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THE NUTRITIONAL ADEQUACY OF FOOD OFFERINGS IN U.S. CORRECTIONAL
SETTINGS: A SYSTEMATIC REVIEW

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ABSTRACT

BACKGROUND: Many lifestyle changes are made upon entrance into a correctional setting (e.g. prisons and jails), including eating habits and nutrition. The research surrounding nutrition in correctional settings can provide insight into the food availability to people who are incarcerated and the impact food offerings have on their health. **PURPOSE:** To determine the nutritional adequacy of food offerings in U.S. correctional settings. **DESIGN AND METHODS:** A systematic review of the literature was conducted utilizing the PubMed and CINAHL databases using the search terms “(nutrition OR diet) AND (prison OR prisoner OR incarcerated OR inmate) NOT prisoner-of-war.” Results were limited to articles written in the English language and performed on human subjects in the United States. Fifteen articles were selected and included as part of the systematic review. **RESULTS:** Current evidence indicates the food offerings in correctional facilities did not meet adequate nutritional recommendations for adults in regard to caloric intake, food group quantities, and multiple vitamin and mineral values. People who are incarcerated have poor views related to the nutritional adequacy of the food offerings available to them. **DISCUSSION:** As a public health topic, it is important to continue to evaluate the adequacy of food offerings in correctional settings. Healthcare professionals can team with interdisciplinary colleagues from nutrition and dietetics to identify nutrient rich healthy alternatives that are the most economically feasible, and work with decision makers about enhancing healthy choices on commissary lists. Understanding the diets of people who are incarcerated can help healthcare providers better promote health and treat and manage diseases commonly found in this population. Two potential future research foci are: a) a comprehensive examination of cafeteria, commissary, and vending machine foods in correctional settings; and b) the relationship between nutrition and chronic disease development in incarcerated populations.

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Chapter 1

Introduction

In the United States, over 2.3 million people were incarcerated as of March, 2019 (Sawyer & Wagner, 2019). People who are incarcerated serve an average of 2.6 years in state prisons, and people who are incarcerated in federal prisons are sentenced to an average of 10 years (Bureau of Justice Statistics, 2018; Federal Bureau of Prisons, 2019). Of the incarcerated population in federal prisons, 16.5% are sentenced to 20 years or more (Federal Bureau of Prisons, 2019). As some people who are incarcerated age in the correctional setting and others return to the community after their stay, the regulations and structure implemented in correctional settings influence the lifestyle and practices of people who are incarcerated and will likely follow with them upon returning to the community. The lifestyle developed in the correctional setting can impact their overall health and well-being. An aspect of health of people who are incarcerated that changes in the correctional setting is nutrition due to their limited options for obtaining food.

In the correctional setting, people who are incarcerated obtain food through two main sources: the cafeteria and the commissary. The cafeterias in federal prisons follow a national menu outlined by the Federal Bureau of Prisons, which can be adjusted by the warden of each facility (Federal Bureau of Prisons, 2011). At the commissary, people who are incarcerated are able to purchase from a list of additional food and beverages chosen by the facility using their own funds. The food offerings in correctional settings provide people who are incarcerated limited autonomy related to their food choices.

Significance of Problem

Of the incarcerated population 50 years of age and older, 57% have three or more chronic health conditions, and it is expected that one third of the incarcerated population will be 50 years of age or older by 2030 (Gates et al., 2018; Loeb & Steffensmeier, 2011). There are many factors that influence the health and well-being of people who are incarcerated, and nutrition is an important one. Adequate nutrition is essential for normal processes and regulations in the body. Poor nutrition or diet can be directly related to many chronic illnesses, including cardiovascular disease, hypertension, diabetes, and cancer (U.S. Department of Agriculture & U.S. Department of Health and Human Services [USDA & USDHHS], 2010). As people who are incarcerated have limited ability to choose their own diets, the food offerings in correctional settings should meet nutritional standards to provide a healthy lifestyle for people who are incarcerated, as nutritional intake can impact their overall health.

The health and well-being of people who are incarcerated is of public concern as it relates to spending in this area, which is financed by taxpayers. Although the incarcerated population has steadily decreased since 2008, a recent study suggests the national average spent on each person who is incarcerated has increased from \$31,296/year in 2010 to \$33,274/year in 2015, and 11 percent of spending was related to healthcare costs, including hospital stays, pharmaceutical costs, and healthcare provider visits (Bureau of Justice Statistics, 2015; Mai & Subramanian, 2017). As spending and the number of people who are incarcerated with chronic illnesses continue to increase, it is crucial to examine factors related to health, specifically nutrition. Correctional facilities provide food to people who are incarcerated with the goals of being both nutritionally adequate and cost effective. Additionally, since poor nutrition is related to chronic health condition development, the possibility of initiating early intervention steps,

including improved nutrition of people who are incarcerated and nutrition education, could impact the health of people who are incarcerated. Although providing more nutrient adequate foods and education will be more costly, it could be used to prevent, slow progression of, or manage diet related chronic health conditions, which would ultimately reduce healthcare costs.

Although people who are incarcerated are managed by the government, little information surrounding the actual diets and nutrient intakes of people who are incarcerated is available. With this, there is difficulty determining the nutritional adequacy of food offerings in correctional settings. The National Commission on Correctional Health Care (2018) is an organization that accredits facilities based on their ability to provide nationally accepted standards of healthcare. The standards established by the organization expect a heart healthy diet to be available to people who are incarcerated and medical diets to be available to those with acute or chronic conditions. While correctional facilities do not have to become accredited, compliance to these standards ensures people who are incarcerated are maintaining adequate health and nutrition.

Purpose

The goal of this systematic review is to examine the food offerings available to people who are incarcerated in U.S. correctional settings. This study aims to answer the following questions:

1. What is the nutritional adequacy of food offerings in U.S. correctional settings?

Table 1: Definitions

Nutrition	The process of obtaining food necessary for health and growth (USDA & USDHHS, 2010).
Nutritionally Adequate Diet	Diets that incorporate current American Heart Association diet and lifestyle recommendations and U.S. Department of Agriculture (USDA) dietary guidelines, consistent with current Dietary Reference Intakes for age, gender, and activity levels of the population (National Commission on Correctional Health Care [NCCCHC], 2018).
Heart Healthy Diet	A diet emphasizing foods and beverages that are low in saturated fat, trans fat, and sodium; minimizes red meat and sugar-sweetened items; and is rich in fiber (NCCCHC, 2018).
Medical Diet	Modified diets ordered for temporary or permanent health conditions. Examples include diabetic/consistent carbohydrate, low sodium, low fat, celiac, renal, soft, liquid, pregnant and nutritional supplementation (NCCCHC, 2018).
Macronutrient	A dietary component that provides energy. Macronutrients include protein, fats, carbohydrates, and alcohol (USDA & USDHHS, 2010).
Micronutrients	A dietary component that is necessary for normal growth, development, and metabolism. Micronutrients include vitamins and minerals (USDA & USDHHS, 2010).
Chronic Illness	A disease or condition lasting 3 months or longer. Examples include cardiovascular disease, cancer, diabetes, and hypertension (USDA & USDHHS, 2010).
Commissary	Stores run by correctional facilities where people who are incarcerated can purchase personal items, including foods and beverages, from a list of offerings, if they have the funds available to do so (Rosenboom, Schlafer, Stang, & Harnack, 2018).

Summary

When people enter the correctional setting, elements of autonomy are forfeited. This includes the ability to freely make all of their nutritional choices. As chronic illnesses in the incarcerated population continues to increase, it is important to examine the impact nutrition has on health. In this systematic review, the nutrition adequacy of food offerings in correctional settings will be examined.

Chapter 2

Background

Determining the nutritional adequacy of food offerings in correctional settings will provide a better understanding of the intake of people who are incarcerated and a basis for additional research. Nutritional intake is an important factor in health, including the management and prevention of chronic diseases. This chapter discusses the basics surrounding nutrition and its relation to health. Additionally, it addresses the standards and components of recommended dietary intake and food offerings in correctional settings. Subsequently, the importance of nutritional adequacy in correctional settings to the healthcare field is addressed.

Nutrition

Nutrients are found in food and used by the body to perform basic functions, including supplying energy, regulating chemical processes, and providing the basics for growth and repair. The body cannot produce nutrients on its own and must acquire them through the diet. There are two categories of nutrients: macronutrients and micronutrients. Macronutrients are needed in large amounts, compared to micronutrients, and are converted into energy that is used by cells. The types of macronutrients are carbohydrates, proteins, and fats. Micronutrients are needed in smaller amounts, compared to macronutrients, and have important roles in bodily function. The types of micronutrients are vitamins and minerals. Examples of vitamins include vitamins A, B, C, D, E, and K. Examples of minerals include sodium, chloride, potassium, calcium, iron, phosphorus, and zinc.

Food Sources

All food is made up of an individual or a combination of nutrients. Examples of foods high in carbohydrates include fruits, vegetables, and grains. Foods that have a high source of protein include meats and legumes. Examples of foods high in fat include oils, nuts, and dairy products. Foods that have higher sources of vitamins and minerals include fruits, vegetables, and whole grains.

History of Nutrition Guidelines

Since 1980, the U.S. Department of Agriculture (USDA) and U.S. Department of Health and Human Services (USHHS) have joined efforts to publish *The Dietary Guidelines for Americans* every 5 years (USDA & USHHS, 2015). Each publication builds on previous knowledge and provides updated recommendations based on current scientific research and medical knowledge. The guideline is intended to be used by the general public as well as policymakers and health and nutrition professionals in the United States (USDA & USHHS, 2015). The guidelines provide information and recommendations for choosing a healthy diet and lifestyle. Additionally, the guidelines discuss the impact food and lifestyle choices have on overall health and disease development.

Current Nutritional Guidelines

The most recent publication, *2015-2020 Dietary Guidelines for Americans* (2015), provides guidance for a healthy diet and lifestyle with an emphasis on disease prevention and

healthy eating patterns. Previous editions focused on food groups and nutrient intake, while this edition shifts focus on healthy eating patterns. With the previous mindset on food groups and nutrients, people made choices to increase overall intake with a mix of unhealthy and healthy choices. The new approach for guiding the public focuses on healthier choices and substitutions that replace unhealthy choices.

Additionally, Dietary Reference Intakes (DRI) for different ages and sexes are provided. These focus on nutritional goals that can be measured by numeric value or percent. These recommendations can be used as standards for dietary intake and nutritional adequacy of a person's diet. These recommendations apply to the average person. Recommended Dietary Allowances (RDA) apply to 97-98% of healthy individuals (USDA & USHHS, 2015). If the RDA cannot be determined, Adequate Intake (AI), the mean nutrient intake of healthy people, is used (USDA & USHHS, 2015). Additionally, Tolerable Upper Intake Levels (UL) are used to establish the highest average daily intake level that poses no risk of adverse health effects (USDA & USHHS, 2015). Certain populations, including pregnant women and people with chronic illnesses, may require nutrient levels that differ from the DRI.

In addition to DRI, the recommended amounts of food from each food group is provided. These amounts are tailored to 12 different calorie levels ranging from 1,000-3,200 calories (USDA & USHHS, 2015). The amounts follow DRI and translate the recommended numerical values of nutrients into numerical amounts of food (USDA & USHHS, 2015). This information can be used by individuals to develop meal plans and examine and compare their current diet to the recommended food amounts.

For example, in regard to males aged 31-50, the recommended caloric intake is 2,200 calories (USDA & USHHS, 2015). The recommended intake of protein is 56 grams and carbohydrates is 130 grams (USDA & USHHS, 2015). Added sugar and saturated fats should be kept at less than 10% of total caloric intake (USDA & USHHS, 2015). Some of the key recommendations for vitamins and minerals include a potassium intake of 4,700 mg; calcium intake of 1,000 mg; and a UL of 2,300 mg of sodium (USDA & USHHS, 2015).

Relationship between Chronic Disease and Nutrition

There are many risk factors that impact the development of chronic diseases, including genetics, age, gender, environmental influences, dietary intake, and lifestyle choices. Nutrition is a modifiable risk factor that has a very important role in chronic disease. It impacts the development, prevention, and treatment of chronic diseases. Diet related chronic diseases include but are not limited to cardiovascular disease, hypertension, type 2 diabetes, and cancer.

Dietary Management of Chronic Disease

Dietary action can be utilized to prevent, treat, and manage certain chronic diseases. In the treatment of most diet related chronic diseases, dietary adjustments are the first interventions. Prevention, treatment, and management of chronic diseases are tailored for each individual. Additional non-pharmacological and pharmacological interventions may be added in addition to a dietary treatment approach. The following diseases examined are the most common, diet-related chronic conditions in the incarcerated population: hypertension, cardiovascular disease, diabetes, and cancer (Bureau of Justice Statistics, 2015).

Hypertension. Hypertension or chronic high blood pressure is consistently elevated blood flow through the body's blood vessels. Hypertension is an important factor in cardiovascular disease and can lead to heart attack, stroke, vision loss and kidney failure. The dietary approach to manage or prevent hypertension emphasizes reducing sodium, saturated fat, trans-fat, and alcohol intake and low-density lipoprotein levels (American Heart Association, 2016). Dietary Approaches to Stop Hypertension (DASH) is a suggested eating pattern that is high in vegetables, fruits, whole grains, poultry, fish, beans, nuts, and low-fat dairy products, while low in added sugar and red meats (USDA & USHHS, 2015). It emphasizes a diet high in potassium, calcium, magnesium, dietary fiber, and protein, while low in saturated fats and sodium (USDA & USHHS, 2015).

Cardiovascular Disease. Cardiovascular disease is a disease of the heart and blood vessels that is related to the process of atherosclerosis. Atherosclerosis is the hardening and narrowing of arteries from the accumulation of plaque, a combination of fat, cholesterol, and calcium, on the inner walls of the arteries (Titchenal, Calabrese, Gibby, Revilla, Meinke, 2018). Cardiovascular disease can lead to life-threatening events including heart attacks and strokes. The dietary approach to manage or prevent cardiovascular disease focuses on limiting salt, saturated fat, trans-fat, red meat, and added sugar intake and increasing dietary fiber (American Heart Association, 2015). Eating a variety of fruits and vegetables, whole grains, low or no fat dairy, skinless poultry and fish, non-tropical vegetable oils, and nuts and legumes products promotes a heart healthy diet (American Heart Association, 2015).

Diabetes. Diabetes is an endocrine disease relating to insulin production and glucose levels. In type 1 diabetes, the body does not produce insulin and the insulin must be replaced through pharmacological methods. In type 2 diabetes, the body produces enough insulin, but the cells

become resistant, which eventually leads to exhaustion of insulin-secreting cells and no insulin production. For someone with diabetes, the main goal is to keep glucose levels at the proper levels. A person with diabetes should avoid eating carbohydrates that spike glucose levels, count carbohydrates consumed, eat healthy-carbohydrates, eat small frequent meals, and never skip meals (National Institute of Diabetes and Digestive and Kidney Diseases, 2019). A dietary approach is the first line of treatment for type 2 diabetes. Weight loss can improve glycemic control, lower blood pressure, and improve dyslipidemia (Horton et al., 2010). A diet for a person with type 2 diabetes should be low in calories, sugar, and fat, carbohydrate conscious, and high in fiber (National Institute of Diabetes and Digestive and Kidney Diseases, 2019).

Cancer. Cancer is the uncontrolled growth of abnormal cells. There are many different risk factors for cancer development including genetics, age, tobacco use, and environmental exposure. Diet and nutrition are linked to cancer. The American Cancer Society (2013) recommends consuming a plant-based diet, limiting red meats, and eating high-fiber foods and whole grains to reduce the risk of developing different types of cancer.

Correctional Settings

The two main types of correctional facilities are prisons and jails. Jails are facilities that typically detain people sentenced to less than one year and people awaiting trial or sentencing. Prisons are either run by the state or federal government or privately run by a third party that is contracted by a government agency. Prison facilities typically hold people with sentences greater than one year. The policies of federal prisons are established by the Bureau of Prisons and the policies of state prisons are established by the Department of Corrections in each state.

Food Offerings in Correctional Settings

In the correctional setting, people who are incarcerated obtain food at two locations: the dining hall and the commissary. In federal prisons, the Bureau of Prisons (BOP) published the standards and policies for food services, which is outlined in the *Food Service Manual* (Federal Bureau of Prisons, 2011). Additionally, the BOP published the standards and policies for commissaries in the *Trust Fund/Deposit Fund Manual* (Federal Bureau of Prisons, 2015a). A National Menu, in the form of a 5-week meal cycle, is used in the dining halls of all institutions and cannot be changed or substituted (Federal Bureau of Prisons, 2018). The commissary listings vary from each facility; however, they do follow certain requirements and exclusions established by the BOP (Federal Bureau of Prisons, 2015a).

After examination of the food services policies of four states, Pennsylvania, California, Alabama, and Iowa, the differences between the policies of the BOP and the states is minimal; therefore, the focus of food service policies of correctional facilities will be on the policies of the Federal Bureau of Prisons (Commonwealth of Pennsylvania Department of Corrections, 2016; California Department of Corrections and Rehabilitation, 2019; State of Alabama Department of Corrections, 2014; Iowa Corrections Department, 2015). All of the states examined do not provide public access to menus; however, they do discuss the policies surrounding requirements of menu.

Dining hall options

Additions can be made to the National Menu at the facilities' Warden's discretion, including the addition of a salad bar, hot bar, beverage bar and/or condiments (Federal Bureau of

Prisons, 2011). The menu is updated annually based on the eating preferences of the people who are incarcerated, product pricing, nutritional content, and operations, and is analyzed by a Register Dietitian to determine adequate nutritional content (Federal Bureau of Prisons, 2011). Menus are provided to people who are incarcerated at least one week in advance with heart healthy and no-flesh alternatives identified (Federal Bureau of Prisons, 2011). Additionally, people who are incarcerated are provided with nutritional information to help them select healthier food options and control portion size (Federal Bureau of Prisons, 2011). The food service policy for California is the only state examined that requires a heart healthy diet (California Department of Corrections and Rehabilitation, 2019). None of the states specified whether nutritional information is provided to people who are incarcerated to help them select healthier foods or not.

Menu items include a mix of carbohydrates, proteins, and fats. With a 5 weeks rotation of meals with similarities and repeated meals, the following is an example of offerings for dinner: lasagna with meat or tofu stir fry (no-flesh offering), garden salad, Italian dressing, garlic bread or whole wheat bread, and a beverage (Federal Bureau of Prisons, 2018). All of these offerings, besides the garlic bread and tofu stir fry, are labeled as heart healthy options (Federal Bureau of Prisons, 2018).

Commissary options

The commissary is a resource that people who are incarcerated can use to purchase items that are not regularly provided by the facility; however, they must have the resources (i.e., money) in their bank-type account (Federal Bureau of Prisons, 2015a). People who are

incarcerated can obtain money in their account through deposits by family, friends and other sources and through working compensation (Federal Bureau of Prisons, 2015a). The number of times and hours a person may visit the commissary varies at each facility and Wardens are able to deny or limit the commissary privilege of certain people (Federal Bureau of Prisons, 2015a). Commissary items are not analyzed by a Registered Dietitian or compared to DRI.

Notable items that are prohibited from sale include fresh fruit and vegetables, canned food, perishable food, and high protein or carbohydrate products (protein or energy powder or bars) (Federal Bureau of Prisons, 2015a). Approved commissary items include Ramen noodles, crackers, chips, candy, dried beef sticks, frozen items (pizza and ice cream), and non-refrigerated meats (Federal Bureau of Prisons, 2015a). The BOP encourages availability of healthier options like dried fruit, fruit juices, pretzels, instant oatmeal, granola bars, and peanut butter crackers (Federal Bureau of Prisons, 2015a).

Special Diets

Diets are accommodated to meet the requirements of an individual's religion, allergies, and medical issues. These diets can only be prescribed by the clinical director, staff physician, staff psychiatrist, or staff dentist (Federal Bureau of Prisons, 2014). All people who are incarcerated will select food items from the National Menu unless the menu cannot meet the requirements of the diet, then accommodations will be made (Federal Bureau of Prisons, 2011).

Hypertension. People who are incarcerated with hypertension receive handouts and information about hypertension prevention (Federal Bureau of Prisons, 2015b). They are encouraged to

choose the heart healthy options, restrict sodium, calories (for overweight individuals), cholesterol, saturated fat intake, and caffeine, and meet daily requirement of potassium and calcium (Federal Bureau of Prisons, 2015b).

Diabetes. Lifestyle modifications, including dietary choices and weight loss, are included in diabetes management for people who are incarcerated. The BOP's statement in *Management of Diabetes* outlines that the most cost-effective and easiest way to promote positive nutritional outcomes for people who are incarcerated with diabetes is heart-healthy diet offerings and consistent carbohydrates at each meal with easy identification of carbohydrate amounts (Federal Bureau of Prisons, 2017). One cup of skim milk and 1 serving of non-sugar-coated cereal and 1 tablespoon of peanut butter with 6 saltine crackers or 1 slice of bread are examples of approved diabetic snacks that are available if needed (Federal Bureau of Prisons, 2017). People with diabetes should be counseled in individual or group settings on choosing foods with low sodium, calories, and fat and how their food choices impact their glucose levels (Federal Bureau of Prisons, 2017).

Importance to Healthcare

As the incarcerated population continues to age and develop multiple chronic diseases, healthcare professionals, including nurses and physicians, should continue to examine the relationship between health and nutrition. The prevalence of ever having a chronic condition among state and federal prisoners is 43.9%, which is higher compared to the general population of 31.0% (Maruschak et al., 2016). Determining the nutritional adequacy of diets of people who are incarcerated is the basis for future studies relating the factors leading to chronic disease

development in the incarcerated population. The variability between facilities causes problems in determining the adequacy of nutrition. In relation to healthcare, the adherence and accommodations to medical diets is a major determinate in patient health. As patient advocates, nurses can advocate for proper nutrition and medical diet resources.

Chapter 3

Methods

This section outlines the process for identifying the articles used in this review to analyze the current state of the science of the nutrition and diets in correctional facilities in the United States. In order to examine the literature surrounding the nutrition of prisoners, a literature search was executed utilizing multiple databases. PubMed and CINAHL were used to perform the search based on their relevance to health which encompasses nutrition and vulnerable populations.

In both databases, the search terms “(nutrition OR diet) AND (prison OR prisoner OR incarcerated OR inmate) NOT prisoner-of-war” were used. Inclusion criteria included a) written in the English language, b) performed on human subjects, and c) conducted in the United States. The geographical component was added in order to determine the status in the United States, since regulations differ in other countries.

In PubMed, the original combination of search terms generated 315 results. The title and abstract of the articles were screened for their relevance to the topic. Of the 315 articles, 58 were relevant to the topic. Since PubMed does not have a geography filter, 17 of the remaining 58 articles were excluded based on the location of their research as outside of the United States. After performing a full text evaluation of the 41 articles, 9 articles were relevant to the topic and followed inclusion criteria.

In CINAHL, the original combination of search terms generated 96 results. The title and abstract of the articles were screened for relevancy to the topic. Twenty of the articles were relevant. After a full text evaluation, 11 articles were not relevant. The remaining 9 articles were

selected based on their relevancy to the topic and adherence to inclusion criteria. Seven of the articles were duplicates from the previous PubMed search.

After examining the literature surrounding this area of study, a review with a similar, however, not identical, research area was discovered. By analyzing the article, 4 additional articles were extracted from the reference list (Smoyer, 2019). A total of 7 articles analyzed in this review were also examined in the Smoyer (2019) article.

In total, the literature searches in PubMed and CINAHL yielded 15 relevant articles for this review, 9 from PubMed (Collins & Thompson, 2012; Cook et al., 2015; Curd et al., 2013; Firth et al., 2015; Jacobs & Mullany, 2014; Loeb & Steffensmeier, 2011; Nwosu et al., 2014; Rosenboom et al., 2018; Smoyer & Blackenship, 2013), 2 from CINAHL (Ferszt & Clarke, 2012; Harner & Riley, 2013), and 4 articles from a reference list (Novisky, 2018; Smoyer, 2014; Smoyer, 2016; Smoyer & Lopes, 2017). The articles were reviewed and rated, and information was extracted according to the Matrix Method.

The Johns Hopkins Nursing Evidence-Based Practice Evidence Level (Appendix A) was used to critically appraise each study (Dang & Dearholt, 2017). The level of evidence and quality was rated for each article. The level of evidence was rated from level I to level V. Level I is the highest level of evidence and level V is the lowest level of evidence. Additionally, each article was graded by quality guides from A to C. Grade A is “high quality” and C is “low quality or major flaws.” The articles were evaluated by two reviewers and mutually agreed upon by both parties after deliberation.

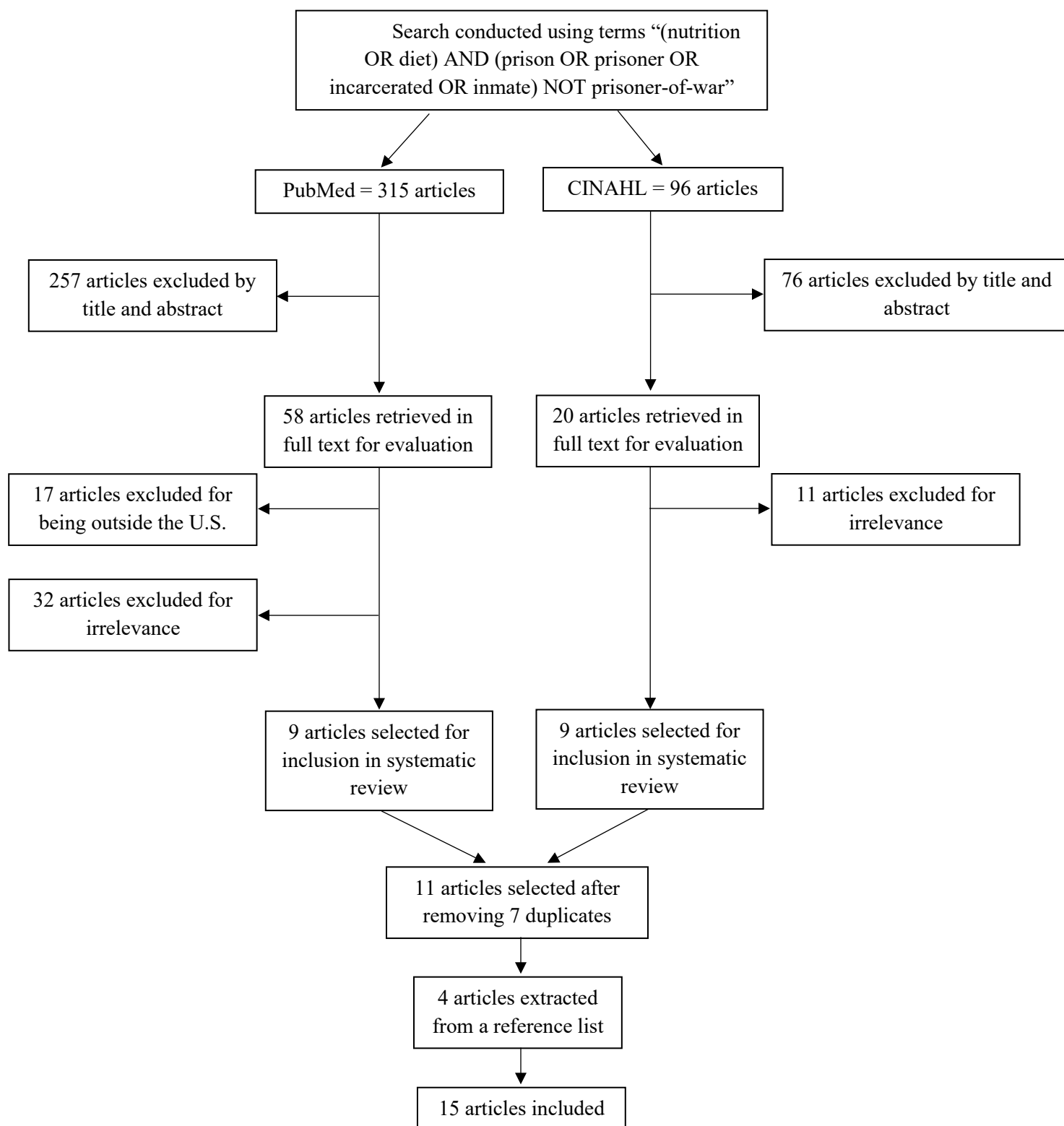
Figure 1. Article Selection Tree

Table 2: Summary of Studies Reviewed

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Novisky, M. A. (2018). Avoiding the runaround: The link between cultural health capital and health management among older prisoners. <i>Criminology</i> .	To provide an understanding of how older people who are incarcerated understand and respond to chronic and acute health needs during incarceration.	Type of Study: Grounded theory Data Collection: Interviews Sample: 193 incarcerated English-speaking men over the age of 50 Setting: One minimum, one medium, and one maximum security prisons in an Eastern region state.	- Open-ended responses to questions about incarcerated health-care experiences. - A qualitative data analysis software (NVivo, v.10) was utilized to code and organize the data using thematic analysis.	- Men who are incarcerated attempted to manage their health and chronic diseases, but felt limited by adequate food availability and diet options. - Men who are incarcerated complained of high carb and starch food offerings. - Men who are incarcerated depended on commissary and unconventional food items for health management. - Men who are incarcerated complained of lack of dietary accommodations for health conditions like diabetes. Implications: - Men who are incarcerated feel they are unable to manage their health through correctional setting food offerings. - There may not be dietary accommodations for chronic diseases.	Strengths: - Multiple different security levels of prisons were included. Limitations: - 193 of 279 interviews were used. 86 were excluded due to lack of qualitative accounts to survey questions. - Convenience sampling utilized. - Exclusion of Hispanic population and people younger than 50. Level & Grade: IIIA

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Rosenboom, L.M., Shlafer, R.J., Stang, J.L., & Harnack, L.J. (2018). Evaluation of the nutritional quality of commissary foods offered in American women's prisons. <i>Journal of Correctional Health Care.</i>	To determine the nutritional adequacy of food served in the commissary of women's prisons.	Type of Study: Descriptive Sample: women's prisons' commissary lists and 175 recipes from a commissary recipe book, "Foodie Pantry." Setting: 4 federal prisons (Aliceville, AL; Dublin, CA; Tallahassee, FL; and Waseca, MN) and 4 state prisons (Cambridge Correctional Institution, PA; Denver Women's Correctional Facility, CO; Mountain View Women's Unit, TX; and Shakopee Women's Correctional Facility, MN).	- Nutrient amounts: energy (kcal), carbohydrates, protein, fat, cholesterol, sodium, fiber, sugar, potassium, vitamin D, iron, calcium. - Food group amounts: grains, protein foods, dairy, vegetables, and fruit.	- Sodium, saturated fat, added sugar, and energy (kcal) exceeded dietary recommendations in recipes. - Vitamin D failed to meet dietary recommendations in recipes. - Refined grains exceeded and fruits, vegetables, and whole grains failed to meet MyPlate recommendations for commissary options and recipes. Implications: - The nutritional quality of commissary food offerings and foods prepared by women who are incarcerated does not meet all recommended nutritional requirements.	Strengths: - Sample from multiple institutions. Limitations: - Utilized commissary lists available online. - Assumptions made about food in recipe list. Level & Grade: IIIA

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Smoyer, A.B. & Lopes, G. (2017). Hungry on the inside: Prison food as concrete and symbolic punishment in a women's prison. <i>Punishment & Society</i>.	To understand the ways in which food contributes to women's experience of prison as punishment.	Type of Study: Phenomenological Data Collection: Interviews Sample: 30 women who were formerly incarcerated who participate in a post-incarceration community-based program. Setting: Women's correctional facility in New England.	- 14 semi-structured questions about food and eating experiences in different parts of the prison, favorite and least favorite foods, and cooking practices. - A qualitative data analysis software (NVivo) was utilized to code and organize the data using thematic analysis.	- Women who were incarcerated complained of limited autonomy of food choices in the dining hall. - Women who were incarcerated felt that there was no logic behind the nutrition and menu planning, mainly due to lack of concern for people who are incarcerated by staff. - Women who were incarcerated complained of no special diets or meals to accommodate people moved to medical unit. - Women who were incarcerated felt that the institution's attempts to control weight gain by limiting cafeteria portions caused the women to consume more commissary food. Implications: - Institutions may not be following national guidelines for nutrition planning. - The commissary plays a major role in food consumption. - People who are incarcerated may have limited autonomy in food choices.	Strengths: - Open ended questioning avoided bias/assumptions. Limitations: - Convenience sampling utilized. - Interviewees were post-incarceration. - Small sample size. - Limitations not discussed. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Smoyer, A. B. (2016). Making fatty girl cakes: Food and resistance in women's prison. <i>The Prison Journal</i>.	To build knowledge about resistance and prison foodways by analyzing women's narratives about food in a U.S. prison.	Type of Study: Phenomenological Data Collection: Interviews Sample: 30 formerly women who are incarcerated who participate in a post-incarceration community-based program. Setting: Women's correctional facility in New England.	- 14 semi-structured questions about food and eating experiences in different parts of the prison, favorite and least favorite foods, and cooking practices. - A qualitative data analysis software (NVivo) was utilized to code and organize the data using thematic analysis.	- Women who are incarcerated complained the food offerings in the cafeteria were small and did not satisfy hunger. - Women who are incarcerated use commissary items to add to cafeteria food offerings and to make "elaborate" meals in their cells. Implications: - Cafeteria food offerings may not meet the hunger needs of the people who are incarcerated. - Commissary items are relied on heavily by people who are incarcerated.	Strengths: - Open ended questioning avoided bias/assumptions. Limitations: - Convenience sampling utilized. - Interviewees were post-incarceration. - Small sample size. - Limitations not discussed. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Cook, E. A., Lee, Y.M., White, D.B., & Gropper, S. S. (2015). The diet of inmates: An analysis of a 28-day cycle menu used in a large county jail in the state of Georgia. <i>Journal of Correctional Health Care.</i>	To examine the nutritional adequacy of meals provided to the people who are incarcerated in a large county jail in the state of Georgia.	Type of Study: Descriptive Sample: a 4-week cycle menu and top 5 commissary items (Ramen Chili noodle, Ho Cheese snack food, Ramen Picante Chicken noodles, Ramen Creamy Chicken noodles, and Honey Buns). Setting: County jail in Georgia housing 380 people.	- Nutrient amounts: energy (kcal), protein, fat, carbohydrate, fiber, cholesterol, vitamins (thiamin, riboflavin, niacin, folate, B6, B12, A, D, E, C) and minerals (calcium, iron, zinc, phosphorus, magnesium, sodium, and potassium). -Food group intake: grains, protein foods, dairy, vegetables, and fruit.	- Energy (females only), sodium, saturated fat, cholesterol exceeded Dietary Reference Intakes recommendations. - Magnesium, potassium, and vitamins A, D, and E failed to meet Dietary Reference Intake recommendations. - Grains exceeded and vegetables, fruits, and dairy failed to meet MyPlate recommendations. Implications: - Nutritional offerings did not meet recommendations for multiple nutrient and food group amounts.	Strengths: - Food items studied are reflective of other correctional facilities. Limitations: - Only applicable if people eat entirety of meals provided. - Used top 5 commissary items rather than all options. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Firth, C.L., Sazie, E., Hedberg, K., Drach, L., & Maher, J. (2015). Female inmates with diabetes: Results from changes in a prison food environment. <i>Women's Health Issues</i>.	To assess the effects that changes in the food had on women who are incarcerated living with diabetes in an Oregon correctional facility.	Type of Study: Quasi-experimental Intervention: Reduced the menu from 3,000 to 2,200 calories per day and provided nutrition education. Sample: 24 diabetic (unspecified type) women and 39 diabetic women controls at minimum security facility; entire facility received intervention. Control: a medium security facility. Setting: Minimum and Medium security facilities at Coffee Creek Correctional Facility in Oregon.	- Glycemic control (hemoglobin A1C levels), BMI, and cholesterol. -Caloric quantity of commissary purchases from June 2012-June 2013.	- Glycemic control improved 0.04% per month in the intervention group compared to 0.01% per month in control group. - BMI and cholesterol did not change in the intervention or control groups. - The average number of calories purchased per day from the commissary was 1,094 calories, in addition to the 2,200 calorie menu. - Top commissary purchases included Top Ramen, soda, and Crystal Lite. Implications: - Intervention supported modest improvement in glycemic control among women who are incarcerated with diabetes. - Women who are incarcerated exposed to intervention did not purchase more calories from the commissary despite receiving less calories. - People who are incarcerated may purchase a large number of calories from the commissary in addition to their dining hall meals.	Strengths: - Identifies top commissary purchases. Limitations: - Small sample size. - Non-random assignment. - Commissary food was assumed to be eaten only by the purchaser and eaten in its entirety. - Does not express what education was provided or how often it was given. Level & Grade: IIC

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Jacobs, E. T. & Mullany, M. B. (2014). Vitamin D deficiency and inadequacy in a correctional population. <i>Nutrition</i>.	To evaluate and compare the vitamin D status of people who are incarcerated and compare people who were incarcerated for <6 weeks or >1 year at the Fourth Avenue Jail in Maricopa County (Phoenix), Arizona.	Type of Study: Cross-sectional Sample: 29 short-term (<6 weeks) and 30 long-term (>1 year) men who are incarcerated between the ages of 20 and 41. Setting: County jail in Arizona	- Vitamin D status: 25-hydroxycholecalciferol [25(OH)D] concentration at single point of time in the winter season.	- 90% of long-term people who are incarcerated had an inadequate or deficient vitamin D status according to Endocrine Society criteria. - Long-term people who are incarcerated had lower levels of 25(OH)D (13.9+/-6.3 ng/mL) compared to short-term people who are incarcerated (25.9+/-12.4 ng/mL) (P<0.0001). Implications: - Consideration should be given to providing dietary or supplemental vitamin D to people who are incarcerated at correctional facilities.	Strengths: - Objective data. Limitations: - Small sample size. - Single measure of vitamin D status. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Nwosu, B. U., Maranda, L., Berry, R., Colocino, B., Flores, C.D., Folkman, K., ... Ruze, P. (2014). The vitamin D status of prison inmates. <i>PLOS ONE</i>.	To determine the baseline vitamin D profiles of people who are incarcerated, and to investigate the vitamin D status of people who are incarcerated.	Type of Study: Cross-sectional Sample: 526 people who are incarcerated (502 males, age 48.6±12.5 years; 24 females, age 44.1±12.2 years) Setting: Massachusetts prisons	- Vitamin D status: 25-hydroxycholecalciferol [25(OH)D] concentration of people who are incarcerated during various points between June 1st 2010 to June 30th 2012.	- 67% of people who are incarcerated had vitamin D levels that failed to meet levels established by the Endocrine Society. - People who are incarcerated at maximum security prisons had lower 25(OH)D levels (54.1 +/- 28.0 nmol/L) compared to medium (63.7 +/- 27.4 nmol/L) or minimum security (61.7 +/- 27.4 nmol/L) (p=0.029). Implications: - The vitamin D status of people who are incarcerated is determined by skin pigmentation, seasons, and the security level of incarceration. - Majority of people who are incarcerated had inadequate Vitamin D levels despite state nutrition regulations.	Strengths: - The studied subjects lived in a uniform prison system with clear guidelines regarding nutrition. - Large sample size. Limitations: - Single measure of vitamin D status. - Available 25(OH)D levels as inclusion criteria. - Data utilized in multiple seasons. Level & Grade: IIIA

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Smoyer, A.B. (2014). Good and healthy: Foodways and construction of identity in a women's prison. <i>The Howard Journal of Criminal Justice</i> .	To explore the ways in which women use prison foodways to try to construct positive identities and considers the impact of correctional policy on these efforts.	Type of Study: Phenomenological Data Collection: Interviews Sample: 30 women who were formerly incarcerated who participate in a post-incarceration community-based program. Setting: Women's correctional facility in New England.	- 14 semi-structured questions about food and eating experiences in different parts of the prison, favorite and least favorite foods, and cooking practices. - A qualitative data analysis software (NVivo) was utilized to code and organize the data using thematic analysis.	- Women who are incarcerated attempted to eat healthy through personal ideas of healthy options, like eating exclusively from the commissary or the dining hall, eating healthier desserts or drinking a lot of water. - Women who are incarcerated complained of the lack of healthy options in the commissary. - 17 of the 30 participants reported gaining weight ranging from 5-100 pounds during incarceration. Implications: - Lack of available nutritional information caused women who are incarcerated to choose unhealthier options despite their intent to choose the healthier option. - Women who are incarcerated attempt to maintain good diet, but feel they are limited by the food offerings.	Strengths: - Open ended questioning avoided bias/assumptions. Limitations: - Convenience sampling utilized. - Interviewees were post-incarceration. - Small sample size. - Limitations not discussed. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Curd, P., Ohlmann, K., & Bush, H. (2013). Effectiveness of a voluntary nutrition education workshop in a state prison. <i>Journal of Correctional Health Care</i>.	To determine the effect of nutrition education intervention on the health people who are incarcerated.	Type of study: Quasi-experimental Intervention: Weekly nutrition education workshops presented by a nurse educator in a classroom setting. The workshops addressed topic of food groups, nutritional values, and management of chronic diseases. 2 groups lasted 4 weeks and 1 group lasted 5 weeks. Sample: 19 male participants volunteered for workshop and 37 male controls, who did not participate in the workshops. Setting: a 200-bed minimum security residential behavioral substance abuse program (SAP) operated by a state prison system.	- General nutrition, self-perceived health rating, strength of social ties. - Self reported data included the answers excellent, Very Good, Good, Fair, and Poor to “In general, your health is...” and “how strong are your family and social ties?” - Responders chose from varying answers including vegetable, fruit, carb, dairy, meat and fried food consumption to determine nutritional practices.	- Greater proportion of intervention participants reported improved nutrition practices (23.5%) compared to control group (3.2%) ($p = 0.047$). - Greater proportion of intervention participants reported improved general health (52.6%) compared to control group (13.9%) ($p = 0.002$). - Lower proportion of intervention participants reported improved social ties (10.5%) compared to control group (30.6%) ($p = 0.18$). Implications: - People who are incarcerated and correctional systems may benefit from nutrition workshops. - Nutrition education could improve nutrition practices and general health.	Strengths: - Multiple aspects of health measured. Limitations: - Small sample size. - Unevaluated instruments used. - Self-reported data. - Volunteer subjects. Level & Grade: IIA

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Harner, H.M. & Riley, S. (2013). Factors contributing to poor physical health in incarcerated women. <i>Journal of Health Care for the Poor and Underserved.</i>	To understand better the factors that affected women's physical health during incarceration.	Type of Study: Focus Group Methodology Data Collection: Focus group Sample: 65 incarcerated women (average age 43) in focus groups of 4-6 women. Focus groups lasted 1.5-2 hours and were conducted by a women's health nurse practitioner. Setting: A maximum security prisons in the U.S.	- Descriptive accounts of food and nutrition. - Open-ended responses to questions about physical and mental health. - Researchers identified common themes related to physical health including limited and complicated access to care; nutritional concerns; limited physical activity; and smoking in prison.	- Women who are incarcerated complained of the use of processed meats and the limited access to fresh vegetables, dairy products, and iron-enriched foods and lack of healthy options in commissary. - Women who are incarcerated complained of poor food preparation and quality, which caused them to eat more from the commissary. Implications: - People who are incarcerated have an overall negative view of food offerings and its effects on their physical health.	Strengths: - Opened questioning avoided bias/assumptions. Limitations: - Non-random sampling, self-selected volunteers. - Single correctional facility observed. - Unable to audio record; hand written or computerized notes. Level & Grade: IIIA

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Smoyer, A.B. & Blackenship, K.M. (2013). Dealing food: Female drug users' narrative about food in a prison place and implications for their health. <i>International Journal of Drug Policy.</i>	To analyze women's narratives about food in prison and describe how food and eating behavior construct the prison experience.	Type of Study: Phenomenological Data Collection: Interviews Sample: 30 women who were formerly incarcerated who participate in a post-incarceration community-based program Setting: Women's correctional facility in New England.	- 14 semi-structured questions about food and eating experiences in different parts of the prison, favorite and least favorite foods, and cooking practices. - A qualitative data analysis software (NVivo) was utilized to code and organize the data using thematic analysis.	- Women who were incarcerated complained of hunger and lack of satiety provided by food offerings. - Women who were incarcerated participated in excessive snacking on commissary foods, including candy, cakes, chips, crackers, pre-cooked rice and pastas, condiments (e.g. peanut butter, jelly, mayonnaise), and processed meats, cheese and fish. -17 of the 30 participants reported gaining weight ranging from 5-100 pounds during incarceration. Implications: - People who are incarcerated excessively consume commissary foods. - Food offerings did not meet the hunger or satiety needs of the women who were incarcerated.	Strengths: - Open ended questioning avoided bias/assumptions. Limitations: - Convenience sampling utilized. - Interviewees were post-incarceration. - Small sample size. - Limitations not discussed. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Collins, S.A. & Thompson, S.H. (2012). What are we feeding our inmates? <i>Journal of Correctional Health Care.</i>	To examine the nutritional adequacy of food served to the people who are incarcerated in South Carolina correctional facilities.	Type of Study: Descriptive Sample: 6-week menus of 28 state correctional facilities obtained from South Carolina Department of Corrections website and a 1-week menu from a county correctional facility obtained from J. Reuben Long Detention Center in Horry County, SC. Setting: Correctional facilities in South Carolina.	- The Diet Analysis Plus Version 8.0.1 computer software program analyzed the nutritional value of the menus. - Nutrient amounts: energy (kcal), protein, fat, carbohydrate, fiber, sugar, cholesterol, water, vitamins (thiamin, riboflavin, niacin, folate, B6, B12, A, D, E, C) and minerals (calcium, iron, zinc, magnesium, sodium, and potassium). - Food group intake: grains, protein foods, dairy, vegetables, and fruit.	- Fiber, calcium, magnesium, potassium, Vitamin E and D failed to meet Dietary Reference Intake recommendations. - Cholesterol, sugar, and sodium exceeded Dietary Reference Intake recommendations. - Grains exceeded and vegetables, fruits, and dairy failed to meet Food Guide Pyramid recommendations. Implications: - The meals available to people who are incarcerated failed to meet U.S. dietary recommendations.	Strengths: - Multiple facilities examined. Limitations: - Limitations not discussed. - Only applicable if the entirety of meals was eaten. - Commissary food not considered. Level & Grade: IIIB

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Ferszt, G.G. & Clarke, J.G. (2012). Health care of pregnant women in U.S. state prisons. <i>Journal of Health Care for the Poor and Underserved.</i>	To examine the healthcare practices of pregnant women in correctional facilities.	Type of Study: Exploratory-Descriptive Sample: 19 state women's correctional facilities. Setting: State women's correctional facilities in the U.S.	- Practices of prenatal care including nutritional needs, counseling, education, and work, rest, and clothing accommodations. - Wardens from correctional facilities responded to 62 multiple choice questions and 4 open ended questions related to pregnancy practices in the facility.	- Nutrition, safety, psychosocial support and education do not meet pregnancy recommendations. Implications: - Majority of facilities did not meet nutritional requirements. - Provided nutrition did not meet dietary recommendations for pregnancy.	Strengths: - Facilities across U.S. Limitations: - Limitations not discussed. - Did not establish guidelines for adequate nutrition. - Low response rate. - Possible bias (warden responses). Level & Grade: IIC

Author, Year, Title, Journal	Purpose	Design	Measures	Key Findings	Strengths & Limitations, Level & Grade
Loeb, S.J. & Steffensmeier, D. (2011). Older inmates' pursuit of good health: A focus group study. <i>Research in Gerontological Nursing</i>	To discuss challenges faced by older people who are incarcerated in their pursuit of good health.	Type of study: Focus Group Methodology Data Collection: Focus group Sample: 42 men who are incarcerated in state prison age 50 and older (average age 58 years) living with comorbidity (at least 2 or more chronic illnesses). Setting: one medium security state correctional institution in a Mid-Atlantic US state.	- Descriptive accounts of challenges including food concerns, prison personnel and policies, cost issues, and fellow people who are incarcerated. - 6 focus groups of 6-8 people who are incarcerated and 1 group of 1 person who is incarcerated discussed questions related to health changes, importance, improvement, management, and programs/instructions.	- People who are incarcerated are challenged to maintain health by cost issues, prison personnel and policies, food concerns, fellow people who are incarcerated, and personal barriers. - People who are incarcerated access resources and support, stay positive, manage diet and weight, engage in physical activity, and protect self. Implications: - People who are incarcerated attempt to maintain good diet, but are unable to due to limited options and high sodium options.	Strengths: - Multiple aspects of health. - Subjective data/opinions of people who are incarcerated Limitations: - Data obtained through field notes, no audio. - Small sample size. Level & Grade: IIIA

Chapter 4

Results

The previous chapters have focused on the background and overview of nutrition and food offerings of correctional facilities and the methods utilized for the execution of this systematic review. The purpose of this chapter is to explore and analyze the current literature surrounding the nutritional adequacy of food offerings in correctional facilities through both qualitative and quantitative research. This will provide a depiction of what the current state of the science is surrounding this topic.

Study Design

Fifteen articles, published between 2011 and 2018, were included in this review (Collins & Thompson, 2012; Cook et al., 2015; Curd et al., 2013; Firth et al., 2015; Ferszt & Clarke, 2012; Harner & Riley, 2013; Jacobs & Mullany, 2014; Loeb & Steffensmeier, 2011; Novisky, 2018; Nwosu et al., 2014; Rosenboom et al., 2018; Smoyer, 2014; Smoyer, 2016; Smoyer & Blackenship, 2013; Smoyer & Lopes, 2017). One article had a grounded theory design (Novisky, 2018), four articles had a descriptive study design (Collins & Thompson, 2012; Cook et al., 2015; Ferszt & Clarke, 2012; Rosenboom et al., 2018), four articles had a phenomenological design (Smoyer, 2014; Smoyer, 2016; Smoyer & Blackenship, 2013; Smoyer & Lopes, 2017), two articles had a focus group methodology design (Harner & Riley, 2013; Loeb & Steffensmeier, 2011), two articles had a cross-sectional design (Jacobs & Mullany, 2014; Nwosu

et al., 2014), and two articles had a quasi-experimental design (Curd et al., 2013; Firth et al., 2015).

Of the studies that examined individuals, sample sizes ranged from 19 to 526 people. Four studies included only male subjects (Curd et al., 2013; Jacobs & Mullany, 2014; Loeb & Steffensmeier, 2011; Novisky, 2018), six studies included only female subjects (Firth et al., 2015; Harner & Riley, 2013; Smoyer, 2014; Smoyer, 2016; Smoyer & Blackenship, 2013; Smoyer & Lopes, 2017), and one study included both males and females (Nwosu et al., 2014). Two studies included only men over the age of 50 (Loeb & Steffensmeier, 2011; Novisky, 2018). Multiple studies did not examine individuals, but examined the food offerings available to incarcerated individuals. One examined the menus of facilities (Collins & Thompson, 2012), one examined the commissary listings of facilities (Rosenboom et al., 2018), and another examined both the menus and commissary items of facilities (Cook et al., 2015). One study surveyed the wardens of 19 correctional facilities about their prenatal practices for pregnant women (Ferszt & Clarke, 2012). All studies were conducted in the United States.

Food Groups

Consuming a variety of food groups is critical in the health and development of humans. Many of the studies suggest that the food group needs of individuals are not met by correctional facilities. By examining commissary lists and popular recipes using commissary items made by incarcerated persons, Rosenboom et al. (2018) found that the food was excessive in refined grains and insufficient in fruits, vegetables, and whole grains. Additionally, 38% of commissary offerings did not fall into one of the food group categories: refined grains, whole grains, dairy,

protein, fruit, and vegetables. These offerings, including candy and sugar-sweetened beverages, were classified as “other” and do not have recommendations for intake (Rosenboom et al., 2018). Both Cook et al. (2015) as well as Collins and Thompson (2012) found similar results, with grains exceeding, but vegetables, fruits, and dairy failing to meet DRI recommendations.

In addition to food offering evaluations, incarcerated people also have negative views of food group variety and availability. Some of the incarcerated people’s observations support the findings discussed previously. Some incarcerated people viewed the food offerings as limited in vegetables and dairy, but high in processed meat (Harner & Riley, 2013). Others viewed the offerings as too high in carbs and reported they are overloaded with starches like pancakes, pasta, potatoes, and rice (Novisky, 2018).

Energy (kcal)

Energy (kcal) exceeded dietary recommendations in multiple studies. Two studies’ findings indicated that energy exceeded recommendations for females (Cook et al., 2015; Rosenboom et al., 2018). Another article reported findings on the effects of reducing the caloric quantity of the cafeteria menu offerings and the impact of providing nutrition education on caloric quantity of commissary purchases. The researchers found that individuals did not increase the caloric quantity of commissary purchases despite receiving fewer calories at meals. Specifically, the study found that the average number of calories purchased per day from the commissary was 1,094 calories, in addition to the 2,200 calorie menu. If the food was eaten in its entirety, the energy (kcal) amounts exceed a 2,000 calorie diet recommended for females by 1,294 calories (Firth et al., 2015). Additionally, Smoyer and Blackenship (2013) found that 17 of

their 30 participants self-reported weight gain during incarceration, which ranged from 5-100 pounds. While this is important information, weight gain during incarceration is likely due to multiple factors, including, but not limited to excess caloric intake, stress, and limited physical activity.

Vitamins and Minerals

Many of the studies evaluated the nutritional quality of correctional facility food offerings through vitamin and mineral values. Two studies found that cafeteria food offerings did not meet dietary recommendations for magnesium, potassium, and Vitamins D and E (Collins & Thompson, 2012; Cook et al., 2015). In addition, Collins and Thompson (2012) found calcium and Cook et al. (2015) found Vitamin A amounts to be insufficient. Another study found that commissary items and common recipes made using commissary items were low in Vitamin D (Rosenboom et al., 2018). Two other studies focused solely on the Vitamin D status of incarcerated people (Jacobs & Mullany, 2014; Nwosu et al., 2014). Both found that the majority of the incarcerated people studied had inadequate Vitamin D levels (Jacobs & Mullany, 2014; Nwosu et al., 2014), while Jacobs and Mullany additionally found that people who had been incarcerated for a longer period of time (i.e., greater than one year), had lower Vitamin D levels compared to people who were incarcerated for a shorter period of time (i.e., less than six weeks) (Jacobs & Mullany, 2014).

Some of these same studies found that food offerings did meet other vitamin and mineral requirements. The recommendations for zinc, iron, niacin, riboflavin, thiamin, and Vitamins A, B6, B12, and C were met in one study (Collins & Thompson, 2012) and thiamin, riboflavin,

folate, phosphorous, iron, and Vitamins, B6, B12, and C were met in another study (Cook et al., 2015). Despite meeting some of the vitamin and minerals recommendations, the food offerings analyzed provided the incarcerated people with a diet that failed to achieve all nutritional guidelines.

Sodium, Saturated Fat & Cholesterol

As high levels of sodium, saturated fat, and cholesterol are associated with many health problems including heart disease, hypertension, and cerebrovascular accidents, it is important to examine these levels in food offerings in correctional facilities. Two studies found that sodium and cholesterol levels in the food offerings of correctional facilities menus exceeded dietary recommendations (Cook et al., 2015; Collins & Thompson, 2012). Additionally, common commissary items were high in sodium and saturated fat levels (Rosenboom et al., 2018; Cook et al., 2015). The top selling commissary items at the sample jail in one study included Ramen Chili noodles, Hot Cheese Curls snack food, Ramen Picante Chicken noodles, Ramen Creamy Chicken noodles, and Honey Buns (Cook et al., 2015). All of the above-mentioned popular foods are high in either carbohydrates, sodium and/or saturated fat (Cook et al., 2015). In addition to dietary values, incarcerated people express concerns about sodium levels. In Loeb and Steffensmeier (2011), incarcerated people discussed that they believe that majority of the commissary items have sodium and revealed concern about its effects on their health, specifically on their blood pressure.

Commissary Options

In many studies, incarcerated people expressed heavy reliance on the commissary for food for multiple reasons. Some complained of poor food preparation and quality in the cafeteria, which caused them to consume more from the commissary to satisfy themselves (Rosenboom et al., 2018; Smoyer, 2016; Harner & Riley, 2013; Loeb & Steffensmeier, 2011). Others complained of receiving small portion sizes in the cafeteria, which caused them to satisfy their hunger using commissary items (Smoyer & Lopes, 2017; Loeb & Steffensmeier, 2011). Others used the commissary as a strategy to manage their health to cope with diminished food quality (Novisky, 2018; Smoyer, 2014). Multiple factors lead to excessive snacking and dependency on commissary items (Smoyer & Blackenship, 2013; Loeb & Steffensmeier, 2011). Despite heavy reliance on commissary items, incarcerated people expressed dissatisfaction with commissary items. Incarcerated people complained of the lack of healthy options available for purchase from the commissary (Smoyer, 2014; Harner & Riley, 2013). When speaking about the commissary, a participant in the Smoyer (2014) study claimed she could “not think of one thing that is not fattening or healthy on that list” (p. 534).

Special Diets

With many diseases and illnesses, a special diet may be required to properly treat, manage, or recover from a condition. In one study, incarcerated people complained that there were no diet accommodations provided by the correctional facility for people with diabetes or other health conditions (Novisky, 2018). An incarcerated person with diabetes revealed that he relied on commissary snacks he purchased to maintain his blood sugar levels and that the

correctional staff did not provide him with resources to manage his disease (Novisky, 2018).

Additionally, in another study, incarcerated people revealed that people that were moved to the medical unit due to an illness or disease were not provided with any type of special meal or diet accommodations (Smoyer & Lopes, 2017). One study examined the practices and care for pregnant women in 19 state women's correctional facilities. The majority of facilities did not fully meet the nutritional needs of pregnant women and had limited availability of fruits and vegetables. There was inconsistency across facilities with meeting dietary recommendations during pregnancy (Ferszt & Clarke, 2012).

Despite claims of the unavailability of specialty diets, a few studies revealed practices that support the use of specialty diets or the ability to manage chronic diseases through the food offerings made available to the people who are incarcerated. In one study, the correctional facility officials reported that special diets were available for those with certain medical conditions, religious beliefs, a pregnancy, or who were vegetarians (Collins & Thompson, 2012). In another study, an incarcerated person reported that he was able to make lifestyle changes in his diet to manage his diabetes (Loeb & Steffensmeier, 2011).

Nutrition Education

Besides challenges with unhealthy food offerings, incarcerated people struggle with making healthy choices due to lack of knowledge related to nutrition. In the Smoyer (2014) study, an incarcerated woman discussed her efforts to make healthy choices by choosing one snack over another. Despite her efforts, the woman chose the unhealthier option due to lack of information related to nutritional quality of food (Smoyer, 2014). An incarcerated man in the

Loeb and Steffensmeier (2011) reported obtaining his knowledge about nutrition and vitamin sources through a chart from a men's health magazine. In a study that provided nutrition education as an intervention, a greater proportion of the intervention participants self-reported improved nutrition practices (23.5%) and overall general health (52.6%) compared to the control group, 3.2% and 13.9% respectively (Curd et al., 2013). This study indicates the possible benefits nutrition education could have for incarcerated people.

Foods Impact on Incarcerated People

Food quality is a common concern among people who are incarcerated. Participants in the Novisky (2018) study reported that poor food quality was the third most stressful aspect of the prison environment, following only their missing freedom and missing friends and family (Novisky, 2018). Incarcerated people described the food as "horrible," "nasty", and "like dog food" (Loeb & Steffensmeier, 2011; Smoyer & Lopes, 2017). Additionally, incarcerated people expressed lack of autonomy in food choices (Smoyer & Lopes, 2017). Even though it is something that affects each person individually and differently, hunger is a common challenge that many incarcerated people reported facing (Smoyer & Lopes, 2017; Smoyer, 2016; Smoyer & Blackenship, 2013; Loeb & Steffensmeier, 2011). With the ability to purchase commissary items determined by accessibility to money, incarcerated people with more resources, either through employment or outside people who deposit money into their account, were able to satisfy their hunger and food needs easier than those without those resources (Novisky, 2018).

Even though most correctional facilities report they deliver a "heart healthy" diet, many incarcerated people found difficulty staying healthy (Loeb & Steffensmeier, 2011). Incarcerated

people express doubt in the actuality of the “heart healthy” diet (Novisky, 2018). One incarcerated person claimed that “the menu looks good on paper, but that is not what [they] actually get” (Harner & Riley, 2013, p. 794-795). Additionally, incarcerated people described there being no logic behind the menu because “they don’t care,” in reference to the correctional facility staff (Smoyer & Lopes, 2017, p. 247). Conversely, two incarcerated people in the Smoyer (2014) study used their time in a correctional facility to regain control of their bodies, by restricting their diets and eating healthier diets.

Summary

Through food analysis and incarcerated peoples’ self-reports, this chapter describes the results of the current literature on the nutritional adequacy of food offerings in correctional facilities. The literature presents multiple perspectives from people who are incarcerated and facility officials on the food quality of correctional facilities. Some articles reported the inability of food offerings to achieve dietary recommendations for certain food groups, energy (kcal), sodium, saturated fat, and cholesterol, as well as for some vitamins and minerals. In other articles, incarcerated people spoke about the lack of healthy options and poor food quality in both the commissary and cafeteria. Additionally, specialty diets to accommodate for diseases and illnesses, and nutritional knowledge and education were lacking. In contrast, other incarcerated people spoke about their ability to manage their health with the available food offerings.

Chapter 5

Discussion

This systematic review explores the current literature surrounding nutritional adequacy of food offerings in U.S. correctional facilities. The previous chapters have introduced the purpose of the systematic review, provided the background and significance of the topic, addressed the research methods, and discussed the results. This chapter will provide: a reintroduction to the purpose of the systematic review; a summary of findings; strengths and limitations; recommendations for practice; future directions for research; and conclusions.

Summary of Findings

Although the findings of the examined literature were at times contrasting, there are several important takeaways from this research. Overall, this body of research suggests that food offerings in U.S. correctional facilities do not meet all of the nutritional requirements for people who are incarcerated. Findings reported in the examined articles indicated that not all of the DRI of vitamins and minerals were being consistently met through the dietary offerings in correctional settings. Vitamin D, which is crucial for bone strength, was found to be lacking in all examined studies. Food options were described as high in sodium, saturated fats, cholesterol, and refined grains, with the popular commissary options being especially high in the four aforementioned dietary elements. In contrast, correctional diets were not achieving recommended amounts of fruits, vegetables, whole grains, and plant-based foods—all of which are important to decreasing chronic disease risk items (Lui, 2013). Energy (kcal) consumption of people living in correctional settings exceeded recommendations in multiple studies, and one

study found that self-report weight gain was a common occurrence during incarceration. Excess calories can lead to weight gain and, eventually obesity, which is associated with multiple chronic diseases. Reports on the prevalence of obesity in people who are incarcerated varies. According to The Bureau of Justice Statistics (2015), 74% of prisoners are overweight, obese, or morbidly obese. However, an earlier study found people who are incarcerated are less likely to be obese than the general population (Binswanger et al., 2009).

Despite findings of excess energy values, people who are incarcerated complain of struggles with hunger. The inability to fully decide eating times and complaints of lack of autonomy in food choices by people who are incarcerated may contribute to their feelings of hunger. Additionally, incarcerated people's descriptions of the quality of food offerings fell into the common themes of unsatisfactory, unhealthy, and stressful. While most correctional facilities reported providing a "heart healthy" diet, the actuality of this is questionable considering people who are incarcerated expressed doubt in the "heart healthy" nature of their diet. In addition, the nutritional values previously discussed in this review contradict the assertion that heart healthy diets are the norm in correctional settings. Study findings are contradictory regarding the availability of specialty diets in correctional settings. Provision of specialty diets (e.g., diabetic, renal, heart healthy, gluten free) can directly impact the ability of people who are incarcerated to manage their chronic health conditions. On a positive note, nutrition education was found to be beneficial to people who are incarcerated, and contributed to improved overall well-being and healthier food choices.

Strengths and Limitations

This systematic review is one of the first of its kind to analyze the nutritional adequacy of food offerings in U.S. correctional settings. As with any research endeavor, it has both strengths and limitations. The strengths of this systematic review are the use of both nutritional value analysis and qualitative data from people who are incarcerated. Examining both outlooks provides a more comprehensive analysis of this research topic. Additionally, this review examined both the nutritional adequacy of the cafeteria and the commissary foods, rather than focusing solely on one aspect of food source for people who are incarcerated.

While there are strengths to this study, there are also limitations. Four of the research articles analyzed were written by the same researcher and emerged from the same study, which could lead to potential bias. Additionally, only one article examined the nutritional value of facilities' entire commissary lists and only two research articles specifically examined nutritional values of meals provided to people who are incarcerated, both were in southeastern states. Also, many of the studies based their findings on people who are incarcerated consuming the entirety of their meals. Many articles examined the viewpoints of people who are incarcerated, which is very beneficial; however, it could lead to potential bias, because being detained against their will may cause people who are incarcerated to be more likely to express dissatisfaction with correctional settings. Another source of nutrition that is accessed by people who are incarcerated is vending machines, which are typically made available in visiting rooms for people who are incarcerated to eat with family and friends who come to visit. The lack of research and information on this food source prohibited its examination in this review.

Recommendation

Although there are many guidelines established by the Federal Bureau of Prisons for food offerings and practices in prisons (see Chapter 2), the findings of the examined literature indicate these guidelines are not being consistently followed by individual correctional settings.

Establishing more structured policies related to nutrition in correctional settings could improve nutritional practices and health outcomes. Requiring correctional facilities to become accredited or increasing incentives for becoming accredited could ensure that facilities are providing adequate nutrition and providing a “heart healthy” diet. Additionally, formulating more specifications and requirements for what is considered “heart healthy” could establish a universal, definite policy for nutrition in correctional settings.

As patient advocates, healthcare professionals can work with interdisciplinary colleagues from nutrition and dietetics to identify nutrient rich healthy alternatives that are the most economically feasible. Providing meals and food options that meet all DRI recommendations could improve the health and well-being of people who are incarcerated. As healthier foods are usually more expensive, cost is a major concern when considering providing healthier food options. However, the potential for reducing future healthcare costs due to improved nutrition could counteract the immediate increased spending on healthier food options. In 2018, the state of California spent an average of \$26,665 on healthcare per inmate compared to \$2,119 on food per inmate (The California Legislature’s Nonpartisan Fiscal and Policy Advisors, 2019). Increasing spending on foods to provide healthier options could potentially decrease healthcare spending.

As the commissary is a food source that allows people who are incarcerated with more independence in food choices, it is important to provide healthy options for people who are

incarcerated to choose from. There are many considerations when it comes to food supply decisions including cost, shelf stability, and safety. Although unhealthy options, like packaged desserts, chips, and snacks are cheaper and have a long shelf life, the high sodium, saturated fat, and cholesterol levels of these foods can have negative effects on health, if consumed frequently. Making healthier options more affordable and increasing the amount of healthy options on the commissary list could encourage people who are incarcerated to choose healthier options. Although it is reasonable to believe that the commissary options at facilities reflect the preferences and likings of the people who are incarcerated, it is necessary for facilities to include a wide range of healthy options to promote healthy decision making.

Through this research, the availability of specialty diets is unclear and it is plausible that they vary from facility to facility. Dietary modifications are crucial in the management of many diseases. For example, people with diabetes require access to food throughout the entire day to manage their blood sugar and people with hypertension should consume a diet low in sodium to manage their blood pressure. While it is a concern that specialty diets may cause a threat to the safety of individuals, as the specialty diets may be viewed as more valuable and could be used as currency or exploited by others, specialty diets are necessary for the maintenance, management, and treatment of certain diseases. Healthcare professionals can advocate for specialty diets that allow people who are incarcerated to adequately maintain, manage, and treat their chronic diseases.

Nutrition education in the incarcerated population has been shown to improve nutrition practices (Curd et al., 2013). In the general population, nutrition education has been shown to improve food choices and habits and prevent chronic disease, especially in at-risk populations (Ammerman et al., 2002). Incarcerated people are at higher risk than the general population to

develop many chronic diseases, including hypertension and cancer (Binswagner et al., 2009).

Healthcare providers can provide nutrition education to people who are incarcerated to help them prevent chronic disease development. Nutrition education interventions could help people who are incarcerated make healthier food decisions, understand the relationship between food and health better, and prevent chronic disease development. Additionally, nutrition education is a low-cost intervention that can prevent chronic disease development, which could lead to decreased health care spending and better quality of life for people who are incarcerated.

As research surrounding the relationship between nutrition and chronic disease development in the incarcerated population continues to develop, healthcare providers can use this information about the diets of people who are incarcerated to better promote health and treat and manage diseases commonly found in this population. People who are incarcerated are more likely to report having a chronic disease than the general population (Bureau of Justice Statistics, 2015). Hypertension is the most common chronic disease found among the incarcerated population (Bureau of Justice Statistics, 2015). Nutrition is one of the biggest factors modifiable risk factors associated with this condition. Knowing people who are incarcerated may be likely to consume a diet high in sodium, saturated fat, and cholesterol can help healthcare providers better promote health and treat and manage hypertension, which can help prevent the development of cardiovascular disease. As nutrition is a modifiable risk factor in many chronic diseases, understanding the diet of people who are incarcerated is crucial for the care provided by healthcare professionals.

Future Research

This study is one of the first of its kind to synthesize the nutritional adequacy of food offerings in correctional settings, and additional research should continue to be conducted to better understand this topic. In this study, research relied heavily on qualitative findings related to nutrition in correctional settings. Additional research surrounding quantitative results could be beneficial in further understanding in this area.

Additionally, a component of obtaining food in correctional settings was not explored: vending machines. There is a lack of research surrounding vending machines and how they impact the nutrition and health of people who are incarcerated. As another food source like the commissary that has more autonomy, exploring the food options and purchasing patterns could provide additional research information and help provide a more comprehensive review of nutrition in correctional settings.

Future research should explore the relationship between the diets of people who are incarcerated and chronic disease. It is well known that nutrition has a direct relationship with the development of many chronic diseases and that there is a high prevalence of chronic diseases in the incarcerated population compared to the general population. Many research studies have studied the multiple factors that influence chronic disease development in people who are incarcerated; however, few have looked directly at the relationship between the nutrition of people who are incarcerated and chronic disease. Examining the direct relationship between nutrition and chronic disease development in the incarcerated population should guide future research in this area of study.

Conclusion

This systematic review explores the existing literature surrounding the nutritional adequacy of food offerings in U.S. correctional settings. The food offerings do not meet all dietary requirements for vitamins, minerals, and food group quantities. People who are incarcerated express dissatisfaction with food offerings due to their personal preferences, health, and well-being. Policies surrounding nutrition in correctional settings should continue to be further developed and established to ensure facilities are providing adequate nutrition to people who are incarcerated. Additionally, healthcare professionals can use information from this study to work together to ensure people who are incarcerated receive nutrition that is both adequate and economically feasible, and to better promote health and treat and manage diseases commonly found in this population. Further research should focus on exploring the quantitative research on this topic to strengthen these findings, the impact vending machines have on the nutrition of people who are incarcerated, and the relationship between nutrition and chronic disease in incarcerated populations.

Appendix A

Johns Hopkins Nursing Evidence-Based Practice Evidence Level and Quality Guide

Evidence Levels	Quality Guides
Level I Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis	A <u>High quality</u>: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence
Level II Quasi-experimental study Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis	B <u>Good quality</u>: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence
Level III Non-experimental study Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only, with or without meta-analysis Qualitative study or systematic review with or without a meta-synthesis	C <u>Low quality or major flaws</u>: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn
Level IV Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence Includes: • Clinical practice guidelines • Consensus panels	A <u>High quality</u>: Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years B <u>Good quality</u>: Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years C <u>Low quality or major flaws</u>: Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years

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