerky were found in sections of the store categorized as "checkout counters" in this study. This study helped reinforce the pre-existing notion that "items closer to the cashier register are more attractive to a customer, especially if they're cheap", as stated by one of the interviewees. Similarly, instant noodles make for quick, easy, cheap meals so these products quickly become popular among customers. In this study, "popularity" was not determined by how many individual pieces of advertisement a certain product had; rather, it was determined by its success rate in luring customers into purchasing those products. To increase the success of certain products over others, grocery stores utilize product placement as a way to draw attention to them, and then accordingly lower prices to make the purchase seem completely reasonable. This is evident as supported by the interviewees' testaments that the instant noodles and jerky were the most popular (Question 1 and 2) and by Graph 1, which depicts how the products are placed in the store; the closer the product is to the entrance, the sooner it captures a customer's attention and (depending on packaging, price, product) the longer it lingers in the back of a shoppers' mind.

Filled-in Gap in the Research

This study addresses and identifies the core contributors to the prevalence of red meat food product advertisements in low-income grocery stores. To ensure that new data and information were collected and analyzed in this study, different parameters were set and the sample population was not part of any previously mentioned studies. In these previous studies, a link was established between red meat and carcinogens, the availability of fresh/healthy food, and the effect of product placement. This study furthers this research by pinpointing the exact culprits that contribute to increased carcinogen intake in low-income neighborhoods. Additionally, previous works (as mentioned in the Lit Review) generate observational data using national or state census information, but this study generates its own new material instead. All previous works cited earlier in this paper link very closely to one another but avoid the gap that serves as the foundation for this study. Furthermore, past research has been vague about the steps and processes that a consumer can take to lessen the consumption of CRM products; however, my study helps to pinpoint three easily recognizable products so that consumers can begin taking the steps necessary to reduce the overall increase in gastric cancer rates.

Implications

The results of this study are important to future research and studies because they could potentially educate their customers about the dangers of product placement; furthermore, common misdirection by consumer ignorance of harmful substances in products is only contributing to rising rates of stomach cancer. Hence, the results of this study can assist customers in choosing either healthier food alternatives or different grocery stores.

One option for fresh produce and higher quality food that is relatively comparable in terms of the price range is Amazon SNAP EBT Grocery Services. The virtual shopping platform expanded to include grocery delivery services, partnering with Whole Foods in 2017 to sell healthy, fresh foods such as "organic strawberries or grass-fed beef" (Banker, Cunnane, 2019). According to the FAQ page on the Amazon Website for SNAP EBT, to accommodate populations who cannot afford the Prime membership or the $35 minimum for free delivery, Amazon joined a "pilot run by the United States Department of Agriculture (USDA) to accept SNAP EBT online" in all US states except Alaska This Electronic Benefits Transfer (EBT) is an online system that allows a supplemental Nutrition Assistance Program (SNAP) participant to "reimburse the store for food that was purchased" (USDA, 2023). One direct parallel to this study would be the prices of a "Quick Meal" food: Instant noodles/pasta. One of the findings of this study was that Instant Noodles was one of the most commonly advertised products, averaging around $3-4 per unit; on Amazon SNAP EBT, one box of Annie's Organic Macaroni and CLassic Cheddar Cheese sells for $3.59, which is relatively affordable in comparison. With multiple healthier, organic options available online with short delivery times of as low as 2 hours, Amazon SNAP EBT could pose as a much more viable, nutritious alternative.

The aforementioned research already suggests growing rates of gastric and colorectal cancer, so raising awareness about the potentially harmful chemical carcinogens that a large population of low-income neighborhoods consumes regularly could help decrease and lower consumption rates.

Limitations

As noted in the method, this study was carried out during the holiday season so certain products were likely more advertised than others, which could possibly lead to a skew in the data due to bias. Additionally, the six stores that were observed were within close proximity to each other, which has a definite effect on the availability and price of certain brands over others. This could be affected by various causes, such as personal relations between store owners, which could lead to similar products being sold in the stores, due to personal recommendations or similar standards. For instance, the brands "Jack Links" and "Maruchan" were both the most widely advertised at the checkout counter and quick meals section. As a result, they were also the most commonly found and purchased products in these stores.

Future Research

This study can be applied on a larger scale and target even more products. Additionally, it can be applied to other carcinogens (other than red meat) such as high salt concentrations or Food Dyes, as mentioned before. Furthermore, the scale of this study can be expanded to the rest of the country and even globally. It would especially benefit countries with large socio-economically challenged populations.

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