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Developing an Evidence-Based Curriculum for Correctional Settings

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Abstract

People experiencing incarceration in the United States face numerous health disparities before, during, and after imprisonment, with prison conditions often exacerbating the severity of their health conditions. Within prisons, inadequate nutrition may contribute to the high prevalence of chronic disease, such as diabetes and heart disease. The aim of this paper is to discuss the development of an evidence-based nutrition curriculum for prison settings, informed by literature on current nutrition in prison, as well as previous health interventions designed to improve prisoners' health. The curriculum was developed using guidelines for an effective health curriculum from the Centers for Disease Control and Prevention. Further, this paper includes a discussion of the theoretical foundations and effective pedagogies for teaching health materials in prison, as well as further recommendations for improving nutrition in correctional institutions.

1. Introduction

At the end of 2019, approximately 2.3 million people were incarcerated in the United States. Of those individuals, over 1.5 million were held in a state, federal, or private prison (Sawyer & Wagner, 2019). Compared to jails, prisons are longer-term facilities, typically owned by a state or by the federal government (Sawyer & Wagner, 2019; Bureau of Justice Statistics, n.d.). Unlike people experiencing incarceration in jail, where the majority of inmates are not yet convicted of a crime, prisoners have undergone sentencing and are commonly serving sentences of one or more years. Of those convicted individuals, half a million serving prison sentences in 2019 were convicted of a nonviolent drug crime (Sawyer & Wagner, 2019). Within prisons, inmates are more likely to be obese or have a chronic condition than the general population (Maruschak, Berzofsky, & Unangst, 2016). This paper describes how nutrition education programs in prison settings have the potential to address this disparity. By presenting a summary and analysis of the limited literature base, as well as an evidence-based health curriculum developed by the author, this paper demonstrates the potential for nutrition education programs to reduce chronic disease, enhance health behaviors, and strengthen the community in correctional facilities.

1.1 General Overview of Prisoner Health

Prisoners in the United States experience a multitude of health disparities before, during, and after incarceration. Prior to entering prison, approximately 15 percent of inmates were houseless, 29 percent were subjected to abuse as children, and 64 percent were dependent on substances. (Leach & Goodwin, 2014). Given these determinants, nearly 90 percent of those seen in prison clinics experience mental health difficulties, which are inextricably linked to other dimensions of health, such as one's physical wellness, or presence of diseases. (Leach & Goodwin, 2014). The burden of noncommunicable diseases (NCDs) differentially impacts populations, with those in vulnerable situations, such as in prisons, especially affected (Herbert, Plugge, Foster, & Doll, 2012). While infectious diseases such as tuberculosis and human immunodeficiency virus are more common among people in prison (Leach & Goodwin, 2014), so too are

noncommunicable diseases such as coronary artery disease, diabetes, and long term neurological conditions (Herbert, Plugge, Foster, & Doll, 2012; Leach & Goodwin, 2014).

As the prevalence of NCDs continues to rise in prison settings, rates of overweight and obesity in prisons warrant considerable attention, as they are often linked to chronic disease. According to a U.S. Department of Justice Report, 74% of prisoners in the United States are overweight, obese, or morbidly obese (Maruschak, Berzofsky, & Unangst, 2016). In their meta-analysis of BMI data for global prison populations, Herbert et al. (2012) found that male prisoners were less likely to be obese than their non-incarcerated counterparts in every country except for the United States, indicating that factors within the US prison system may lead to high prevalence of overweight and obesity. Within the United States prison population, gender disparities exist. While most prisoners experience weight gain during incarceration, female prisoners gain more weight than males (Gates & Bradford, 2015), with an average gain of 1.1 pounds per week (Clarke & Waring, 2012).

Incarceration exacerbates many of the health problems experienced by individuals prior to imprisonment (Massoglia & Pridemore, 2015), and living conditions in prison have been hypothesized to contribute to weight gain. These conditions include: stressful and unsanitary environments from overcrowding, abuse and sexual violence, lack of control, depression, adverse side effects from medications, lack of sleep, insufficient physical activity, and lack of access to nutritious food (de Castro Rodrigues, Jolluskin, & Silva, 2018). Despite these problems, current research points to low utilization of the prison health services available to inmates. This may indicate that health maintenance is a low priority for prisons in the United States (de Castro Rodrigues, Jolluskin & Silva, 2018). Because the vast majority of U.S. prisoners will return to their communities, where they will take with them the negative health consequences from incarceration, prison health is an important public health issue (Pont, 2008; Rosenbloom, Shlafer, Stang, & Harnack, 2018). Due to the important role of food in all dimensions of health, proper nutrition is a key focal point for health promotion programs in correctional settings.

1.2. Overview of Nutrition in Prison

Research suggests that proper nutrition within prisons has the potential to prevent noncommunicable diseases, improve the management of chronic conditions, and reduce rates of recidivism (Davison, D'Andreamatteo, & Smye, 2019). Despite these findings, a systematic review of nutrition in prison settings demonstrates that many prisoners do not have access to healthy foods or appropriate energy content (Herbert, Plugge, Foster, & Doll, 2012). Not only does the food served in many prison cafeterias "tend toward the monochromatic, bland, and monotonous" (Jones, 2017, p. 73), but it may contribute to high rates of chronic disease. Owing to a reliance on processed foods, many prisons serve meals that contain excess fat and sodium, resulting in a sodium intake of over twice the recommended level in global prison populations (Herbert, Plugge, Foster, & Doll, 2012).

A variety of other factors contribute to inadequate nutrition in prison settings, such as the lenient enforcement of standards for food served in correctional facilities. In public prisons, where 92 percent of prisoners in the United States are housed (Bronson & Carson, 2019), menus do not follow the Dietary Guidelines for Americans (DGA) as they do in other public institutions, such as schools. Alternatively, the American Public Health Association, the American Dietetic Association, and the American Correctional Association have crafted a set of voluntary guidelines for correctional facilities to follow when making decisions regarding nutrition (Jones, 2017). With discretionary guidelines and limited budgets, many prisons in the United States opt for the cheapest, and subsequently most processed, foods when feeding their inmates. Margarine, oil, salt, and Jell-O, a cheap dessert consisting of 18 grams of sugar per serving, are documented staples in prison cafeterias (Jones, 2017; Godderis, 2006).

Another shortcoming of the correctional food system is the lack of consideration for personalized nutritional requirements. Despite all prisoners in the United States having different caloric needs, medical histories, and ethnic backgrounds, the food served in prison cafeterias across the country is relatively homogenous. While most prisons prioritize providing inmates with adequate calories, male prisoners in larger bodies and who are highly active consistently report struggling to feel satiated after consuming the allotted portion of food served in prison cafeterias (Jones, 2017; Cate, 2008). In contrast, Herbert et al. (2012) found that female prisoners in high-income countries are supplied with an excess of energy, contributing to high rates of overweight and obesity. Evidence suggests that the surplus of calories consumed by women who are incarcerated is attributable to correctional institutions supplying female inmates with diets designed to serve the needs of male-bodied prisoners (Herbert, Plugge, Foster, & Doll, 2012). Additionally, an estimated 65 percent of the individuals entering the prison system have active substance use disorders (NIH, 2019), which can lead to loss of appetite and subsequent malnutrition (Leach & Goodwin, 2014). By serving prisoners with unmet nutritional requirements a diet identical to that of their well-nourished counterparts, correctional facilities may play a role in exacerbating their health challenges.

Of the many prisoners who fail to reach a state of fullness after eating in their prison's cafeteria, or who believe that the food served in their correctional facility is unpalatable, some turn to their prison's commissary, a small store selling snacks, hygiene items, and stationery supplies, to supplement their diets. By purchasing snacks at prison commissaries, inmates are able to exercise more control over their personal consumptive experiences and regain a sense of autonomy (Godderis, 2006). Additionally, some inmates utilize commissary foods to express their creativity or celebrate momentous events through the act of "spreading," or creating alternative meals with ingredients purchased from the prison commissary, usually to be shared with others (Cate, 2008).

While commissary foods provide inmates with a sense of familiarity, comfort, and control, they may be a leading contributor to high rates of noncommunicable diseases among prisoners. A recent examination of the nutritional quality of commissary offerings found that over one third (38%) of the items sold in prison commissaries were incompatible with the dietary recommendations put forth by the DGA (Rosenboom, Shlafer, Stang, & Harnack, 2018). Examples of these items, listed on a commissary menu for Florida prisons, include soda, chocolate milk, gummy bears, various chips, Pop Tarts, Twinkies, and other highly processed foods (Florida Department of Corrections, 2019). In contrast, less than five percent of commissary foods sold in federal prisons in the United States were classified as fruits or vegetables (Rosenboom, Shlafer, Stang, & Harnack, 2018). Some prisons cite security matters to justify their lack of healthful foods, claiming that fruits could be exploited to make alcohol (Godderis, 2006). However, health experts, prison officials, and inmates alike have expressed concerns regarding the daily consumption of processed commissary food and its impact on prisoner health (Rosenboom, Shlafer, Stang, & Harnack, 2018; Cate, 2008; Jones, 2007). To address these concerns and bolster inmates' abilities to live healthfully with their existing resources, nutrition education interventions may be helpful. The next section reviews four health education programs in prison settings, providing insight into the best practices for implementing a nutrition curriculum in correctional facilities.

2. Review of Previous Nutrition Education Interventions in Prison Settings

Ending disparities in inmate health requires change on both individual and policy levels. Interventions designed to target individual health behaviors can improve the health of communities with relative urgency and cost-effectiveness. In their ethnographic study of medical nutrition therapy in Canadian prisons, Davison, D'Andreamatteo, and Smye (2019) noted that many dietitians employed in prison settings believed nutrition education and skills building exercises were necessary for improving prisoners' ability to make healthful choices, yet most prisons lacked programs designed to improve prisoners' health literacy and knowledge. The development of health and nutrition programs in prisons may reduce recidivism rates, health care costs, and criminal justice system costs, rendering health behavior interventions imperative. This section reviews previous interventions implemented in prison settings, designed to enhance inmates' knowledge of nutrition and physical fitness, health literacy, and other dimensions of health. By highlighting effective program components and best practices for effecting behavior change, these papers serve as useful guides for modeling future interventions in correctional facilities, which can have long-term impacts on communities touched by the prison system.

Table 1 lists the details for each intervention discussed in this section. Papers on the interventions were identified by searching combinations of keywords such as "health," "nutrition," "intervention," "prison," and "correctional facilities" in the ProQuest Central database. While there are numerous papers on health interventions in correctional facilities, the four interventions discussed in this paper were chosen for several reasons. First, due to the high prevalence in prison settings (Kassira et al., 2001; Mir-Nasseri, Khani, Tavakkoli, Ansari, & Poustchi, 2011), many of the documented interventions identified in ProQuest had specific objectives concerning HIV/AIDS, tuberculosis, hepatitis C, or drug use. Second, although all of the interventions included in the review did not address nutrition specifically, each addressed nutrition and physical health in their educational programs. Last, and most importantly, the four interventions included in this review were participatory in nature, had a peer education component, or both. Described in greater detail in the next section, these health programming approaches are highly beneficial in prison settings, where inmates frequently experience feelings of disconnectedness.

2.1. Theoretical Foundation(s)

Each intervention followed a theoretical framework designed to empower and engage participants, such as PRECEDE-PROCEED, participatory action research, peer education, the empowerment paradigm, and the model of resilience. Developed for public health in the late 20th century (Gielen & Eileen, 196), the PRECEDE-PROCEED model views

health as a community issue and involves all stakeholders in each phase of an 8-step, outcome-driven health intervention. PRECEDE-PROCEED is ideal in prison settings, as it considers the ways in which policy guidelines, such as security regulations, can limit or shape an intervention. Further, its guiding principle of community involvement builds community ownership of the intervention, resulting in greater support from both inmates and administrators.

Community involvement additionally serves as a guiding principle of participatory action research (PAR). Used by Martin et al. (2013) in their nutrition and fitness program, PAR involves the collective, self-reflective inquiry of all stakeholders at every step of a program to inform future activities (Baum, MacDougall, & Smith, 2006). This ensures that community programs are egalitarian in nature, rendering the PAR model highly beneficial in settings where program participants regularly experience feelings of disempowerment, such as prisons. Accordingly, program participants attributed their continued involvement in the nutrition and fitness program to its emphasis on community and inclusion.

2.2. Description of Interventions

With the exception of one program, which had a total of 128 participants (Curd, WInter, & Connell, 2007), most interventions were relatively small, ranging from n=11 (de Castro Rodrigues, Jólluskin, & Silva, 2018) to n=30 participants (Johnson, Milner, Heng, Greer, & DeNisco, 2018). Each program included several types of activities, which were largely dependent on the programs' objectives. For example, because peer education was central to the health literacy program described by de Castro Rodrigues, Jólluskin, and Silva (2018), participants engaged in a poster-making activity, where they constructed health-communication materials for the larger prison community. Similarly, programs with an emphasis on fitness and nutrition included activities such as group circuit classes (Martin et al., 2013) or pedometer use to measure step-count (Johnson, Milner, Heng, Greer, & DeNisco, 2018).

Each program additionally had an educational component, designed to supplement the other activities. Two interventions included nutrition-specific classes (Martin et al., 2013; Johnson, Milner, Heng, Greer, & DeNisco, 2018), while other programs held health education classes that covered a variety of topics, from tobacco nonuse (Curd, WInter, & Connell, 2007) to oral hygiene (de Castro Rodrigues, Jólluskin, & Silva, 2018). To encourage high levels of engagement, most lessons were held in small groups and were discussion-based.

2.3. Methodology

Despite slight variations in methodology, the four interventions shared similar practices. Notably, three interventions began with a needs assessment to gauge participants' interests, needs, and current resources (Curd, Winter, & Connell, 2007; Martin et al., 2013; de Castro Rodrigues, Jólluskin, & Silva, 2018). Following the steps outlined by the PRECEDE-PROCEED model, Curd, Winter, and Connell (2007) conducted initial social, epidemiological, and environmental assessments in the prison to identify prevalent risk factors in the community, as well as existing health promotion activities that could be enhanced by the new wellness program. Similarly, the nutrition and fitness intervention described by Martin et al. (2013) began with a pre-survey designed to inform the activities in the program. The survey consisted of questions designed to measure participants' perceptions of nutrition, physical fitness, and its relation to other dimensions of health, such as mental and emotional wellness. Lastly, de Castro Rodrigues, Jólluskin, & Silva (2018) began their program with key informant interviews to gain insight on inmates' most common health problems, existing resources, and barriers to health promotion within the prison. By interviewing both inmates and prison staff, the programmers were able to develop a holistic health program that addressed a diverse array of concerns.

Outcome assessments were highly dependent on each intervention's theoretical framework, time-frame, and objectives. For example, Curd, Winter, and Connell (2007) followed a participatory action framework, requiring stakeholders to assess the program's activities during the implementation phase to inform the remainder of the program. The other three interventions performed traditional outcome assessments, surveying participants at the conclusion of their program to understand the impact of the intervention (Martin et al., 2013; de Castro Rodrigues, Jólluskin, & Silva, 2018; Johnson, Milner, Heng, Greer, & DeNisco, 2018). Due to time constraints, de Castro Rodrigues, Jólluskin, and Silva (2018) were able to perform an outcome assessment for only one of their program's several objectives. For programs designed to facilitate weight loss or maintenance, measurements were taken at the end of the program and compared to those taken at baseline (Martin et al., 2013; Johnson, Milner, Heng, Greer, & DeNisco, 2018).

2.4. Results

Qualitative and quantitative assessments for all four interventions indicated that inmates were generally receptive to the health programs in their respective institutions. In two of the interventions, there were physical changes observed, such as changes in participants' waist-to-hip ratios and BMIs (Martin et al., 2013; Johnson, Milner, Heng, Greer, & DeNisco, 2018). In the two interventions that involved participatory research and peer education, respondents agreed that they felt healthier because of their participation in the programs and were interested in learning more (Curd, Winter, & Connell, 2007; de Castro Rodrigues, Jolluskin, & Silva, 2018).

The success of these programs may be attributable to several factors. First, all interventions (Curd, Winter, & Connell, 2007; Martin et al., 2013; de Castro Rodrigues, Jolluskin, & Silva, 2018; Johnson, Milner, Heng, Greer, & DeNisco) followed a theoretical framework, with most adhering to steps outlined by PRECEDE PROCEED and Participatory Action Research. These frameworks are based on principles of collaboration and prioritize program evaluation before, during, and after a program is implemented to ensure that activities remain relevant. Second, three out of the four interventions contained a peer education component. This motivated prisoners to adopt healthy behaviors, as those behaviors were modeled by someone with similar circumstances. Lastly, all interventions were appropriately tailored to their settings, using little to no resources from outside the prisons. This indicates that prison budgets should not pose a significant barrier to conducting effective interventions in correctional facilities.

Table 1. Review of Previous Health Interventions in Prison Settings

Intervention Title & Location	**Theoretical Foundation(s)**	**Participant Information**	**Intervention Description**	**Study Methodology**	**Results**
Participative Planning to Enhance Inmate Wellness: Preliminary Report of a Correctional Wellness Program (Curd, Winter, & Connell, 2007 Roederer Therapeutic Community (operated by the Kentucky Department of Corrections))	PRECEDE-PROCEED, Community-Based Participatory Research	128 male prisoners enrolled in the program, 30 percent attended the events	A wide variety of wellness activities were held over a 12-month period, falling under policy, environmental, programmatic, individual, and planning categories. Given the numerous factors that influence program participation, the number of activities held by the program was not consistent each month.	An initial social assessment was conducted by the prison's wellness committee over a 3-month period, followed by an epidemiological assessment to identify central concerns for the wellness program. An environmental assessment was conducted to identify existing health-promoting resources. After initial assessments, the wellness committee spent two months developing an evidence-based wellness program. Once the program was underway, the wellness committee revised program activities as needed. Wellness classes and workshops were evaluated with a one page evaluation at the end of each class, and participants completed an exit evaluation at the end of the 11-month program.	Exit evaluations found that a majority of responding residents thought they would be healthier as a result of the program (n=46), however key informant evaluations suggested less agreement that the program would lead to lasting lifestyle changes. There was ample evidence to suggest that the wellness program was institutionalized in the prison, including interest in leadership, increased use of the walking trail and garden, and requests for health-oriented literature in the library.
Incarcerated Women Develop a Nutrition and Fitness Program: Participatory Research (Martin et al., 2013) Canadian provincial medium security correctional center	Participatory Action Research	28 female prisoners enrolled in the program, 16 completed	For the nutritional component of the intervention, participants used a Canadian Food Guide and a personalized food chart to inform their dietary decisions and monitor their progress. Additionally, presentations on nutrition-related topics were given every Saturday morning of the six-week intervention. The exercise component of the intervention began with an orientation to the gym facility to demonstrate safe use of exercise equipment. Participants were invited to join group fitness classes that included cardio, weights, free-standing movements, and stretching. Participants used an exercise program card to track their cardio, strength, and flexibility measures.	Surveys were given to every woman in the prison about their perceptions of physical fitness, nutrition, and how fitness relates to other dimensions of health. Based on their findings, an inmate participatory research team designed a six-week nutrition and fitness pilot program for interested inmates. Pre- and post-program assessment were given to those who completed the pilot program. Differences between the assessments were tested for significance using a paired *t*-test.	Paired *t*-tests demonstrated a decrease in participants' waist-to-hip ratio that approached statistical significance (p=0.06). Weight and BMI additionally decreased, however they were not statistically significant (p=0.25 and 0.11). In response to the follow up questionnaire's question, "Do you think you will continue exercising after your release?" 15 participants reported "yes." Similarly, when asked if they noticed improvements since participating in the fitness program, all 16 participants reported "yes."
Health Promotion in a Prison Setting: An Exploratory Study on Why and How to Do It (de Castro Rodrigues, Jólluskin, & Silva, 2018)	Empowerment Paradigm, Peer Education	11 male prisoners enrolled in and completed the program	Eight group sessions focusing on the enhancement of health literacy were held weekly for 90 minutes. Each session began with a brainstorming exercise and was followed by a brief lecture, then a group discussion or role playing exercise. Six extra	A needs assessment was conducted through key informant interviews of two groups: 10 prison staff members and 11 inmates. Following the needs assessment, intervention priorities were identified based on the insights of the key informants and an extensive literature review. Due to the fact that the authors	The program was, in general, positively assessed by participants. Responses to the questionnaire suggested that participants considered the program's contents to be interesting and practical. Further, participants expressed an interest in more sessions being added to the

Intervention Title & Location	Theoretical Foundation(s)	Participant Information	Intervention Description	Study Methodology	Results
Prison north of Portugal, unknown security level			sessions were held in addition to the regular group sessions to carry out the peer education component of the program. In these sessions, participants made posters dedicated to: anxiety and stress, communication, oral health, sleeping problems, and emotions. The posters were hung in the prison school, where they were visible to a large number of inmates.	had one-year funding and it took four months to get into the field, it was not possible to perform pre- and post- evaluations for each participant. A one page questionnaire was administered in the last session, with questions regarding participants' opinion of the program and its facilitators, as well as the most valuable program components. An outcome assessment was performed for the peer education component of the program.	program, indicating overall satisfaction. Responses to the questionnaire on the health communication materials were also positive. Most inmates (91 percent) responded that they believed the posters conveyed important information, and all but one respondent (n=33) indicated that they would be interested in receiving more health information.
Implementation and Evaluation of a Physical Activity and Dietary Program in Federal Incarcerated Females (Johnson, Milner, Heng, Greer, & DeNisco, 2018) Female federal prison camp located in the northeastern United States	Model of Resilience	30 female prisoners enrolled in the program, 29 completed	The intervention had four components, including: pedometer use, health education, use of USDA's MyPlate tool to inform portion control, and support from a nurse practitioner. Health education classes were held during weeks 1, 4, and 8 of the intervention and used free teaching aids from http://ChooseMyPlate.gov. In addition to recording step count, participants were later encouraged to record their commissary purchases.	Thirty participants who met the program's eligibility criteria were recruited during a regularly scheduled physical examination. Participants met with a nurse practitioner weekly to report step count, MyPlate usage, commissary purchases, and missing data. Following the intervention, an impact evaluation was performed to identify changes in body mass index (BMI) and resilience scores from baseline. BMI was calculated using the formula kg/m^2, and resilience was measured using Wagnild and Young's (1993) Resilience Scale.	Average weekly step count ranged from 6,729 to 9,138 steps. MyPlate usage ranged from 41% to 60% and commissary purchases ranged from 8 to 11 items. BMI decreased significantly from baseline to 6 weeks and from baseline to 12 weeks. There were no significant differences in resilience form baseline scores, which may be attributable to moderately high resilience at baseline.

3. Nutrition Education: Developing a Curriculum

This paper has explored the research around nutrition in correctional institutions and has delved deeply into the small number of interventions that have been implemented to promote healthy behaviors in prisons. This section describes an original prison nutrition education curriculum developed by the author and focuses on the curriculum's theoretical foundations and pedagogy.

Setting clear objectives enables health promoters to develop effective health promotion programs and their curricula accordingly. This corrections-based community health program curriculum, *My Food Matters: A Nutrition Curriculum for Correctional Settings,* utilizes guidance from the CDC's *Characteristics of an Effective Curriculum* (2019). In consideration of prisoners' schedules, lessons were designed to last no more than one hour. Additionally, they do not build off of previous knowledge, as this could limit program participation. Six topics were addressed in the curriculum, including: (1) Nutrition's role in the eight dimensions of wellness, (2) Nutrition basics, as outlined by the Dietary Guidelines for Americans (3) Diet and mental wellness, (4) Reading and understanding a nutrition label, (5) Local and national food-security resources, and (6) Vitamins and micronutrients. Figure 1 shows a basic outline of the curriculum.

According to the CDC, less effective health curricula "overemphasize teaching scientific facts and increasing student knowledge" (2019). This is particularly problematic in prison settings, where an increased knowledge of health concepts does little to help prisoners circumnavigate the institutional barriers to achieving optimal health. In contrast, an effective curriculum for promoting prisoners' health should, in addition to teaching health information, shape personal values and beliefs that will persist post-incarceration, help develop essential health skills that can be utilized in the prison setting, and shape group norms that prioritize healthy lifestyles.

This nutrition curriculum incorporates activities that are prison-specific in order to support realistic and sustainable behavior change. For example, the fourth lesson in the curriculum not only provides information about interpreting nutrition labels, but it includes an activity that enables participants to practice reading the nutrition labels of foods from their prison commissary. This learning experience enhances participants' confidence in their ability to perform the associated health related behavior, paving the way for collective behavior change. This aligns with reviews of effective community health programs, which suggest that health curricula are most competent when they include instructional strategies that support the development of healthy behaviors. After engaging with a curriculum, participants should not only gain knowledge, but applicable skills that can be implemented as part of a healthy lifestyle. For a curriculum to meet this criteria, lessons should set clear health goals and incorporate activities that challenge participants to apply their newly-acquired knowledge to real-world situations.

Additionally, this curriculum acknowledges the wide range of identities and roles held by inmates and provides lessons that address the multifaceted nature of their lives beyond incarceration. Because it is common for previously-incarcerated people to have feelings of anxiety and disorientation following their release from prison (Maps, 2017), skills-building exercises are prioritized in each lesson. Noting previous research that highlights the challenges faced by ex-prisoners when engaging in tasks such as food-budgeting and grocery shopping (Davison, D'Andreamatteo, & Smye, 2019), this curriculum supports the empowerment of inmates following their release by increasing their awareness of food-related resources, as well as their self-efficacy to access them.

Further, an effective curriculum provides appropriate information that addresses students' needs, interests, concerns, experiences, current knowledge, and skill levels (CDC, 2019). This curriculum follows this criteria by tailoring information to accommodate a diverse array of health experiences and available resources. For example, all information in the curriculum is intended to be disseminated in plain language, and the foods discussed in each lesson should be readily available in the prison where the health program is implemented.

To ensure that a health curriculum meets its objectives, research points to participatory monitoring and evaluation. Unlike other methods of program evaluation, which has historically relied on health professionals measuring a concluded program's performance against pre-set indicators, participatory monitoring and evaluation involves all stakeholders involved in a program and begins the evaluatory process on the first day of implementation (Fawcett et al., 2003). This curriculum is designed to undergo evaluative participation and monitoring for several reasons. First, it provides insight into which program elements do and do not work from the perspective of those who are most directly involved, such as the beneficiaries of the program. Further, it can be used to explain *why* certain elements are not effective, giving program planners a clear direction for making adjustments. Last, and arguably most importantly, participatory monitoring empowers stakeholders and gives each individual involved in the program the opportunity to use their voice. This aspect of participatory evaluation and monitoring is highly important in prison settings, where, through the internalization of stigma, many prisoners are led to believe that they lack the right to community involvement (Jarrett, 2018).

My Food Matters: A Nutrition Curriculum for Correctional Settings

I. Food and the Eight Dimensions of Health

- Objectives:
  - Participants demonstrate an understanding of the eight dimensions of wellness and how health extends beyond physical wellness
  - Participants can articulate which dimension they would like to give more attention to in their lives. I.e., "I would like to eat less meat to improve my environmental wellness."
  - Participants demonstrate an understanding of food's role in each dimension of wellness, particularly the emotional, environmental, physical, and social dimensions
- Activity:
  - In notebooks, encourage participants to write down a dimension of health that they would like to give more attention to in your life. Next, instruct them to set a very small goal that can be reached in the next week to help improve this dimension. Discuss the role of food in this goal.

II. Nutrition Basics

- Objectives:
  - Participants demonstrate an understanding of what a healthy eating pattern includes and limits, as described by the Dietary Guidelines for Americans
  - Participants demonstrate an understanding of the individualized nature of dietary patterns
  - Participants can discuss the key takeaways of the Dietary Guidelines for Americans with proficiency
- Activity:
  - Folding a piece of construction paper into thirds, make a chart with letters "K," "W," and "L" on the top. These letters stand for "Know," "Want to Know," and "Learned." Before beginning the lesson, make a list under the letter "K" of everything you know about nutrition. Next, make a list under the letter "W" of everything you want to know, or any questions you might have. After the lesson, make a list of the most important things you learned in the "L" column. Refer to this list when making nutrition-related decisions.
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III. Diet and Mental Wellness

- Objectives:
  - Participants demonstrate a basic understanding of the gut microbiome and its role in human health
  - Participants can connect food to mental health and describe the basic physiological mechanism that links them
  - Participants understand the importance of fiber for gut health and know where to find it in food sources
- Activity:
  - Give each participant a bag filled with dried pasta, lentils, beans, etc, representing a different type of bacteria in their microbiome. Next, describe a series of events that impact the microbiome, i.e., eating a new food, taking an antibiotic, etc., and have participants remove elements from or add elements to the bag with each scenario
  - If dried foods are not permitted, cut up different pieces of paper or use materials from a craft store to represent the bacteria in the gut

IV. Reading a Nutrition Label

- Objectives:
  - Participants demonstrate mastery reading and interpreting a nutrition label
  - Participants demonstrate an understanding of the differences between serving size and servings per container
- Activity:
  - Using foods sold in the prison commissary, identify the nutrients that we discussed during the lesson and answer the following questions:
    - Which food is the best choice if we are trying to consume less sugar?
    - Which food has the highest amount of vitamin D? Potassium?
    - Which food has the most protein? Why might we want to eat this food?
    - Which food provides the most calories?

V. National and Local Nutrition Resources

- Objectives:
  - Participants are aware of the national and local nutrition resources mentioned in this lesson and can describe them in conversation
  - Participants understand the barriers to accessing the resources listed in this lesson
- Activity:
  - Prior to the lesson, provide groups with a scenario. Have participants briefly discuss what someone with similar circumstances as those discussed in the scenario can do. This will help instructors develop an understanding of what participants know about existing resources.
  - Post lesson, return to the scenarios with the participants. Ask the following questions:
    - What did you learn about that could support the person in Scenario A/B?
    - What barriers might the person in scenario A/B run into when trying to find resources? How can they mitigate these barriers?

VI. Vitamins

- Objectives:
  - Participants can list and differentiate fat soluble and water soluble vitamins
  - Participants demonstrate an understanding of the importance of micronutrients in a balanced diet
  - Participants can identify food sources of vitamins A, D, E, K, C, and B-Complex
- Activity:
  - Following the lesson, split participants into groups and assign each group a different vitamin. Using the information from the lesson, instruct groups to write a recipe for a meal that is high in their specific vitamin. Discuss why they chose that recipe and what they did to increase the vitamin content.

Figure 1. My Food Matters: A Nutrition Curriculum for Correctional Settings

4. Perspectives on Implementation

While this paper discusses the potential for a nutrition education curriculum in prison settings, implementing such a curriculum is challenging. Although previous interventions illustrate prisoners' potential to meaningfully engage with health-promoting materials, institutional barriers may prevent this potential from becoming fully realized. Furthermore, policies that determine which foods are served and sold in prisons can limit prisoners' abilities to engage in healthy eating patterns. Until these institutional barriers are addressed, many disparities in prisoner health will persist, despite nutrition education initiatives that support better health. This section expands on these barriers and provides recommendations for comprehensively addressing disparities in prisoner health. To reach health parity in prison settings, a combination of policy initiatives, participative programs, and innovative solutions are needed.

4.1. Participatory Health Programs

While much of the research involving prisoners is now participatory in nature, consideration of prisoners' wellbeing has not always been a top priority for those in academic settings. Historically, most research conducted in U.S. correctional facilities was largely inconsiderate of inmates' best interests. Until 1975, 90% of all new pharmaceutical products were tested on prisoners, and clinical studies exploring the toxicity of new drugs were performed "almost exclusively on prisoners" (Pont, 2008, p. 185). Incarcerated individuals were also highly appealing to biomedical scientists, as their participation in research required little compensation, and the geographical isolation of prisons ensured that any negative outcomes would be shielded from the public eye (Pont, 2008).

In response to the exploitation of prisoners for research, prisoners are now classified as a vulnerable population in The Code of Federal Regulations (OHRP, 2004). Under these guidelines, prisoners are eligible to participate in only four categories of research, including: (1) Studies of the possible causes, effects, and processes of incarceration, (2) Studies of prisons as institutional structures or of prisoners as incarcerated persons, (3) Research on health conditions particularly affecting prisoners, and (4) Research on practices which have the reasonable probability of improving prisoners' health (OHRP, 2004). This criteria is indispensable for the protection of prisoners, but, because they were developed as a response to preceding abuses, their main utility is to restrict research, rather than to advocate for initiatives that could improve prisoners' wellbeing. Further, approval from an Institutional Review Board (IRB) is required to ensure that research meets these guidelines (Pont, 2008). Although important, this time-intensive process may shorten the amount of time allotted to program implementation, potentially preventing participants from meeting their objectives. Currently, participatory planning seems to be the best approach for designing accessible and appropriate programs in prison settings, as it entails discussing the projected benefits and risks of each activity and requires prisoners' consent at each step of the planning process. Official guidelines that highlight best practices for participatory research in prisons, rather than restrictions on research, may increase the number of beneficial programs implemented in correctional facilities.

4.2. Policy

In addition to integrating participatory health programs in prisons, policy changes influencing which foods correctional facilities are permitted to serve and sell are equally necessary. The disparities in inmate health are not attributable solely to the health behaviors of prisoners, but to a failure of the prison system. To supplement small portion sizes, or to avoid eating unpalatable, culturally inappropriate foods in the cafeteria, many inmates with employment spend the earnings they receive from their prison in the commissary, "not unlike sharecroppers and coal miners who were forced to use the 'company store'" (Raher, 2018). Through the sale of hygiene necessities and highly processed foods, prison commissaries earned an estimated 1.6 billion dollars in 2016 in private, state, and federal prisons alike (Raher, 2018). Prison commissaries are highly lucrative, and, due to the revenue they generate, policies that limit their freedoms may face strong opposition. However, policy changes which require commissary foods to meet certain nutritional standards, such as having less than 200 mg of sodium, could drastically reduce rates of chronic disease, overweight, and obesity in prisons (Rosenboom, Shlafer, Stang, & Harnack, 2018).

4.2. Innovative Solutions

Improving the nutritional quality of food served in prison cafeterias is possible with innovative solutions. Similar to prison commissaries, prison cafeterias are profit-driven. Many state correctional systems outsource their kitchen operations to private companies, which are usually paid a flat rate per meal. This creates an incentive for companies to serve smaller portions of lower-quality foods to inmates, as doing so results in a higher profit margin. At worst, this practice has led to outbreaks of foodborne illnesses in prison settings, and, at best, prisoners leave the cafeteria hungry, prompting them to purchase food from their prison's commissary (Fassler & Brown, 2017).

While policies that end outsourcing may help to resolve these issues, they have historically come up against lobbyists for the contracted food companies, rendering policy change a distant goal. Until policy change becomes more feasible, community efforts to improve nutrition in correctional facilities are necessary. One such effort that is gaining considerable attention is establishing community gardens in correctional facilities. Literature on gardening programs in prisons suggests that tending to gardens has various benefits for prisoners, including: increased confidence and self-esteem, improved personal and interpersonal wellbeing, and the ability to manage stress (Farrier, Baybutt, & Dooris, 2019; Baybutt & Chemlal, 2016). Further, food grown in prison gardens can be used as ingredients in the cafeteria, giving prisoners a sense of control over what they consume, as well as access to fresh, nutrient rich foods.

Lastly, it is important to recognize that the lack of fresh fruits and vegetables in prison cafeterias is not due to a global scarcity of these products. Every year, farmers in the United States produce surplus crops to ensure they will meet the market's demand. Some of these crops spoil before making it to grocery stores, and of those that do, many are discarded due to aesthetic reasons, or because they are not sold within an appropriate length of time (FAO, 2011). Under these circumstances, the United States wastes 30 to 40 percent of its food supply annually (FAO, 2011). Rather than throwing away edible, nutritious food or allowing it to remain in a grocery store until expiration, grocery stores could donate these products for use in local prisons. Programs that connect grocery stores to correctional facilities have the potential to drastically change the way prisoners consume food by providing cafeterias with quality ingredients. Additionally, these programs will reduce food waste, helping the nation meet its Sustainable Development Goal of halving the amount of food waste produced at the retail and consumer levels by 2030 (United Nations, n.d.).

5. Conclusion

In the United States, approximately 9 million people are released from prison each year (Beck, 2006). Of those 9 million, many return to their communities with one or more chronic diseases, which, as previous research suggests, are caused or exacerbated by food served and sold in United States correctional facilities. Chronic disease impacts one's ability to engage in daily tasks and has been linked to financial difficulties, cognitive issues, depression, anxiety, and difficulty maintaining healthy relationships (CDC, 2012). These factors may reinforce criminogenic behaviors, contributing to high rates of recidivism (Link, Ward, & Stansfield, 2019). It is, therefore, imperative to regard prisoner nutrition as a substantial public health issue. This paper demonstrates how to develop and implement an effective, research-based curriculum designed specifically for prison settings. By using such a curriculum, correctional staff and other stakeholders have an exciting opportunity to improve the health of thousands of individuals.

In addition to education, clear systems-wide policies that aim to improve the quality of food in correctional facilities are also necessary. For prisons to truly operate as rehabilitative entities, they must be well-equipped with the resources that help facilitate behavior change, such as nutritious foods. While policy change may be idealistic in present times, this should not deter us from advocating for improved nutrition in prisons, as enjoying the highest attainable standard of health is a fundamental human right.

6. References

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