Comparison of the Lived Experiences of Food Insecurity and Food Choices Among Adults Who Currently Smoke versus Formerly Smoked: A Qualitative Investigation

ACCEPTANCE

This thesis, **Comparison of the Lived Experiences of Food Insecurity and Food Choices Among Adults Who Currently Smoke versus Formerly Smoked: A Qualitative Investigation**

by Emmaline Peterson

was prepared under the direction of the Master's Thesis Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Master of Science in the Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University. The Master's Thesis Advisory Committee, as representatives of the faculty, certify that this thesis has met all standards of excellence and scholarship as determined by the faculty.

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EDUCATION

Georgia State University – Atlanta, GA — Expected December 2023
Master of Science in Health Sciences

- Nutrition

The University of Georgia – Athens, GA — Fall 2021
Bachelor of Science in Family and Consumer Sciences

- Double major in Dietetics and Culinary Sciences and Nutrition

NUTRITION-RELATED EXPERIENCE

RESEARCH

GSU Department of Nutrition Master's Thesis – Atlanta, GA — August 2022 – Present
Supervisor: Dr. Nida Shaikh

- Conduct qualitative research on the lived experiences of food insecurity and food choices of adults who currently smoke and formerly smoked.
- Gain knowledge and critical thinking skills through reflexive data analysis

UGA Maternal and Infant Research Lab – Athens, GA — February 2021 – August 2022
Research Assistant under Dr. Sina Gallo

- Conducted meta-analysis research on the ability of children ages 6-12 to recall dietary data with the assistance of a parent or caregiver
- Gain knowledge by researching 24-hour dietary recalls conducted jointly with families and parents

UGA Childhood Obesity Research – Athens GA — March 2022-June 2022
Research Assistant under Dr. Sina Gallo

- Compare dietary recall accuracy of children with normal body mass index and high BMI and using an interview protocol that asks children to report both items and amounts eaten vs. only items eaten
- Interviewed, weighed, measured, and observed children

UGA Food Quality Research Lab – Jackson County, GA — January 2020 – May 2020
Research Assistant under Allie Lindke, Ph.D. student (20 hours)

- Researched the perception of Jackson County Schools' plant-based protein entrees by communicating with consumers as part of the National School Lunch Program
- Examined behavior changes through advertisements and tracked consumption and perceptions

SPORTS

UGA Football Nutrition Intern June 2023-July 2023

- Made meal plans for athletes applying considerations for weight gain, weight loss, maintenance, food preference, and protein and carb recommended intakes.
- Conducted research for presentations to both athletes and nutrition staff pertaining to topics such as protein goals, REDS diagnosis, DEXA research, etc

UGA Performance Nutrition Student Worker August 2021 – March 2022

- Observe counseling sessions with sports dietitians and student-athletes
- Collaborate with sports dietitians by creating nutritional posters and fliers, helping with paperwork, and filing and analyzing DEXA or BodPod data
- Transport of food and proper storage of goods to student-athletes throughout campus

FOODSERVICE

"Big Event" Catering Project – Athens, GA January 2020 – May 2020

Team manager for a mock "Big Event" in FDNS 3610 (20 hours)

- Led my group in a themed, catered "mock" brunch (changed due to COVID-19)
- Facilitated and directed all food service procedures to ensure a successful event

COMMUNITY

University of Georgia Campus Kitchen Shift Leader– Athens,GA August 2019 – December 2020

Shift leader (60 hours)

- Lead volunteers in redistributing, packaging, cooking, and delivering foods to older adults and human service agencies, overall helping with hunger and food waste within the community

LEADERSHIP EXPERIENCE

Georgia Academy of Nutrition and Dietetics Social Media Representative

December 2022- May 2023

- Create monthly Instagram posts through CANVA for the GAND social media page related to holidays, celebrations, and awards

Student Liaison for the Academy of Nutrition and Dietetics June 2021 – June 2022

- Communicate Academy student member initiatives, announcements, and other information to all Student Dietetics Associations and Clubs across U.S. college campuses

University of Georgia Student Dietetic Association – Athens, GA

President May 2021 – December 2021

- Represent presidential position, lead all general and executive meetings, responsible for all organization activities, register the club in multiple organizations, and stay up to date on events dealing with the College of Consumer and Family Sciences

Director of UGA SDA Dietetic Internship Forum November 2021

- Planned the Student Dietetic Associations' Dietetic Internship forum by reaching out to multiple Internship directors, created zoom meeting rooms for students to interact and network with directors

Secretary January 2020 – May 2021

- Represented the secretary position, which involves tracking meetings as well as maintaining and distributing materials to the members as needed

AWARDS & NOMINATIONS

GAND Outstanding Dietetic Student Award Winner – Athens, GA. March 2022

- Nominated by Dr. Emma Laing, Director of UGA's Didactic Program of Dietetics. Presented by the Georgia Academy of Nutrition and Dietetics for hard work and dedication

OTHER COMMUNITY INVOLVEMENT

Swim Across America – Hickory, NC February 2015 – Present
Timer/Volunteer (40 hours)

- Participate in the annual swim meet in memory of my mother to benefit cancer research.

Greater Cooperative Christian Ministries Nutrition Center Volunteer – Hickory, NC
February 2020 – April 2020
Volunteer (60 hours)

- Planned, packed, and organized food carts for the homeless and families in need of food during the Covid-19 pandemic

CERTIFICATIONS AND PROFESSIONAL DEVELOPMENT

- Academy of Nutrition and Dietetics Student Member: July 2020-Present
- Georgia Academy of Nutrition and Dietetics Member: January 2023-Present
- EPIC training

ABSTRACT

Objective: To describe and compare the lived experiences of food insecurity, including the food choices, of people who currently smoke and people who formerly smoked in rural communities.

Design: Secondary analysis of qualitative in-depth interviews.

Participants: N = 32 food insecure participants of which 23 currently smoke and nine formerly smoked in rural Massachusetts.

Analysis: Participants' demographic data were analyzed using t-tests for continuous variables and chi square tests for categorical variables in SPSS. We used Braun & Clarke reflexive thematic analysis and coded the data using NVivo after two coders collaboratively developed a codebook. We evaluated responses from food insecure participants' choice to use $10 towards a sandwich or cigarettes. Lastly, we created word clouds to describe participants' food and beverage choices during the previous day and the food and beverage choices from grocery stores and/or free food and meal services.

Results: On average, participants were 44 years old, primarily female (71.9%), and non-Hispanic white (62.5%). A total of 7 themes represented the lived experiences of food insecurity among people who currently smoke and formerly smoked. Three themes were specific to participants who currently smoke: A.1) Using Cigarettes to Replace Food in the Context of Food Insecurity, A.2) Buying Cigarettes Instead of Food, Other Necessities, or Entertainment, and A.3) Concerns of Weight Gain Impeding Smoking Cessation. Four themes were seen among participants who currently smoke and formerly smoked B.1) The Interplay of Mental and Physical Illness, Food Insecurity, and Smoking Histories, B.2) Psychosocial Stressors, Health Issues, and Financial Strain Forming a Cycle that Exacerbates Food Insecurity, B.3) Navigating Low-Cost Food Access As a Part of Experiencing Food Insecurity B.4) Showing Resilience Through Food Insecurity Coping Strategies. Food choices were similar among participants who currently smoke and participants who formerly smoked, including a mix of nutrient-dense and high-fat and processed foods. The responses to the hypothetical scenario varied; most people chose a sandwich (47.8%).

Conclusions: On comparing the lived experiences of food insecurity, including food choice, of participants who currently smoke and formerly smoked, we found that participants with a few exceptions mostly shared a multitude of complex challenges and employed various coping strategies to address both food insecurity and their various life adversities and had similar food choices. Future research could describe and compare the lived experiences of food insecurity among participants who currently smoke, formerly smoked, *and* never smoked in both urban and rural settings.

Keywords: Food insecurity, people who currently smoke, people who formerly smoked, lived experiences, food choices

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I am profoundly grateful to my father and friends for their unwavering support throughout this scholarly journey. A special mention to my roommate Donna, whose patience and understanding were invaluable, particularly during the countless hours I spent ensconced in my room, immersed in my research. My greatest appreciation is reserved for my father, whose support has been both tangible and intangible. His boundless generosity, both materially and emotionally, has been my bedrock. Whether it was being at the other end of an early morning call to provide solace during moments of anxiety or sharing celebratory meals to commemorate minor victories, his unwavering faith and encouragement have been instrumental in reaching this academic milestone.

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ABBREVIATIONS

Abbreviation	Term
HIP	Healthy Incentives Program
IRB	International Review Board
NHANES	National Health and Nutrition Examination Survey
SNAP	Supplemental Nutrition Assistance Program
SPSS	Statistical Package for the Social Sciences
SSI	Supplemental Security Income
U.S.	United States
USDA	United States Department of Agriculture
WIC	Supplemental Nutrition Program for Women, Infants, and Children

CHAPTER I

Introduction

Problem

Food insecurity is a public health concern across the globe, including within the United States (U.S.).[2, 3] In the U.S., the United States Department of Agriculture (USDA) defines food insecurity as "a household-level economic and social condition of limited or uncertain access to adequate food."[4] In 2020, 10.5% of U.S. household were food insecure, which accounted for around 13.8 million households. [3] In 2021, 10.2%, or 13.5 million households were food insecure, seeing a small decline in food insecure households from 2020. [3] However, in 2022, 12.8%, or 17 million households in the U.S. were food insecure, which was a significant rise from 10.2%, or 13.5 million, in 2021.[3] Household smoking is a risk factor for food insecurity and vice versa, likely because both smoking and food insecurity share components of poverty and socioeconomic disadvantage. [1, 5] Since 2005, smoking rates have decreased in the U.S. by 9.4%. [6] In 2021, an estimated 28.3 million adults smoked, constituting approximately 11.5% of the U.S. adult population. [7] Smoking is more common in households experiencing food insecurity, and the likelihood of smoking increases with the severity of food insecurity. [8, 9] Households with people who smoke tend to have higher rates of food insecurity and lower incomes than households with people who do not smoke. [5, 10]

Smoking can be expensive and take up a portion of a household's income, further exacerbating any current financial strains experienced by individuals. [11] In 2020, while nationwide smoking rates have been decreasing overall, rural communities have had a more modest decline in smoking prevalence (19.2%) when compared to urban areas (14.4%).[12, 13] In 2022, food insecurity was more prevalent in main cities of metropolitan zones (15.3 %) and rural

areas (14.7 %) compared to suburban regions and other metro areas outside the central cities, which stood at 10.5 %. [4] Individuals living in rural areas may face challenges accessing healthy and affordable food options and have limited variety in their diets due to the limited number of grocery stores and limited means of transportation. [14] According to the USDA, 76 counties in the U.S., predominantly in rural areas like the Midwest and Great Plains, lack a single grocery store, potentially leading to nutrition-related deficiencies and diseases due to limited access to fresh fruits and vegetables and higher consumption of processed foods rich in salt, sugar, or fat. [15-18]

People who smoke are more likely to consume high-fat foods and alcohol and less likely to consume fruit and vegetables when compared to non-smokers. [19-21] Studies have found people who smoke are less likely to consume vitamin A, vitamin C, protein, zinc, vitamin B1, folate, fiber, and iron than former and non-smokers. [22-24] Similarly, people experiencing food insecurity are more likely to consume high-fat and processed foods and less likely to consume fruits and vegetables when compared to people without food insecurity.[25, 26]

People who smoke and formerly smoked may allocate their resources differently, with people who formerly smoked being more likely to prioritize expenses on groceries, medicine, and health practitioners. [27, 28] However, we do not know how individuals experiencing food insecurity allocate resources (money and time) towards purchasing, procuring, and consuming food based on their smoking status (currently versus formerly smoking). For people who smoke, the expenditure on tobacco products may limit the money available to purchase and consume healthy and nutritious food. In addition, there may be various other factors that influence the food choices of people who currently smoke and formerly smoked experiencing food insecurity; nicotine can act as an appetite suppressant for people who currently smoke[29, 30], while people

who formerly smoked may experience increased hunger as a part of nicotine withdrawal upon smoking cessation. [31-34]

Quantitative studies have explored the prevalence and relationship between food insecurity and smoking status[5, 35-39], and qualitative studies have examined the lived experiences of people experiencing food insecurity[40-43] and the lived experiences of people who smoke[44-47]. However, there is yet to be research on the lived experiences of food insecurity among people who currently smoke and people who formerly smoked in rural communities, including their food choices. Furthermore, this research void extends to urban communities, too. A study focused on the lived experiences of food insecurity among people who currently smoke and people who formerly smoked in rural communities would be pioneering, offering unique insights for rural areas, and setting a precedent for urban investigations.

Significance

Examining the lived experiences of food insecurity, including the food choices, of people who currently smoke and people who formerly smoked in rural communities, would provide insights into the emotional, psychological, and socioeconomic factors shaping behaviors, choices, and coping mechanisms. In addition, exploring the food choices and lived experiences of food insecurity among people who smoke and people who formerly smoked within a rural context can highlight how rurality may influence these lived experiences, as previous research has found that, similar to the experiences of those with food insecurity and those who smoke, people living within rural communities face food access challenges and lack nutritious food choices.[48-50] By comparing the lived experiences of food insecurity, including the food choices of people who currently smoke and people who formerly smoked in rural communities, we can see if smoking status influences the food choices and lived experiences of food insecurity, or if

food insecurity influences their lived experiences and food choices similarly, irrespective of smoking status.

Research Aim

The aim of this study is to describe and compare the lived experiences of food insecurity, including the food choices, among people who currently smoke versus people who formerly smoked in a rural community.

CHAPTER II

Review of the Literature

Food Insecurity in the U.S.

According to the USDA, food insecurity is delineated into two categories: “low food security” and “very low food security”. [4] Low food security refers to situations wherein households face compromised dietary diversity, palatability, and nutritional integrity, yet the overall quantity of food intake remains unaffected. In contrast, households with very low food security not only navigate the aforementioned nutritional inadequacies but also exhibit irregular eating patterns, underscoring a more acute instability in food access. [4] A common concern amongst 98% of food-insecure households, irrespective of the severity of their food security status, is the apprehension about exhausting their food supply. [4] Other common indicators include going the whole day without eating, feeling as though they cannot afford a balanced meal, losing weight, being hungry but not being able to eat, cutting or skipping meals, and eating less than they feel they should. [4]

In 2020, 10.5% of U.S. household were food insecure, which accounted for around 13.8 million households. [3] In 2021, 10.2%, or 13.5 million households were food insecure, seeing a small decline in food insecure households from 2020. [3] However, in 2022, 12.8%, or 17 million households in the U.S. were food insecure, which was a significant rise from 10.2%, or 13.5 million, in 2021.[3] Food insecurity is most often seen in single-mother households, households with older adults, households with disabilities, and households where one or more individuals smoke. [8, 51, 52] In 2020, single-mother households had the highest levels of food insecurity among all households, and children in single-mother households were almost twice as likely to be food insecure compared to the national average for all households with children. [51] Older

adults above 65 also experience a higher prevalence of food insecurity when compared to other age groups, and are more likely to be overweight and malnourished than food-secure older adults above 65. [53] Ethnicity and race are also associated with food insecurity; Black and Hispanic households experience higher rates of food insecurity than the national average. [54] The risk factors associated with food insecurity also include access to transportation services and location, with some counties in America having few grocery stores, if any. [55, 56] In addition, full-service supermarkets are located more frequently in predominantly white neighborhoods than in predominantly Hispanic and Black neighborhoods. Full-service supermarkets are known to offer more foods of high nutritional value, such as fresh produce, compared to convenience stores. [57]

Food insecurity and poverty are predominant in rural areas. [58] In 2022, 14.7% of rural households were food insecure, which was statistically higher than the national average. [4] This was also a significant increase from 2021, where 10.8% of rural households were food insecure. [4] The economic instability prevalent in rural regions, characterized by job loss, declining populations, and an aging demographic, contributes to life challenges, including limited food access, transportation barriers, and financial insecurity. [48, 49]

Food insecurity is a crucial social determinant of health that increases the risk of chronic diseases such as diabetes, hypertension, kidney diseases, obesity, and heart disease. [59, 60] It can also hinder disease management, leading to difficulty adhering to a healthy diet, physical activity, taking medication, and managing chronic conditions. [59, 61] Food insecurity can also impact mental health, with higher rates of depression and psychological distress observed among those experiencing food insecurity than those with food security. [62-64]

Lived Experiences of People Experiencing Food Insecurity

Food insecurity manifests across diverse socio-cultural contexts, influencing the lived experiences of those affected. An exploration of global narratives surrounding food insecurity can furnish valuable insights, shedding light on how individuals of lower socioeconomic status navigate and cope with such adversities worldwide. While several of the studies under review originate from regions outside the USA[42, 43], they highlight the complexities associated with food insecurity, ranging from direct experiences to systemic challenges and coping mechanisms. The relative scarcity of US-centric studies on the lived experiences of people experiencing food insecurity[40, 41] emphasizes the pressing need for more in-depth research to capture the multifaceted dimensions of food insecurity within American landscapes.

In a study conducted in an urban Massachusetts setting, researchers explored the lived experiences of both food-insecure and secure individuals concerning their use of the Supplemental Nutrition Assistance Program (SNAP) and the Healthy Incentives Program (HIP). SNAP operates under federal oversight as a comprehensive food assistance initiative and HIP serves as a fruit and vegetable subsidy mechanism exclusively tailored for the Massachusetts populace. The study found three primary findings: a pervasive unfamiliarity with SNAP and HIP across both food-secure and insecure cohorts, specific obstacles precluding utilization of these programs, and a pronounced imperative for augmented educational outreach targeting the underserved segments regarding SNAP and HIP.[40] These insights underscore the criticality of contextualizing programmatic interventions within local cultural and systemic landscapes, emphasizing the interplay between policy design and lived experiences in addressing food insecurity challenges.

Transitioning to an academic environment, another study probed the experiences of college students experiencing food insecurity and the subsequent impact on their educational and health trajectories. Drawing from thirty students from a prominent, public land-grant university in the Southeast United States, researchers employed semi-structured qualitative interviews. The findings unearthed nine core themes, encompassing the definition of food insecurity as perceived by students, their direct experiences with it, and food-related coping mechanisms. Identified facilitators included social networks and campus resources, while financial burdens of higher education and associated stigmas acted as barriers.[41] The investigation illuminated the profound repercussions of food insecurity, emphasizing its profound influence on well-being, health trajectories, and coping strategies.

To understand the health condition management of individuals experiencing food insecurity in northeast Scotland, researchers conducted twenty meticulous interviews with individuals frequenting a food bank and pantry, all of whom disclosed diverse physical and mental health ailments. The analysis found four significant themes: 1) food practices shaped by economic constraints leading to trade-offs and compromises, 2) the interplay between illness experiences and food in the context of physical and mental health, 3) the overlooked nature of participants' economic struggles during health consultations, and 4) participants' views and expectations of the health care system. This UK study accentuates the consequential interplay between food insecurity and health aspirations, with the revelation that such adversities often remained overshadowed in healthcare dialogues. [42]

Another study examined the lived experiences of adults experiencing food insecurity in the UK during challenging economic times. The research showed that people's access to food can vary, sometimes relying on extra help. The study highlighted three main points: 1) food

insecurity was conceptualized as a transient phase rather than a permanent state; 2) it investigated the interplay between individual agency and overarching societal influences, particularly emphasizing the socio-cultural stigma associated with seeking emergency food aid; and 3) it addressed the persistent liminality of oscillating between stable and unstable food access. Amidst adverse economic conditions in the UK, the study underscored that individuals' experiences with food insecurity are not static but fluctuate, influenced heavily by societal perceptions and the ever-present challenge of navigating the boundary between consistent and inconsistent food access.[43]

Food Insecurity and Food Choices

People experiencing food insecurity make food choices based on various factors, including economic, cultural, and social influences. [65, 66] Affordability is one of the critical factors influencing the food choices of people experiencing food insecurity. [67] Household food insecurity is associated with higher consumption of affordable, energy-dense, nutrient-poor foods, such as fast food and convenience meals. [67] This may result in a lack of nutritional variety of foods in their diets. [67, 68]

Accessibility to food is another crucial factor that affects the food choices of people experiencing food insecurity. [67, 69, 70] People experiencing food insecurity often live in food ‘deserts,’ areas with limited access to affordable and healthy food, and may have to rely on convenience stores and fast food restaurants for their meals. [67] These stores and restaurants typically sell foods high in calories, saturated fats, and added sugars that are often nutritionally inadequate and associated with nutrition-related chronic diseases such as obesity and diabetes. [57, 67, 71, 72] In contrast to these limited options, supermarkets typically offer a wider array of

nutritionally robust choices, including fresh produce.[57, 67] Dollar store chains are a type of convenience store that is rapidly growing in food deserts in rural communities, and they typically sell highly processed foods and lack fresh produce. [50]

Although there is a lack of research on how cultural food preference impacts the food choices of people experiencing food insecurity directly, it is important to discuss how cultural preferences can affect food choices, as America is a culturally diverse country, and cultural diversity is constantly increasing. [73] Cultural influences, such as traditions, customs, and social norms, could impact the types of foods people prefer and consume. [74] Cultural preferences for specific dishes or traditional foods may persist despite financial constraints, and individuals may prioritize culturally relevant foods over more affordable or nutritious options. [75] Additionally, cultural norms around sharing and communal meals can drive individuals to prioritize feeding their family or community members over meeting their own nutritional needs.[75]

Smoking in the U.S.

Cigarette smoking is the leading cause of preventable death and disease in the U.S.. [76] According to the American Lung Association, long-term cigarette smoking rates have fallen from 42.6% of adults in 1965 to 13.7% in 2018. [77] In 2021, this number dropped even more, with 11.5 of U.S. adults currently smoking.[78] However, for those below the poverty line in 2021, the rate was 18.3%.[78] Smoking rates have declined overall in the U.S., but the lowest socioeconomic groups have experienced the smallest decreases, with those in lower-income households more likely to smoke and be nicotine-dependent. [10] Data from the 2019 National Health and Nutrition Examination Survey (NHANES) showed that those with an annual household income of less than $35,000 were more likely to smoke than those with a higher

annual household income. [76] In 2015-2016, almost 25% of adults in households below the poverty line smoked, compared to 10% of those in higher-income households. [10] Smoking-related illnesses disproportionately affect those with lower socioeconomic status, and they are also more likely to face other health risks associated with poverty. [10] Access to health insurance can also be a challenge for those with lower incomes. [10]

Individuals of lower socioeconomic status, especially those facing poverty, demonstrate reduced rates of successful smoking cessation and infrequent utilization of empirically backed cessation methods, such as nicotine therapies and bupropion. Factors contributing to this pattern encompass financial constraints, knowledge gaps, and culturally rooted beliefs like equating smoking cessation solely to willpower. [79] Compounding elements include heightened stress, limited self-efficacy, inadequate social support for cessation, and targeted marketing by the tobacco industry towards economically disadvantaged populations. [80, 81] A 2012 study involving 654 Milwaukee residents revealed that certain beliefs about smoking and cessation correlated with previous cessation attempts and future quitting intentions among those with an annual family income below $15,000. [79] Common misconceptions included skepticism towards cessation medications and viewing the use of aids as indicative of weakness. [79]

Nicotine addiction is believed to be caused by the rapid and controllable delivery of the substance to the brain in an affordable and accessible manner. [82, 83] Nicotine has many neurochemical effects that may be linked to why it is so addictive, but one of the main things it does is provide a dopamine release. [82, 83] Not only is dopamine a hormone known for making one feel good, but it also acts as a “neural teaching signal” that teaches the brain to repeat the action it just committed so that every inhale triggers the desire to do another. [82, 83] People with high stress, perceived or otherwise, often in low-income communities, may find this release of

dopamine desirable. [84] A 2014 systematic review of 40 papers was carried out to identify perceived barriers to smoking cessation in vulnerable populations, including people who are homeless, people with mental illness, indigenous groups, low socioeconomic groups, prisoners, and at-risk youth. [85] Along with many other complex factors, one of the most common perceived barriers to smoking cessation found in this review was that smoking helped manage stress. [85]

Lived Experiences of People Who Smoke

Few studies have investigated the lived experiences of smokers. [44-46] This knowledge gap becomes even more pronounced when considering the experiences of socioeconomically disadvantaged smokers, particularly in the American context. Nevertheless, several international studies provide a glimpse into these lived experiences, shedding light on what contributes to smoking behaviors. From the streets of Iran to the suburbs of Australia, these investigations underscore the importance of understanding the personal narratives of smokers, revealing the complexities of their choices, challenges, and circumstances.

In a 2014 qualitative analysis conducted in four selected cities in Iran, researchers aimed to understand the lived experiences of adult smokers concerning the concept of smoking. [44] Through in-depth, semi-structured interviews with 12 smokers, the data were meticulously transcribed, coded, and analyzed. [44] This analysis yielded eight primary themes encompassing the understanding of smoking: the physics of a cigarette, addiction, and dependency, habit, feeling the need, pleasure, seeking peace, mental involvement, and the deliberate reinforcement of ones own smoking behavior. [44] Conclusively, the participants' experiences and perceptions

of cigarette smoking provided nuanced insights that could enhance both smokers' and healthcare professionals' comprehension of smoking-related concepts. [44]

In another qualitative study set in Iran in 2020, researchers utilized a phenomenological approach to delve into the life experiences of young smokers and understand the root causes behind their inclination to smoke. [45] Through semi-structured interviews with 14 participants aged 20 to 35 who smoked daily, the study employed purposive sampling, continuing until data saturation was achieved. [45] These subclasses encompassed aspects such as misconceptions about the effects of smoking, using smoking as a coping mechanism for psychological issues, and the influence of negative advertising. [45] The primary categories were identified as intrapersonal and extrapersonal components driving the youth's tendency to smoke. [45]

In a 2015 study conducted in New South Wales, Australia, researchers aimed to understand the broader financial implications and unintended consequences of cigarette costs on socioeconomically disadvantaged smokers. [46] Utilizing semi-structured face-to-face interviews, 20 smokers were engaged from a welfare organization. [46] The study sought to understand the effects of tobacco costs on essential household expenditures and the impact on smoking behavior and smoking cessation intentions. [46] Thematic framework analysis of the interviews found that these smokers frequently faced financial stress due to smoking, with instances of skipping meals, altering food choices, and delaying bill payments to afford cigarettes. [46] To counteract rising cigarette costs, they resorted to price-minimization strategies and shared tobacco within their social networks. [46] While participants acknowledged that increased tobacco prices could deter smoking initiation, they also felt that significant price hikes and subsidized cessation aids would be more effective in assisting them to quit. [46] The study concluded that while these findings do

not negate the importance of tobacco taxation, there is a pressing need to better support socioeconomically disadvantaged smokers in their attempts to quit. [46]

A 2020 UK study aimed to investigate written accounts of how COVID-19 affected their smoking habits.[47] 132 smokers aged 19-52 provided their experiences on the pandemics impact on their smoking behaviors during the lockdown from May 22nd 2020 to June 22nd 2020. [47] The study uncovered three primary trends in smoking behaviors during the COVID-19 lockdown: an increase in smoking as a stress response, a reduction in smoking due to the removal of social triggers and a focus on health, and no change in smoking habits, often due to distrust in COVID-19 information from authorities. [47] The findings highlight the necessity for credible public health messaging tailored to smokers, emphasizing the need for targeted smoking cessation support. [47]

Smoking Status and Food Choices

Smoking status is known to influence appetite and food cravings and, in turn, may influence food choices. Resources may be allocated differently towards food and non-food expenses (e.g., housing, utilities, childcare, etc.) among people who smoke and people who do not smoke or formerly smoked. People who smoke typically experience appetite suppression and poor health [29, 30], while people who formerly smoked experience an increase in appetite and often gain weight, which has also been associated with poor health. [86-88] A recent qualitative study suggested that smoking may be a strategy to avoid hunger and cope with having less to eat when an individual is experiencing food insecurity. [89]

Several studies from across the globe have found that smoking status impacts diet. [19, 22-24, 90-93] Additionally, several studies have examined the relationship between smoking status and food intake, revealing notable differences in dietary patterns and nutrient consumption between

people who smoke and people who do not smoke. [19, 23, 90, 93-95] Diets of individuals according to their smoking status have been assessed in various ways such as estimating nutrient intakes[84, 96, 97], food consumption[83, 84, 97-99], or diet quality[24, 100]. When looking at food consumption, compared to people who do not smoke or formerly smoked, people who smoke were found to have lower intakes of fruit, vegetables, whole grains, low-fat milk, and vitamin supplements and higher intake of non-nutritious foods such as white bread, processed meat, coffee, caffeine, sugar, sweets, fat, fast food, high-salt snacks, and alcohol. [22, 24, 90, 91, 93] A 2012 European study examined the association between fruit and vegetable intake and smoking cessation among 1056 males who smoke. [93] Over ten years, higher fruit and vegetable consumption was linked to a higher probability of smoking cessation. [93] A study from 2015, utilizing NHANES data from 2005-2008, showed gender-specific differences in alcohol consumption and smoking status. Specifically, males who currently smoke reported higher alcohol intake compared to their counterparts who formerly smoked or never smoked. On the other hand, among females, those who formerly smoked had higher alcohol consumption than women who currently smoke and those who have never smoked.[92] Studies that assessed the macro- and micronutrient intake of people who currently smoke, formerly smoked, and never smoked have found that people who smoke have poor nutrient intakes, especially lower intakes of vitamin A, vitamin C, protein, zinc, vitamin B1, folate, fiber, and iron when compared to people who formerly smoked and never smoked. [22-24]

There is conflicting evidence on whether smoking increases sodium intake. Studies have found that smoking is correlated with an increase in high-salt foods such as processed meats and high-salt snacks. [91] A 2011 cohort study examined the association between diet quality and smoking status in 667 Korean men. [24] Participants completed a survey on demographics and

lifestyles and were classified as people who never smoked, formerly smoked, or currently smoke. [24] The results showed that compared to other groups, people who currently smoke had higher sodium intake. [24] However, a 2022 Chinese cohort study among 4,213 elderly individuals (aged 50 or older) found that people who do not smoke had higher sodium intake than those who smoked. [101] This study examined the association between sodium, potassium, sodium/potassium ratio, and salt intake with mental cognition. [101] These conflicting results on sodium consumption and smoking status may have to do with cultural, age, and health status differences.

Smoking status may have an impact on the diet quality of food-insecure households. A 2018 U.S. cross-sectional study examined the differences in smoking habits, perceived health, and perceived diet of parents and caretakers of school children living in food-insecure and food-secure households in rural Appalachian Mississippi.[102] They also assessed the association between household food security status and smoking habits, perceived health, and perceived diet. [102] Those living in food-secure households scored higher on perceived health and diet than those in food-insecure households. [102] They also found that health and diet worsened as the prevalence of household food insecurity and smoking increased. [102]

Another way smoking status may also impact food choice is through food cravings. A 2017 study on 712 U.S. adults explored the relationship between smoking status and food cravings. [19] People who smoke tended to opt for unhealthy, calorie-dense foods more frequently than people who do not smoke. [19] People who smoke had more frequent consumption and cravings for high-fat foods. [19] In this study, depression and stress were found to play a significant role in how smoking affects food cravings. [19] These psychological factors can influence the intensity and frequency of cravings experienced by individuals who smoke. [19] However, the study did not find evidence to suggest that smoking itself directly moderates the

relationship between food cravings and the actual consumption of food. [19] While smoking may impact food cravings, it did not appear to have a direct influence on whether those cravings translate into increased food intake. [19]

Smoking cessation has been associated with higher fruit and vegetable intake, indicating a potential link between smoking cessation and making healthier food choices. [93, 95] Overall, these findings underscore the importance of considering the impact of smoking status on food intake and food choices when addressing smoking cessation and dietary intervention efforts.

Smoking and Food Insecurity in the U.S.

Epidemiological studies have extensively explored the relationship between smoking and food insecurity. [39, 76, 89, 98] Low income, high unemployment rates, poor education, food insecurity, and psychological distress are associated with an increased risk of smoking. [39, 76, 89, 97, 98, 103] A cross-sectional study from 2011-2012 on 1,511 low-income young adults found that people who smoke were twice as likely as people who never smoked to experience food insecurity, even after adjusting for income, education, and other sociodemographic factors. [39] A 2013-2015 cross-sectional study in Los Angeles on 542 women eight weeks after giving birth and smoking daily studied the social and environmental factors related to smoking cessation. [38] The results of this study found that food insecurity was associated with significantly decreased odds of smoking cessation. [38] Another cross-sectional study in 2017 on 1,917 adults in New York studied the association between food distress and smoking. [37] Food distress is defined in that study as insufficiency in food and nutrition, which includes unfavorable dietary patterns, insecurity in accessing food that is beneficial for health, and deficient or ineffective policies

related to food and nutrition. [37] The study found that among those experiencing food insecurity, 57% were smokers, and for those without food insecurity, 33% were smokers.[37]

A 2014 study examined the prevalence of and factors associated with food insecurity, focusing on the co-occurrence of obesity and smoking using data (5,364 non-pregnant adults aged 20 and older) from the 2013-2014 NHANES study. [99] Among individuals experiencing food insecurity, smoking prevalence stood at 36.6%, compared to 16.6% among the food secure participants. [99] Similarly, obesity rates were higher at 47.1% for the food-insecure group, in contrast to 37.0% for their food-secure counterparts. [99] Lastly, the co-occurrence of smoking and obesity was 14.4% for those experiencing food insecurity, whereas it was only 5.7% for those who were food secure. [99] Younger age, lower poverty-income ratio, lower education level, smoking, and obesity were significant predictors of food insecurity. [99]

One study analyzed the relationship between psychological distress, food insecurity, and smoking using data from the 2015 U.S. Panel Study of Income Dynamics. [97] Respondents experiencing psychological distress and food insecurity had the highest smoking prevalence of all participants. [97] Respondents experiencing food insecurity exhibited a higher smoking prevalence compared to those experiencing psychological distress, especially among respondents situated above the poverty line. [97]

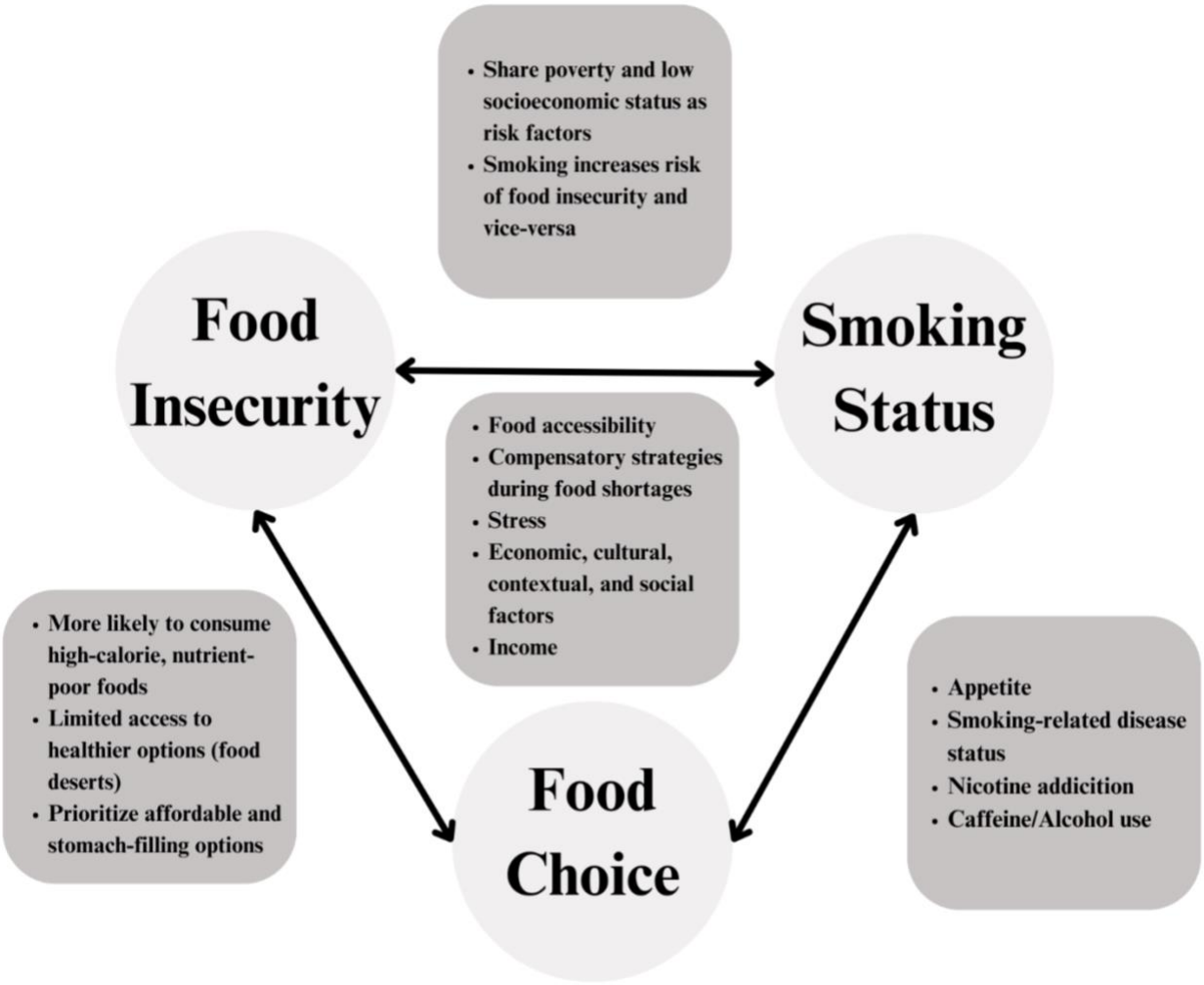


Figure 1: The Intersection Between Food Insecurity, Smoking Status, and Food Choice

Adapted from (Appendix II): A Working Conceptual Model on the Intersection of Tobacco Use and Food Insecurity by Jin E Kim-Mozeleski, Susan J Shaw, Irene H Yen, and Janice Y Tsoh.[1]

Gaps in the Literature

While there has been qualitative research on the lived experiences of people who smoke[44-47] and the lived experiences of people experiencing food insecurity[40-43], descriptions and comparisons of the lived experiences and food choices among people who currently smoke and formerly smoked in a rural setting have not yet been studied. The influence of rural and

urban settings on the lived experiences of food insecurity and food choices among people who currently smoke and those who formerly smoked also remains unexplored in research. Previous quantitative research in rural and urban settings have found how smoking status and food insecurity overlap in risk factors, food choices, and prevalence, [8, 10, 29, 37-39, 48, 49, 51-53, 55-64, 76, 77, 79-85, 98, 99, 103] but a more in-depth exploration of the lived experiences of food-insecure people who currently smoke and formerly smoke is needed to contextualize and describe the influence food insecurity and smoking status may have life experiences and food choices.

MANUSCRIPT

Introduction

Smoking and food insecurity are intrinsically linked, manifesting as direct outcomes of prevailing poverty and socioeconomic disadvantages. [1, 5] Food insecurity is a significant issue in the U.S., with the United States Department of Agriculture (USDA) defining it as "a household-level economic and social condition of limited or uncertain access to adequate food."[4] In 2020, 10.5% of U.S. household were food insecure, which accounted for around 13.8 million households. [3] In 2021, 10.2%, or 13.5 million households were food insecure, seeing a small decline in food insecure households from 2020. [3] However, in 2022, 12.8%, or 17 million households in the U.S. were food insecure, which was a significant rise from 10.2%, or 13.5 million, in 2021.[3] Household smoking is a risk factor for food insecurity and vice versa, likely because smoking and food insecurity share components of poverty and socioeconomic disadvantage. [1, 5] Although food insecurity has seen a significant increase from 2021 to 2022, smoking rates have been consistently decreasing for decades.[3, 7] Since 2005, smoking rates have decreased in the U.S. by 9.4%. [6] In 2021, an estimated 28.3 million adults, constituting approximately 11.5% of the U.S. adult population, smoked. [7] Smoking is more common in households experiencing food insecurity, and the likelihood of smoking increases with the severity of food insecurity. [8, 9]Households with people who smoke tend to have higher rates of food insecurity and lower incomes than households with people who do not smoke. [5, 10]

While smoking rates for all adults in the U.S. have decreased over the past few decades[7], rural communities have had a more modest decline in smoking prevalence than urban areas. [12] In 2019, food insecurity was more prevalent in main cities of metropolitan zones (12.4 percent) and rural areas (12.1 percent) compared to suburban regions and other metro areas outside the

central cities, which stood at 8.3 percent.[104] Like those experiencing food insecurity, rural communities often face food access challenges along with lacking nutritious food choices. [48-50] The USDA reports that 76 U.S. counties, primarily rural, lack a grocery store, leading to less fresh produce consumption and more processed foods.[14, 56, 105]

The food choices of people who smoke and people experiencing food insecurity are well explored quantitatively. People who smoke and food-insecure individuals often have less nutritious foods. [19-26] People who smoke may prioritize purchasing tobacco over nutritious food, while people who formerly smoked more often prioritize groceries and healthcare costs in comparison. [27, 28] People who currently smoke may choose to eat less food as nicotine affects appetite and suppresses hunger, while those who have ceased to smoke may eat more from increased hunger after smoking cessation. [29-34]

Our previous work in this area focused on the lived experiences of food-insecure participants who currently smoke, not those that formerly smoked. This study found themes through the lived experiences of people who currently smoke experiencing food insecurity, including smoking to alleviate hunger, prioritizing cigarettes, the influence of life stressors on lived experiences, and past adversities. [89] While some longitudinal studies have found that food insecurity increases the tendency of smoking and vice-versa[5, 38, 39], and qualitative research has been done on the lived experiences of people experiencing food insecurity and people who smoke[40-47], no research has been done on the lived experiences and food choices people experiencing food insecurity who currently smoke and formerly smoked in a rural community.

Understanding the lived experiences of food insecurity among people who currently smoke and formerly smoked in rural areas can help inform health and nutrition policy and program development for healthier rural communities. The present study aims to describe and

compare the lived experiences of food insecurity, including the food choices of people who currently smoke versus people who formerly smoked in rural communities.

Methods

This was a secondary analysis of in-depth qualitative interviews exploring tobacco use and food insecurity among U.S. adults. [89]

Participant Recruitment

In rural communities in western Massachusetts, through purposive sampling, adults who were experiencing or had recently experienced food insecurity and were either people who currently (those who smoke daily) or formerly smoked cigarettes (those who have ceased in the last three years) were recruited. Participants were primarily recruited through needs-assessment surveys, flyers, and word-of-mouth at local food pantries, as well as through flyers at other community-based organizations, local bus route advertisements, and online ads on Craigslist. Those who agreed to participate were interviewed over the phone between June and August 2019. The interviews, lasting an average of one hour (ranging from 27 to 150 minutes), utilized a semi-structured guide (Appendix 1) that covered topics such as current life circumstances, smoking behaviors (including other tobacco use), interest in smoking cessation, tobacco budgets, and expenditures, and experiences of food insecurity. People who smoked were asked a specific hypothetical spending scenario where they decided to spend $10 on food, such as a sandwich, or cigarettes. Demographic data such as age, gender, race, and ethnicity were obtained from the screening survey while education, source of income, dwelling, food assistance, and own or rent dwelling were obtained from interviews. Participants were compensated with a $50 gift card from a grocer of their choice for participating in the study.

Measures

All 32 interviews (23 participants who currently smoke and 9 participants who formerly smoked) were audio recorded and transcribed verbatim by professionals and checked for accuracy. Table 1 describes the questions that were asked during the interviews and possible follow-up questions or probes. "Smoking" or "tobacco use" refers to using cigarettes or other commercially sold combustible tobacco products. All study procedures were approved by the Institutional Review Board (IRB) at Case Western Reserve University.

Table 1: Sample Interview Questions and Probes

- To start us off, please take me through a day in your life, from the time you wake up to the time you go to sleep. As in, can you paint a mental picture for me of what a typical day is like for you?
- You mentioned during our phone screening that sometimes you worry about running out of food. Tell me about the first time you worried about having enough food, whatever you can remember, in as much detail as you can remember.
- What kinds of support do you receive? Does anybody else help you deal with these concerns? Where do you go to?
- Are there chronic stressors that you deal with? For example, any chronic health conditions that you might deal with that you consider to be a stressor or financial stress? If general answers are provided, ask what kinds of ____?
- Is there any sort of special diet that you follow? (E.g., vegetarian, vegan, has diabetes) If so, how long have you been following that diet?
- Where do you usually get your groceries?
- Nowadays, is there any pattern of running out of food or worrying about food?
- I'm wondering about what you do if there isn't enough food. What helps you deal with your food concerns?
- (For people who currently smoke) Do you typically budget for cigarettes? How does your smoking pattern or frequency change depending on how much money you have?
- Consider this hypothetical scenario. Say you had $10 to spend at the store **right now**, and your choices were to spend it on a pack of cigarettes or a sandwich. What would you spend it on right now? What made you make that decision?

Analytical plan

Participants' demographic data, including age, gender, race, ethnicity, education level, smoking status (current vs. former), and socioeconomic status, were extracted from previous

qualitative research [89] and analyzed using t-tests for age and chi-square tests on SPSS. We presented means or n (%) for the overall sample and by smoking status.

Qualitative analysis of the transcripts was conducted through the Braun & Clarke reflexive method using NVivo.[106] First, two coders read the transcripts and developed a list of codes to create an initial codebook. Then, they coded the same transcripts, discussed the coding process, identified discrepancies, and revised the codebook as needed. Once the two coders found a strong agreement, they split the remaining transcripts and coded independently. After the coding process, memos were created to find themes, and quotes were pulled and included to provide context and support for the theme. For the hypothetical question that asked participants who currently smoke to choose between food or cigarettes if given $10, we determined the most prevalent answer and pulled any quotes that provided context as to why they made that choice.

In addition to the qualitative analysis described above, to understand the food choices (types of foods eaten) and food variety of the participants who currently smoke and formerly smoked first, we listed all the food and drinks mentioned during the interview and created a code book to group food items by food groups (e.g., fresh fruits, fresh vegetables, protein). For all word clouds, while some words were extracted directly from the transcripts, some words were combined into categories. For instance, any mention of a fruit, vegetable, or fresh produce was categorized as “fresh produce”. “Potatoes” were not combined into fresh produce to showcase starchy foods. “Nut butter” included any mention of almond or peanut butter. “Nuts” included peanuts, walnuts, and almonds. Words like “canned” or “frozen” meals, fruits, or vegetables mean the participants explicitly said the food they consumed was frozen or canned. “Dairy” included only cheese and milk. “Yogurt” and “ice cream” were not included in the dairy category because they may have added sugars and flavorings, making them nutritionally different from

cheese and milk. “Ramen” was not considered pasta as it typically has other added ingredients such as sodium, making it nutritionally different. “Meat” included mentions of steak or any other general red meat. “Hot dogs” and “hamburgers” were not included as “meat” as they are typically higher sodium and more processed. “Chicken” and “fried chicken” were considered separate items because fried chicken is higher in fat and sometimes sodium than grilled and baked chicken.

Results

Socio-demographic characteristics

Overall, mean age of participants was 44.0 ± 10.9 years (Table 2). Of the 32 participants, 23 (71.9%) were female, 20 (62.5%) of the participants were Non-Hispanic White, and 15 (46.9%) reported completing “some college.” Demographic characteristics of participants who currently smoke and formerly smoked were similar.

Lived Experience of Food Insecurity among Participants Who Currently Smoke vs. Formerly Smoked

A total of seven themes were uncovered from the interviews on the lived experiences of food insecurity among participants who currently smoke versus those who formerly smoked (Table 3). Three themes were specific to participants who currently smoke: A.1) Using Cigarettes to Replace Food in the Context of Food Insecurity, A.2) Buying Cigarettes Instead of Food, Other Necessities, or Entertainment, and A.3) Concerns of Weight Gain Impeding Smoking Cessation. Four themes were seen among participants who currently smoke and formerly smoked B.1) The Interplay of Mental and Physical Illness, Food Insecurity, and Smoking Histories, B.2) Psychosocial Stressors, Health Issues, and Financial Strain Forming a Cycle that Exacerbates

Food Insecurity, B.3) Navigating Low-Cost Food Access As a Part of Experiencing Food Insecurity B.4) Showing Resilience Through Food Insecurity Coping Strategies. These seven themes and the intersection of food choices as a part of the lived experiences of food insecurity among participants who currently smoke and formerly smoked can be seen in Figure 6.

Themes Among Food Insecure Participants Who Currently Smoke

The following three themes were specific to food insecure participants who smoked.

Theme A.1: Using Cigarettes to Replace Food in the Context of Food Insecurity

The relationship between appetite suppression, smoking, and food insecurity was seen through the narratives of several participants who smoked. From experiencing homelessness to experiences with food scarcity, participants found that smoking served not merely as a habit but as an adaptive response to food insecurity. Within these stories, cigarettes emerged as more than just a source of nicotine; they became a means of sustenance, a tool for managing hunger, and a coping mechanism for stress.

“Pam” (all names are pseudonyms), a 58-year-old woman, offered a testament to the intersections between homelessness, hunger, and smoking. Through her narrative, she underscored a profound sentiment that resonated among several participants: smoking was not just a mere habit but an adaptive response to food insecurity. "The appetite thing," as Pam termed it, emerged as a tangible mechanism wherein smoking assumed the role of an alternative for scarce or inaccessible food. Her statement, “So smoking in a sense...is a food replacement,” particularly accentuated this point, reflecting not just the lack of food availability but the challenges posed by the lack of means to prepare it.

> *The appetite thing. I've realized that if you don't have food with you or something, smoking is another thing you can do that sort of replaces, I guess, heat and food.* (Pam, CS02)

"Sandra," a 48-year-old woman, provided a perspective into the multifaceted challenges of appetite, smoking, and food insecurity. Having grown up in an environment marred by food scarcity, Sandra shared how she often did not recognize her body's hunger cues, a sensation she learned to dissociate from. Yet, her recount highlighted the complex dynamics that were at play. She stated, "I think it (smoking) definitely does relieve stress. It also relieves hunger. It takes away my appetite." Smoking emerged as a dual mechanism for her, providing temporary relief from the stressors of daily life and acting as a surrogate for food, suppressing her appetite. On days of profound food insecurity, Sandra admitted to smoking more, especially if she went without eating for prolonged periods:

> *I smoke more on the days I don't eat, especially if they've been multiple days, like more than one day in a row, that I haven't eaten; I definitely smoke more to combat that.* (Sandra, CS27)

Further highlighting the gravity of her reliance on cigarettes, Sandra found her financial sacrifices to sustain her smoking habit, even prioritizing it over critical expenses like health insurance.

"Tamera," a 34-year-old mother, offered a window into her life marked by the complexities of unemployment, the responsibilities of motherhood, and a tumultuous relationship with food. While she emphasized her commitment to providing for her children first, she fought her internal battles. "I feel like if my kids were going to be needing it[food], that's different, and I would always give to them first. But for me, I guess I find the cigarettes more satisfying than

anything else or more necessary," she shared. For Tamera, cigarettes emerged as a means to alleviate stress, which was amplified by her economic hardships, and as a surrogate for sustenance. "There's been times like at work breaks. And sometimes I don't eat breakfast; I do just go smoke a cigarette, and that's it." Looking deeper into her journey, she touched on her fraught relationship with food, one characterized by periods marked with anorexic behaviors and weight fluctuations:

> *My weight is like a yo-yo. I've kind of yo-yoed up and down...I guess I've been pretty thin for a while now. And so I think probably maybe half from choosing the cigarettes and half from trying to wane my appetite.* (Tamera, CS05)

Tamera's narrative underscored the web of factors that influenced her smoking habits, with the appetite-suppressing effects of cigarettes interwoven with her lived experiences of food insecurity and her history of eating disorders.

The topics of hunger, addiction, and survival come to the fore through these women's experiences. Their stories underscored the myriad ways smoking was entwined with the complex challenges of food insecurity. While cigarettes may have momentarily alleviate hunger or served as a temporary refuge from the pains of scarcity, they also illustrated participants' profound choices and sacrifices in the face of systemic challenges.

Theme A.2: Buying Cigarettes Instead of Food, Other Necessities, or Entertainment

As participants navigated the choices and sacrifices surrounding their smoking habits, the financial implications on their daily sustenance, especially their food choices, came to the fore. While many found solace in simple pleasures like going to the movies or indulging in an occasional treat, Donna, a 55-year-old woman, often relinquished these fleeting moments of joy,

choosing cigarettes over such sustenance. The depth of her sacrifice became evident when s he said,

> *I deny myself other things, like being able to go to the movies or being able to go out to eat.* (Donna, CS12)

Donna's resourcefulness also shone through as she sought out free activities at a nearby substance abuse support center, where she found alternative ways to access entertainment through a gifted television. Central to Donna's narrative was a profound revelation that spoke volumes about her priorities amid food insecurity: "I buy the cigarettes instead." This choice illustrated not just a financial constraint but a deliberate prioritization of cigarettes, emphasizing the depth of the challenges she and others like her may have navigated daily.

"Jasmine," a 45-year-old woman, offered a glimpse into her experiences navigating the challenges of smoking and its financial implications. Initially drawn to the allure of cigarettes, she recalled the calming sensation they provided her in times of stress. "If I was stressed, that would be like the first thing I would go for was get a cigarette and light it, you know? And I felt like it was calming," Jasmine mentioned, touching upon the societal influences that may have made smoking seem glamorous. Yet, the actual cost of her smoking habit became evident when reflecting on her budgeting. She compared her smoking expenditure to a fixed expense, stating,

> *I just counted it like a bill. So on the 1st, you know, when I got paid, I would go to New Hampshire and buy them for the month, so basically, I just acted like it was the cable bill, but it was my cigarette habit bill.* (Jasmine, CS14)

The financial strain imposed by her smoking habit became even more palpable when she switched to vaping (still with nicotine), noting the savings of $300, which could then be directed towards other necessities such as food and bills. Jasmine's narrative highlighted the sacrifices

made to sustain a smoking habit, echoing the broader theme of participants making tough choices and prioritizing cigarettes, even in the face of financial constraints and food insecurity.

Although they were not participants who smoked, “Lauren,” a 55-year-old woman, and “Emma,” a 27-year-old woman, both participants who formerly smoked, shared experiences like the participants who smoked, shedding light on the financial sacrifices made to sustain their former smoking habits. Lauren emphasized her prioritization of cigarettes over necessities, stating, “I would go without food before I would without a pack of cigarettes.” She elaborated on her commitment to ensuring she had her daily pack, even if it meant borrowing money for other essential needs, “Sometimes, I went without. I’d borrow money from people to do my laundry because I spent my money on cigarettes.” Similarly, Emma highlighted the financial constraints of her smoking days, saying,

> *It was like my whole budget… I sometimes would choose to spend money on cigarettes instead of on food, which is stupid.* (Emma, FS04)

After smoking cessation, Emma reflected on the tangible positive impact on her finances, mentioning that she could indulge in activities like dining out, which she had previously deemed unaffordable.

Theme A.3: Concerns of Weight Gain Impeding Smoking Cessation

The fear of weight gain was a complex concern that impacted participants on various levels. This apprehension took on a layered dimension for those navigating the intricacies of smoking habits. “John,” a 47-year-old man, shared the connection between his smoking habits and concerns about weight gain. Looking into the behavioral aspect of smoking, John discussed the "hand-mouth thing," suggesting that smoking played a role in keeping him from eating more. A prominent fear that stood out was the potential for substantial weight gain if he ceased

smoking. He expressed, "If I quit smoking, I'd probably gain 300 pounds." Reinforcing this apprehension, John referred to a family member's experience, stating, "My uncle quit for ten years. He gained like almost 100 pounds. He started smoking again, and he actually lost like 100 pounds." John's narrative underlined the impact of the physical repercussions John associated with cessation, indicating that the fear of weight gain was a deterrent to his contemplating cessation.

"Ava," a 34-year-old woman, expressed concerns about weight gain, especially related to her smoking habits. This apprehension became apparent when she shared her challenges with quitting smoking, stating, "I'm really trying to lose this weight, and I'm terrified I'm going start gaining weight once I quit." Ava's fears about weight gain were rooted in her desire to manage her weight and seemed influenced by her recent back surgery. While she had undergone physical therapy to aid her recovery, her restrictions on activities, such as "No heavy lifting, no bending, no real twisting," further accentuated her concerns. The thought of weight gain post-quitting underscored the intertwined challenges Ava faced as she navigated her journey as a smoker with health concerns.

"Leah," a 35-year-old woman, encountered an internal conflict when she tried smoking cessation. She found that her children's pleas and their visible distress over her smoking habits motivated her to quit. She noted, "I had attempted to stop, and I stopped for like a smooth two months." However, the cessation journey brought unexpected challenges for Leah. "I found myself gaining an extreme amount of weight, like bad," she reflected. This weight gain, she explained, was due to her replacing her smoking habit with eating, "every time I wanted a cigarette or felt like I needed one, I would eat." Yet, this rapid weight gain presented another set of health concerns for Leah, who was already grappling with diabetes and hypertension. She

elucidated this by sharing, "Even when I stopped, then I was putting on all this weight, which was even more concerning to the doctors." Her doctors' concerns about her weight, her personal health challenges, and the hectic rhythm of her life left Leah feeling torn. She disclosed,

> *I started smoking again because I was stressed out, and I started smoking, and I started losing the weight all over again.* (Leah, CS20)

Her narrative provided a window into the complex balancing act she navigates daily between her smoking habits, weight concerns, and health conditions.

“Ashley,” a 47-year-old woman, offered a perspective from someone who had previously smoked. She stated, "It [smoking] made me not eat as much." Smoking, for her, was more than just a habit; it seemingly affected various facets of her life. She described it as something that "felt like the endorphins were released when I was smoking, so it made me want to do more. It made me have a little more energy." Interestingly, Ashley's narrative also intersected with her experiences with bulimia. When questioned about her recovery journey from bulimia, she stated, "I gained a lot of weight after my recovery." Even as she tried to cut back on smoking, the lingering effects of her eating disorder and decreased smoking led her to gain around 40 pounds over three years.

Themes Among Participants Who Currently Smoke and Formerly Smoked

The following four themes were common among food insecure participants who smoked and formerly smoked.

Theme B.1: The Interplay of Mental and Physical Illness, Food Insecurity, and Smoking Histories

Among participants experiencing food insecurity who smoked and formerly smoked, there was an added layer of complexity when mental and physical health issues intersected with the adversities they may have already faced. The daily struggles that participants experienced were not merely isolated incidents but a myriad of complex lifestyle hurdles that span mental, physical, and socio-economic spectrums. The following testimonies provided a window into the magnitude of challenges that food insecure people who smoked and formerly smoked grappled with, magnifying the broader consequences of their health issues on daily life and choices.

“Pam,” a 58-year-old woman who smoked and was experiencing homelessness, reflected on her mental and physical health challenges. The statement, "I realized that this is going to be very hard with such an unstable situation where I’m continually triggered and just want to lower my vibe and relax," highlighted her battle with mental anguish and the triggers that perpetually surrounded her. Her mention of "lobelia tincture", an herbal extract intended to help promote smoking cessation, and her hesitancy in using it because of her depressive state, captured in her words, "I’m just so depressed," showcased the impact of her mental health on her physical well-being. The daily anxiety, encapsulated in her words, "I have so much anxiety because I’m never anywhere that there’s no space to go hide," demonstrated her constant unease.

One participant who smoked, “Mary,” a 29-year-old woman, shared her journey through mental and physical health adversities and how she pushed to better herself despite these challenges. As a recovering cocaine user with post-traumatic stress disorder, she showed

determination to work on self-awareness and rehabilitation. Her desire to address her addictive behaviors, even when abstinent from drug use – "I'm not getting high, but my behaviors are like somebody who uses" – underscored her commitment to mental well-being. The phrase, "a lot of people are afraid to tear themselves apart and deal with the pain and the hurt," pinpointed the emotional challenges many face in her situation. Mary's physical health, too, presented challenges, most notably with her hip, which she described: "My hip is just from wear and tear... I need hip replacement." Her struggles extended to the constraints of her past substance use, as her medical history influenced medical decisions, like avoiding opiates, for her well-being.

"Jared," a 32-year-old man who formerly smoked, shared his journey with mental health challenges, made more evident during a vulnerable period. His statement, "I had an inpatient hospitalization, a psychiatric hospitalization," showed his engagement with institutional care. The integration of smoking into his daily life during this tumultuous time was evident in his remark, "I was having a really tough time... that's when I first started having two [cigarettes] a day." The facilities' practices, such as allowing two cigarettes during lunch breaks, reinforced this habit. However, the underlying cause of his hospitalization most profoundly encapsulated his mental health struggle. Jared shared, "my dad had died a few weeks before," and the ensuing challenges of managing his grief, sudden responsibilities, and unexpected job loss were detrimental to his mental well-being. His description of "prolonged insomnia led to some hallucinations" and being diagnosed with a "brief psychotic break" highlighted the deep-rooted mental adversities with which he grappled.

"Sam," a 46-year-old non-binary individual who formerly smoked, shared their complex journey intertwined with mental and physical health challenges. Sam remarked, "I guess at the time, didn't know I had ADHD and a lot of different executive issues," underscoring their

challenges as a college student. Despite showing enthusiasm for their studies in cultural geography, Sam's academic path was interrupted by numerous hurdles. Sam's reflection, "Besides me having a lot of financial issues with [college]... I had a lot of depression," captured the multifaceted reasons behind their academic discontinuation. Their emotional distress was exacerbated by their grandmother's illness and subsequent passing. Further complicating their situation, Sam's revelation, "I had smoked pot laced with speed and was diagnosed with bipolar like less than three months later," unveiled a critical juncture in their health journey, where they grappled with the debilitating effects of medication. Sam's description of the medications' side effects highlighted the profound impact on their cognitive function, stating, "If I read a sentence, I wouldn't remember it by the end of the next paragraph." Sam's account of being "diagnosed with a lot of physical conditions; back issues, sprains, shoulder, had whiplash Stage III, had a number of work-related injuries" showcased the convergence of their physical and mental struggles. Through their narrative, the implications of Sam's mental and physical health challenges on their lived experiences emerge clearly, painting a compelling picture of resilience amid adversity.

Participants who smoked and formerly smoked faced various physical health challenges that influenced their daily lives and food choices. Jasmine (a 45-year-old woman who smoked) highlighted, "I had gastric bypass surgery, so I can't eat like a lot at one time." This surgical intervention limited her food consumption. Dave (a 51-year-old man who smoked) conveyed, "I'm retaining water in my legs and feet, so that's making everything difficult too," indicating the possibility of this condition affecting his daily activities. Sandra (a 48-year-old woman who smoked) shared about her diabetes: "I'm also diabetic. So yeah. If my blood sugar is being affected, I need to eat," signifying a direct influence on her eating choices. Ashley (a 47-year-old

woman who formerly smoked) mentioned, "I have spinal stenosis in my back, I have arthritis in my back, and I have two herniated discs." These back issues caused her to be unemployable. Lauren (a 55-year-old woman who formerly smoked) found a complex health situation, "I have a metal plate in my neck...I also have a torn rotator cuff in my right shoulder...three of the discs in my lower back are crushed." She added, "I've had 22 surgeries in 14 years. So, pain is like an everyday thing with me. I literally have pain every day."

Theme B.2: Psychosocial Stressors, Health Issues, and Financial Strain Forming a Cycle that Exacerbates Food Insecurity

The narratives featured here of people experiencing food insecurity, irrespective of their smoking status, showed the various challenges stemming from their circumstances. Whether grappling with the grief of losing a loved one, enduring past traumas related to family instability or substance misuse, or navigating the financial implications caused by unforeseen health issues, these stories testified to the complex web of adversities and stressors faced by those experiencing food insecurity.

Building upon the overarching themes of adversity, the experiences of "Anna" shed light on the personal and emotional challenges participants face, especially when compounded by existing hardships such as food insecurity and health complications. Anna, a 57-year-old woman who smoked and experienced food insecurity, chronic depression, and type two diabetes, faced another heart-wrenching challenge: losing her beloved mother three years ago. While families often serve as a pillar of support, they can also be the root of deep-seated pain and grief. This pain was evident in Anna's journey as she faced the day-to-day struggles of her health and financial conditions and the overwhelming sorrow from the void her mother's passing left

behind. Reflecting on the impact of this loss, Anna shared, "I lost my mother almost three years ago." She shared the depths of her emotions, revealing, "Yeah, that was a bad trigger," when discussing the intense pull of grief that led her back to smoking after an attempt to quit. The sudden loss became a turning point, drawing her back to old habits as a coping mechanism. Anna's story underscored the profound influence familial events can have on one's well-being and coping strategies, particularly when already navigating the adversities of food insecurity.

“Beth" was a 42-year-old woman who smoked and had lived a life of numerous challenges. Once a recovering heroin addict and previously homeless, she endured the agony of having her children taken away during those tumultuous times. Having regained custody, she faced the added strain of caregiving for her youngest son with special needs, an experience she described as a constant oscillation between moments of progress and setbacks:

> *My son, my youngest son has behavioral—he has special needs. He has some behavioral issues. He goes to a special school, and he has had challenges, and that is a big thing for me. He’s been doing very well lately the last couple of months, but every so often, he hits a rough patch. And I’ve had the police come to my house for him, and that’s very stressful.* (Beth, CS11)

"Ava," a 34-year-old participant who smoked, faced multiple challenges beyond her experiences with food insecurity. Historically, Ava's narrative showed familial instability beginning from a young age. Specifically, she reported,

> *Well, when I was eight, my mom died… And I was put in foster care and kind of bounced around from home to home.* (Ava, CS13)

At the age of 10, she moved in with her aunt, but by 15, due to differences related to religious beliefs, she stated, "she was pushing it on me. And it just got to the point where I didn’t want to

be there anymore, so I took off." In addition to her early life adversities, Ava mentioned a medical procedure that required her to make lifestyle adjustments. She stated, "So the surgery was in February. I had to stop (smoking) back the end of January, so it would test clean." Furthermore, she indicated a significant financial setback when she mentioned, "But in June, when we realized we were moving, we had been saving money and it got stolen." This event seemed to coincide with a return to smoking, as evidenced by her statement, "that triggered so much stress that I just started smoking again."

"Diane," a 32-year-old woman who smoked, transitioned from the struggles of homelessness and scavenging for sustenance to a place of stability with her aging parents. Her history was a testament to resilience, and her current reality reflected her dedication to family. Amidst the challenges posed by her father's declining health, she fervently contributed to caregiving, aiding her mother in manifold ways, emphasizing the familial pressures she faced each day:

> *Mostly my parents. My dad has dementia and it can be very stressful. I try my best to split duties with my mom. Like if he needs help bathing, and things like that, she does it, but I try to cook at least half the meals. And I try to keep the house clean so that she doesn't have as much on her plate. And I usually do all the errands outside of the house.* (Diane, CS26)

"Mary," a 49-year-old woman, recounted her life punctuated by adversities stemming from a tumultuous domestic environment and the racial prejudices she faced due to her biracial heritage. Amidst the pain of witnessing parental conflicts and wrestling with her own identity in a world that often misunderstood her, she found herself tangled in the grip of substance abuse as an escape from her daunting circumstances:

> *I grew up with a lot of abuse, a lot of drugs, dysfunctional family…I was using cocaine back then.* (Mary,CS25)

"Lila," a 44-year-old woman who formerly smoked, described a series of adversities linked to familial challenges, financial strain, and substance abuse. Her narrative was punctuated with moments where she explicitly linked stress with smoking, highlighting the interconnectedness of these factors. She shared why she smoked in the past, "Stressful situations. Well, when I went through my divorce. Going through hard times in life made it bad to quit smoking at all." When probed about more recent challenges, Lila identified financial stress, saying, "Right now, I don't—just stressors of daily living, really. I want to say bills. Yeah, bills. That's a big stressor." Substance abuse was another pronounced theme in Lila's recounting. She shared, "I was on crack cocaine and that was very harsh. That was a very hard time in my life. I was in that addiction for almost 18 years, I want to say. In and out of rehab". Lila detailed her experiences with various substances but particularly emphasized the severity of her crack cocaine addiction, noting, "And the hardest one to get out of, for me, was crack cocaine." Her journey towards sobriety seemed to have commenced around 2005, following a stay in rehab where she mentioned, "I became Christian and they helped me back in 2005." Notably, the impact of substance misuse extended beyond personal health and wellness, affecting her family life significantly. Lila remarked,

> *I lost my children, my older children, for six—for about nine months to a year to the system because I was in such a bad shape back then.* (Lila, FS07)

Though she later regained custody with the help of her mother, Lila reflected on the profound challenges of her past, emphasizing, "It's something that I don't wish upon nobody. It's the worst, I don't know, slavery that you could ever be into that drug." Lila's narrative provided a

comprehensive view of the multifaceted adversities she encountered, emphasizing the confluence of familial, financial, and substance-related challenges in her life.

Hannah, a 52-year-old woman who formerly smoked, grappled with stress from family losses. The consecutive losses of her mother, followed by a sibling just six months later, intensified her emotional challenges. She recollected, "Like I lost my mom, I lost my sibling six months after my mom, so I was therapy-smoking." For Hannah, these losses pushed her to believe in the soothing qualities of smoking, thinking it was a form of self-medication. As time passed and she ceased smoking, she recognized that her initial perceptions might have been misplaced. Hannah eventually found solace in communication to cope with the overwhelming weight of her family tragedies and the consequent stress, sharing that her new approach was to "Just talk it out. Talk." Through this lens, Hannah's journey revealed a shifting narrative from using cigarettes as an emotional crutch during family-related distress to embracing open dialogue as a healthier and more constructive coping mechanism.

"Jasmine," a 45-year-old woman who smoked, navigated a life marked by early adversities, including teenage pregnancy, a challenging relationship with the foster care system, and health-related financial stress. Her history with substance misuse in her youth not only entangled her with the law but also influenced her desires as a prospective mother within the foster care context:

> *I was caught with marijuana, so they put me on probation…That was when I was like 12. But I kept running away, which was obviously a violation of my probation, so they put me in lockup a couple of times… I didn't want to have my child while I was in a foster home or they would take him* (Jasmine, CS14).

Health complications further complicated her life when she mentioned, "I had a blood clot in my carotid artery in my neck, and it blew up into my brain." This led to prolonged physical therapy and the necessity of blood thinners, which affected her financial situation, as she could no longer work as before: "I'm on Social Security, so it's not like a lot. I don't get much money." Recent unexpected expenses added to her woes, with her sharing, "In the last week, my TV broke, I'm having car problems, and I got an unexpected bill from the propane company for heating the house." With an income limited to SSI and assistance from her boyfriend, they barely made ends meet on around $1,100 or $1,200 monthly. Though they did not bear the burden of rent due to foreclosure, they leaned on other forms of government assistance, including food stamps and winter fuel aid.

Financial hardship, with its multifaceted implications, was a dominant theme that permeated the lives of all participants experiencing food insecurity regardless of their smoking status. This strain, often accentuated by unforeseen health issues and unexpected expenditures, challenged their daily existence. "Maya," a 58-year-old woman who smoked, faced financial stress, which added to her already challenging life dealing with limited income. One of the primary sources of her financial difficulties stemmed from an unplanned back surgery she underwent in 2012. She recalls, "I never planned on having back surgery, so now I'm on disability and limited income." The initiation of these health challenges could be traced back to a severe incident where she blew out a disc in her back. Although the disc issue was addressed, her back problems persisted, necessitating two surgeries. Not only did the surgeries bring about financial strain due to medical bills, but they also left her on disability. With a limited income and the added cost of her medical needs, managing day-to-day expenses and bills became a

predominant stressor for her. Coupled with her experiences of food insecurity, these financial burdens weighed heavily on Maya's well-being.

Building on the theme of financial struggles faced by participants, Emma, a 27-year-old woman who formerly smoked, confronted her financial hardships that intensified her challenges with experiencing food insecurity. She highlighted, "Money is a stressor." Although she lived with her boyfriend, she valued her financial independence, mentioning, "I've always been pretty independent with my finances, and so I don't really want to rely on him." This sense of self-reliance led her to seek opportunities, even for a nominal amount, like a $50 gift card. The distance from her family in Chicago increased costs, making visits financially strained. Further exacerbating her situation, her main job had recently been eliminated. However, finding solace in babysitting, she remarked, "I'm a lot less stressed these days because I love babysitting the kids that I babysit," indicating a slight reprieve from her financial woes.

Financial strain was a prevalent concern among participants who smoked and those who formerly smoked. However, a discernible shift in financial dynamics was observed among the participants who had ceased smoking. These participants recounted a positive transformation in their economic circumstances post-cessation of their smoking habit. The cessation granted them the luxury of more disposable income, which they could divert to meet other pressing needs. As a result, they experienced a tangible reduction in financial strain, with enhanced capability to cater to their essential requirements without compromising on food or other necessities. One participant elaborated, "I don't spend it on the cigarettes, and we have extra money, and we can do extra things." (Ashley, a 47-year-old woman who formerly smoked).

Similarly, "Lauren," a 55-year-old woman who formerly smoked, experienced a shift in her financial position after she ceased smoking. She remarked on the impact, stating, "My

grandkids are spoiled. Because, I mean, any extra money, I usually spend it on them. I've got better clothes. I've got things that I—my bills are always paid on time. I never fell behind on my bills, but I have more money during the month." This newfound financial stability not only allowed her to indulge in simple pleasures, such as buying a car or gifting her grandchildren, but also instilled a sense of security and accomplishment, as she proudly asserted, "Like I said, I just bought a new—well, not a new car, but a new car to me... I can show, okay, I bought a car with my money instead of cigarettes."

Apart from her interests, like hiking or tag sales, Laurens expressed love and dedication for her grandkids: "I love hanging out with my grandkids. I do a lot with my twin grandsons." Yet, juxtaposed with these treasured moments was a heartbreaking reality surrounding her granddaughter. "She is being put up for adoption... After Monday, I won't see her anymore because her aunt [who has custody] doesn't want me being a part of her life," Lauren lamented. Despite the economic relief from quitting smoking, this impending familial loss underlined the perpetual nature of her emotional trials. It showcased how for adults experiencing food insecurity, alleviating one source of stress like financial hardship, doesn't improve other life challenges, especially when faced with profound personal adversities.

Theme B.3: Navigating Low-Cost Food Access As a Part of Experiencing Food Insecurity

Participant narratives explored their food access challenges, shedding light on the dynamics between their smoking experiences and food acquisition habits. The food shopping patterns among participants found a consistent routine, with most indicating a "weekly" or "bi-weekly" shopping schedule. This frequency played a role in shaping the accessibility and choices of food available to these participants. Meanwhile, the acquisition of free food was primarily

influenced by the availability and periodicity of food resources. Several participants turned to specific programs like the Salvation Army, which provided daily lunch, while others depended on periodic distributions from locations such as food pantries or fresh vegetable giveaways. Notably, one of the more frequently mentioned food pantries limited food pick-ups to "once a month."

Participants exhibited preferences in their grocery shopping locations based on affordability, sales, and discounts. One participant said, "Usually Market Basket. It's just the cheapest." (CS26). Such sentiments echoed throughout the discussions, emphasizing the allure of Market Basket as a hub for cost-effective shopping. Another participant leaned towards an alternative, stating, "I've gone to Dollar Tree because it saves money so that I can [get] more for the food stamps that they give me." (CS12). A common trend emerged, with participants consistently turning to stores known for their budget-friendly options, such as Market Basket, Dollar Store, Save-A-Lot, and 7-Eleven. Yet, it wasn't just about frequenting a single store. One participant shared their diversified approach, remarking, "I go at least once a week, and I go to like every single store... depending on what's on sale." (CS14). Their shopping routine, as indicated, was molded by ongoing sales and deals across different outlets. For one participant, word-of-mouth played a role in their shopping decisions; "I was going to Wegmans, but recently, one of my neighbors said that Market Basket was really cheap for certain things." (FS04). This highlighted the communal aspect of information-sharing, where individuals exchange tips on where to find the best deals. Further emphasizing the role of sales and discounts in their shopping decisions, many participants relied on stores like Stop & Shop and BJ's. They also turned to apps from establishments like Star Markets to ensure they got the most value from every dollar.

All participants were engaged through local food pantries or they utilized complimentary meal services to supplement their dietary needs. Looking into their preferences, one prominent charitable organization was frequently sought for free meals. Its use among the participants highlighted its vital role in the community, offering sustenance to those in need. Likewise, another frequently mentioned community center was recognized for its provision of free groceries. The regular mention of this facility indicates its importance in supporting the participants, acting as a reliable source of food provisions.

Transportation, as a fundamental part of daily life, influenced the ability to access food among all food insecure participants regardless of their smoking status. John, a 47-year-old man who smoked, spoke of the challenges of his rural living. Without buses running in his area and a convenience store a mile away, he was limited in accessing bigger grocery stores. His words capture this reality:

> *I was going to walk yesterday, but somebody actually gave me a ride, and that was just to go get milk and a loaf of bread.* (John, CS04)

“Claire,” a 68-year-old woman who smoked, found her reliance on others for food transportation to the nearby community center. "I depend on other people to give me a ride there," she said, emphasizing her irregular visits despite the weekly availability of food resources. Mary, a 29-year-old woman who also smoked, relied on the goodwill of a neighbor who assisted with her transportation needs: "She will take me anywhere I need to go." Ava, a 34-year-old woman who smoked, portrayed another layer of complexity to this issue. Her strategy for food shopping involved a monthly excursion to stretch her food stamps, yet she faced challenges due to her lack of personal transportation. "The place closest to us, we’ll go buy their meats because they’re cheaper," she stated, adding the notable detail that, after spending fifty dollars, the store offers a

ride home, "saving us on having to Uber or Lyft home." For “Lila,” a 44-year-old woman who used to smoke, the absence of her vehicle led her to rely on her mother’s car for grocery trips. “Liam,” a 54-year-old man who formerly smoked, mentioned his proximity to a convenience store and a grocery store, but the emphasis was on walking, his primary mode of transportation. When asked about visits to a food pantry, he outlined his strategy: "I put it in a suitcase," highlighting the challenges of transporting groceries without a car and resorting to public transportation.

Theme B.4: Showing Resilience Through Food Insecurity Coping Strategies

In the complex landscape of food insecurity, participants showcased a remarkable range of coping strategies to manage their nutritional needs. A common trend was resilience, from carefully selecting long-lasting food items to innovative storage and meal planning. Balancing the fine line between budget constraints and sustenance, participants often prioritized essentials, ensuring that food lasts as long as possible. The art of making the most of available resources shone through as many adopted meticulous food management techniques. For some, this entailed freezing food portions for future consumption or integrating cost-effective ingredients to stretch their meals. Beyond the individual efforts, there was also an evident reliance on broader community support systems, including friends, family, and local organizations.

In the face of food insecurity, there was a palpable trend towards resourceful food storage and management strategies among participants. From staple purchases like rice and meat to versatile choices such as pasta and bread, there was a shared understanding of the importance of longevity in food items. The act of freezing portions for later consumption appeared to be a common tactic, suggesting an overarching strategy to extend the shelf life of perishables.

Furthermore, incorporating cost-effective ingredients showcased a collective effort to maximize meal volume without straining the budget.

"Beth," a 42-year-old woman who smoked, developed resourceful food storage practices to cope with food insecurity. Like many grappling with food shortages, she faced challenges ensuring her purchases were well-spent. Drawing from her personal experiences, she stated,

> *I really have to be aware like if I buy a family pack of meat, I have to break it up pretty quickly after and make sure I freeze it right away. (Beth, CS11)*

This approach was born out of past incidents where meat, a valuable food resource for her, has gone bad. Reflecting on the gravity of such losses, Beth lamented, "I don't have the money for that; animals died, and they're not even being used." This represented a financial strain and struck an emotional chord with Beth, reinforcing the importance of ensuring that food does not go to waste. She concluded, "So I've had to be very careful about that," which underlined her commitment to making the most of her available food resources.

"Liam," a 54-year-old male who formerly smoked, took a similar approach to managing food insecurity through food storage and preparation methods. To ensure that the food he purchased lasted as long as possible, Liam employed a two-pronged strategy. He noted, "If I make enough at one time, I put some in the freezer to eat later," indicating his practice of batch cooking and freezing portions for future consumption. This approach extended the shelf life of perishables and provided convenient meals for later dates. Additionally, Liam leveraged the cost-effectiveness of certain staple foods to stretch his meals further. He mentioned, "Or I mix it with cheaper foods, like the stuffing or, you know, different things like stuffing that's cheap." By integrating affordable ingredients into his meals, Liam augmented the volume of his dishes and maximized his food budget.

“Ava,” a 34-year-old woman who smoked, exhibited a keen sense of resourcefulness in her food storage practices. Ava prioritized staple foods that would last and offered sustenance for extended periods. She elaborated, "I figured if we run out of meat, we can still have rice, we can still have mashed potatoes, we can still have stuff like that." Her pragmatic approach was evident when she mentioned, "stuff that I didn’t have to buy. And I will always, like—next time I go, I have to buy a big, huge bag of rice, but I find that if I buy a huge bag of rice if there’s nothing else in the house, we can eat rice for a few months."

“Jared,” a 32-year-old man who previously smoked, frequently invested in staple items such as brown rice, pasta, tomato sauce, bread, and proteins like ham or turkey for sandwiches. These choices highlighted his focus on foods that can be easily stored and have a longer shelf life. An aspect of Jared's approach to food management was his reliance on frozen foods. Living alone, he mentioned, "I do certainly eat more frozen foods that I end up microwaving than I did growing up... Cooking for one, I definitely have more frozen burritos, or things like that." This suggested a consideration of convenience and portion control. Jared's involvement in a Farm Share demonstrated his proactive efforts to incorporate fresh vegetables into his meals. He exhibited adaptability, sharing, "I’ll wait to see what vegetables I’m getting for the week... last week we got kohlrabi, which isn’t a vegetable I’m familiar with. So I looked up some recipes and made this sort of coleslaw with grated kohlrabi in it." Notably, his approach to cooking involved preparing larger portions, which were then stored in Tupperware or frozen for future consumption. "Usually, I’m cooking two to three times a week in the evenings and then storing that for lunches and then for other dinners as well," he explained. Through these methods, Jared ensured that he had meals ready for multiple days without the need to cook daily, exemplifying a resourceful approach to managing his food resources.

Food insecurity often led participants to adopt coping mechanisms prioritizing sustenance over satiety. For many, the act of not eating became a conscious choice. "Well, just kind of hold my breath and wait for the food stamps to come," remarked “Claire” (68-year-old woman who smoked), underscoring the reliance on governmental assistance. This sentiment was echoed by others, revealing a shared experience of waiting in the hope of eventual relief. One prevalent theme was prioritizing feeding children over oneself, a sacrifice parents willingly made. “Sandra” (48-year-old woman who smoked) noted, "I don’t eat. I make sure my daughter is fed," emphasizing that the well-being of her child was paramount, even if it meant going without meals herself. Similarly, “Sarah's” (27-year-old woman who smoked) narrative gave insight into her daily battles, as she said,

> *I just try not to think about being hungry because I don’t have time or I don’t have the want to cook. (Sarah, CS08)*

Her strategy leaned on ready-to-eat foods like yogurt and fruits, but there was a clear undertone of resignation. Cooking, often associated with joy and nourishment, became a task overshadowed by fatigue and the subsequent chores it brought.

For some, the challenge was not about the entirety of the month but specific periods, such as the end of the month or around holidays. “Lauren” (a 55-year-old woman who formerly smoked) reflected on her experiences with budgeting, noting that she sometimes ran out of daily essentials like bread and milk. "I go without," she stated plainly, suggesting a sense of acceptance. Yet, there was also an adaptability and resourcefulness evident in her narrative. She elaborated on seeking external support, sharing, "That’s why I go to the food bank every week for the fruit and vegetables." This reliance on community resources like food banks indicated a more extensive support network that individuals tap into when faced with scarcity.

Navigating the complexities of food insecurity often goes beyond individual strategies; the role of friends and family can be paramount. Social ties became a lifeline for many, bridging the gap during times of scarcity. “Anna,” a 57-year-old woman who formerly smoked, introduced a unique and heartwarming coping mechanism that revolved around social ties and camaraderie. She has a friend who, not wanting to dine alone, often invited Anna to join her. When discussing how she coped when she was low on food, Anna shared, "I have a friend. She likes to cook because she doesn’t like eating by herself, so—". This recurring invitation was a form of sustenance and provided a shared dining experience. Anna stated she enjoyed this arrangement a couple of times each week.

Another participant who smoked, “Emma” (a 27-year-old woman), found solace in the support of her friends. While financial challenges, such as phone bills, rent, and the inaccessibility of her truck, compounded her situation, her friends became a crucial resource in her life. When asked about her coping mechanisms during limited funds, she responded, "I actually have friends... A lot of my friends help me." These friends, some of whom she had known for only a year, not only assisted with meals but went a step further. Emma mentioned, "My friends would buy it for me," underlining their pivotal role in ensuring she had food on her table. This support network was even extended when she might have needed something from the store. Emma shared,

> *My friend just knocked at the door before you called, said he was going to the store, and asked me if I needed anything.* (Emma, CS04)

Family also plays a role in helping participants cope with food insecurity. “Tammy,” a 40-year-old woman who smoked, was often concerned about the lack of fresh food to provide for her children towards the latter half of the month. She explained she worried about running low

on food, "usually around the 20th of the month because there's no fresh food for them (her kids). Like, I worry about them more than I do myself." However, Tammy was not entirely on her own. She benefited from the generosity of her uncle, who played a supportive role in her life. He aided her by providing meals from a local food pantry where he volunteered. Tammy elaborated, "Well, sometimes my uncle will bring me food because he volunteers at a food pantry on Fridays, and he used to bring me food, like, a lot of meats and stuff, sometimes produce." Aside from her uncle's assistance, Tammy also took advantage of community resources like the food distribution truck and other programs, though she sometimes faced scheduling conflicts with her appointments. These combined efforts, especially the timely help from her uncle, helped Tammy manage and mitigate the pressures of food insecurity.

"Lauren," a 55-year-old woman who formerly smoked, found relief through an arrangement with her upstairs neighbor. This neighborly relationship seemed to be a source of mutual support. Lauren said,

> *Like I said, my upstairs neighbor, tonight instead of tomorrow, I'm watching her daughter. In exchange, she made me supper, so I didn't have to use any of my food.* (Lauren, FS02)

This exchange went beyond just monetary or material aid, as her neighbor sometimes provided meals like the mentioned "chicken parmesan for supper," which Lauren appreciated not just for the immediate dinner but also as leftovers for another day.

For participants experiencing food insecurity, leveraging available resources and finding innovative solutions was essential. "Emma," a 27-year-old woman who formerly smoked, tapped into the digital age to address her food needs. She had discovered a modern coping strategy by joining a local Facebook group where community members offered items for free. Emma stated,

I am part of a Facebook group for my area, where people give away free things…I've gotten some food on there for free. (Emma, FS04)

This highlighted the potential of online platforms to connect with immediate resources.

Response to the Hypothetical $10 Spending Scenario Among Participants Who Currently Smoke

Half of the participants who smoked (47.8%) responded that they would choose to purchase a sandwich (Table 3). One participant remarked,

Well, right now I have a couple cigarettes so probably the sandwich (CS12).

Similarly, other participants who smoked voiced their inclination toward food, with comments like "Right now, I'd spend it on food because I already have cigarettes" (CS15) and "Cigarettes are not the priority/they're not first, because like I'm not going to be here hungry with a pack of cigarettes" (CS25). Conversely, 30.4% of the participants who smoked expressed a stronger inclination to buy cigarettes over a sandwich. One participant explained, "Yeah. I was actually going to tell you that—a minute ago I was going to tell you if I had the last $10 in my pocket it would go toward a bag of tobacco and tubes, which would be my cigarettes, over the sandwich" (CS04). Another commented on the lasting satisfaction they derive from smoking: "Well, because they would last a little bit. You know, the sandwich would be gone immediately once I'm done eating it" (CS20). Interestingly, despite the binary nature of the question, some participants offered alternative responses. One participant (4.3%) expressed an intent to purchase both items by saying, "I could get a pack of Hot Pockets; I could get a ticket and cigarettes" (CS19). Meanwhile, two participants (8.7%) opted for neither a sandwich nor cigarettes. One stated, "Neither, I would buy gas" (CS02), while another emphasized prioritizing essential bills

and partner's needs: "I always make sure our house or bills, or what my partner needs, comes before I ever buy a pack of cigarettes" (CS07). In summary, while a significant portion of participants who smoked favored food over cigarettes when posed with a choice, a sizable minority still prioritized smoking. Additionally, a few participants diverged from the presented options, reflecting the complexities of real-life decision-making(Table 4).

Food and Beverage Choices of Participants Who Currently Smoke and Formerly Smoked

For participants who smoked, some of foods and beverages they reported consuming when asked what they ate the day prior were coffee, bread, fresh vegetables, potatoes, dairy, eggs, fried chicken, and soda (Figure 2). Among the groceries they purchased or acquired from free meal services or food banks were items like fresh vegetables, fresh fruit, dairy, bread, pasta, coffee, chicken, and ramen. (Figure 4).

For participants who formerly smoked, some of foods and beverages they reported consuming when asked what they ate the day prior were bread, coffee, fresh vegetables, dairy, water, and eggs (Figure 3). Among the groceries they purchased or acquired from free meal services or food banks were items like dairy, fresh vegetables, fresh fruit, hot dogs, bread, and pasta (Figure 5).

Table 2. Comparison of the Demographic Characteristics of Adults Who Currently Smoke and Formerly Smoked

Characteristic	All (n=32)	Adults who currently smoke (n=23)	Adults who formerly smoked (n=9)	P
Age, years	44.0 ± 10.9	44.2 ± 11.5	43.7 ± 9.9	0.41
Gender				0.19
Female	23 (71.9)	18 (78.3)	5 (55.6)	
Male	8 (25.0)	5 (21.7)	3 (33.3)	
Non-binary	1 (3.1)	0 (0.0)	1 (11.1)	
Race/Ethnicity				0.58
White, non-Hispanic	20 (62.5)	15 (65.2)	5 (55.6)	
African American/Black	5 (15.6)	3 (13.0)	2 (22.2)	
Hispanic/Latino	4 (12.5)	3 (13.0)	1 (11.1)	
Another Race	1 (3.1)	0 (0.0)	1 (11.1)	
Bi-Racial: White/African American	1 (3.1)	1 (4.3)	0 (0.0)	
Bi-Racial: White/Hispanic Latino	1 (3.1)	1 (4.3)	0 (0.0)	
Education				0.16
Less than high school	3 (9.4)	3 (13.0)	0 (0.0)	
Completed high school	7 (21.9)	7 (30.4)	0 (0.0)	
Some college	15 (46.9)	8 (34.8)	7 (77.8)	
Completed a college degree	4 (12.4)	3 (13.0)	1 (11.1)	
More than college	3 (9.4)	2 (8.70)	1 (11.1)	

Source of Income[1]				1.0
Full time job	7 (21.9)	5 (21.7)	2 (22.2)	
Part time job	8 (25.0)	5 (21.7)	3 (33.3)	
Side gigs	9 (28.1)	8 (34.8)	1 (11.1)	
Family/Friend support	11 (34.4)	9 (39.1)	2 (22.2)	
Social Security or Social Security Disability Insurance	12 (37.5)	9 (39.1)	3 (33.3)	
Pension or retirement	2 (6.25)	0 (0.0)	2 (22.2)	
Unemployed	4 (12.5)	1 (4.3)	3 (33.3)	
Other[2]	10 (31.3)	9 (39.1)	1 (11.1)	
Food Assistance[3]				
Food Stamps (SNAP)	16 (50.0)	12 (52.2)	4 (44.4)	
Women Infant Children	2 (6.25)	1 (4.3)	1 (11.1)	
Dwelling Type				.41
Apartment	22 (68.8)	15 (65.2)	7 (77.8)	
House	6 (18.8)	4 (17.4)	2 (22.2)	
Unhoused [4]	4 (12.5)	4 (17.4)	0 (0.0)	
Own or Rent Dwelling				.13
Rent	14 (43.8)	8 (34.8)	6 (66.7)	
Own	4 (12.5)	2 (8.70)	2 (22.2)	
Not applicable[5]	14 (43.8)	13 (56.5)	1 (11.1)	

[1] Multiple income choices could be chosen
[2] Included financial support from child support, rental support programs, selling things online, participating in studies, not wanting to share their source, and performance art
[3] Not all participants mentioned receiving government funded food assistance
[4] Defined as homeless, living in shelter, car, trailer or couch surfing
[5] Participants either were not asked this question or did not live somewhere where owning/renting was an option, such as being homeless or living with someone who lets them stay there for free

Hypothetical Question Responses[6]	
Sandwich	11 (47.8)
Cigarette	8 (34.8)
Neither	2 (8.7)
Both Cigarette and Sandwich	1 (4.3)
Missing	1 (4.3)

[6] This question was intended for participants who currently smoke only. The question asked "Say you had $10 to spend at the store right now, and your choices were to spend it on a pack of cigarettes or a sandwich. What would you spend it on right now?" Not all participants answered the question. If they are in the neither category, they specifically said they would not get either

Table 3: Theme Descriptions and Example Quotes describing the Lived Experiences of Participants Experiencing Food Insecurity that Currently Smoke versus Formerly Smoked

Group	Theme	Description	Example Quotes
Participants Who Currently Smoke	Theme A.1: Using Cigarettes to Replace Food in the Context of Food Insecurity	Personal narratives reveal smoking as a means of appetite suppression, serving both as a coping mechanism for stress and an alternative to sustenance in the face of food scarcity.	*I don't really feel hunger…It (smoking) takes away my appetite.* (CS27)
	Theme A.2: Buying Cigarettes Instead of Food, Other Necessities, or Entertainment	As participants navigate the choices and sacrifices surrounding their smoking habits, the financial implications on their daily sustenance, especially their food choices, come to the fore.	*I avoid paying bills to make sure that I have cigarettes.* (CS27)
	Theme A.3: Concerns of Weight Gain Impeding Smoking Cessation	Participants who smoked expressed anxiety about weight gain if they were to stop smoking.	*I've lost weight since I started smoking and I feel like if I quit I'm going to gain all of that weight back…I'm terrified I'm going start gaining weight once I quit.* (CS13)
	Theme B.1: The Interplay of Mental and Physical Illness, Food Insecurity, and Smoking Histories	Participants who smoked and formerly smoked faced various mental and physical health challenges that had impact on their day to day lives.	*I grew up with a lot of abuse, a lot of drugs, dysfunctional family… I had post traumatic stress disorder a little bit after all that.* (CS05) *I have a metal plate in my neck...I also have a torn rotator cuff in my right shoulder...three of the discs in my lower*

Participants who currently smoke and formerly smoked			*back are crushed… I've had 22 surgeries in 14 years. So, pain is like an everyday thing with me. I literally have pain every day.* (FS02)
	Theme B.2: Psychosocial Stressors, Health Issues, and Financial Strain Forming a Cycle that Exacerbates Food Insecurity	Face challenges ranging from personal grief, past traumas, family instability, substance misuse, to financial strains, highlighting the multifaceted adversities intrinsic to those experiencing food insecurity.	*I never planned on having back surgery, so now I'm on disability and limited income* (CS07) *I lost my children, my older children, for six—for about nine months to a year to the system because I was in such a bad shape back then.* (FS07)
	Theme B.3: Navigating Low-Cost Food Access As a Part of Experiencing Food Insecurity	The location, prices, transportation, and timing of how participants accessed their food had an impact on their food choices.	*The place closest to us, we'll go buy their meats because they're cheaper. And when you've spent a fifty dollars…that saves us on having to Uber or Lyft home.* (CS13) *Interviewer: Now how do you get there?* *FS10:By a bus.* *Interviewer: Through a bus? Okay. And how do you do if you have a lot of stuff or something?* *FS10:I put it in a suitcase.*
	Theme B.4: Showing Resilience Through Food Insecurity Coping Strategies	Participants adopted similar strategies for coping experiencing food insecurity such	*I just try not to think about being hungry.* (CS08)

		as getting aid from others, using resourceful food storage strategies, or simply choosing to not eat.	*Like I said, my upstairs neighbor, tonight instead of tomorrow, I'm watching her daughter. In exchange, she made me supper, so I didn't have to use any of my food.* (FS02)

Table 4. Hypothetical Scenario Responses and Comments From <u>Participants Who Currently Smoke</u>

Answer Choice	Percent	Notable Quotes Explaining Why
Sandwich	47.8%	*Well, right now I have a couple cigarettes so probably the sandwich. (CS12)* *Right now, I'd spend it on food because I already have cigarettes.* (CS15) *Something to eat…Because I already have cigarettes.* (CS18) *Right now, something to eat because I have cigarettes.* (CS22) *Cigarettes are not the priority/they're not first, because like I'm not going to be here hungry with a pack of cigarettes.* (CS25)
Cigarette	30.4%	*Yeah. I was actually going to tell you that—a minute ago I was going to tell you if I had the last $10 in my pocket it would go toward a bag of tobacco and tubes, which would be my cigarettes, over the sandwich.* (CS04) *I feel like if my kids were going to be needing it that's different and I would always give to them first. But for me, I don't know, I guess I find the cigarettes more satisfying than anything else, or more necessary.* (CS05) *Oh, right now probably—yeah, I hate to say it but cigarettes because I don't—I'm nauseous a lot now from just all the medical issues. So, that's awful because if you're having health issues why would you smoke, but that's how it is.*(CS17) *Well, because they would last a little bit. You know, the sandwich would be gone immediately once I'm done eating it.* (CS20) *Because I know full well that I can still work and make money for the things that I need when I'm hungry but if I can't smoke then I can't do that.* (CS26)
Both	4.3%	*I could get a pack of Hot Pockets; I could get a ticket and cigarettes.* CS19)
Neither	8.7%	*Neither, I would buy gas.* (CS02) *I always make sure our house or bills, or what my partner needs, comes before I ever buy a pack of cigarettes.*(CS07)
No Answer	8.7%	

Figure 2. Word cloud illustrating the foods and beverages consumed by <u>participants who currently smoke</u> during the previous day

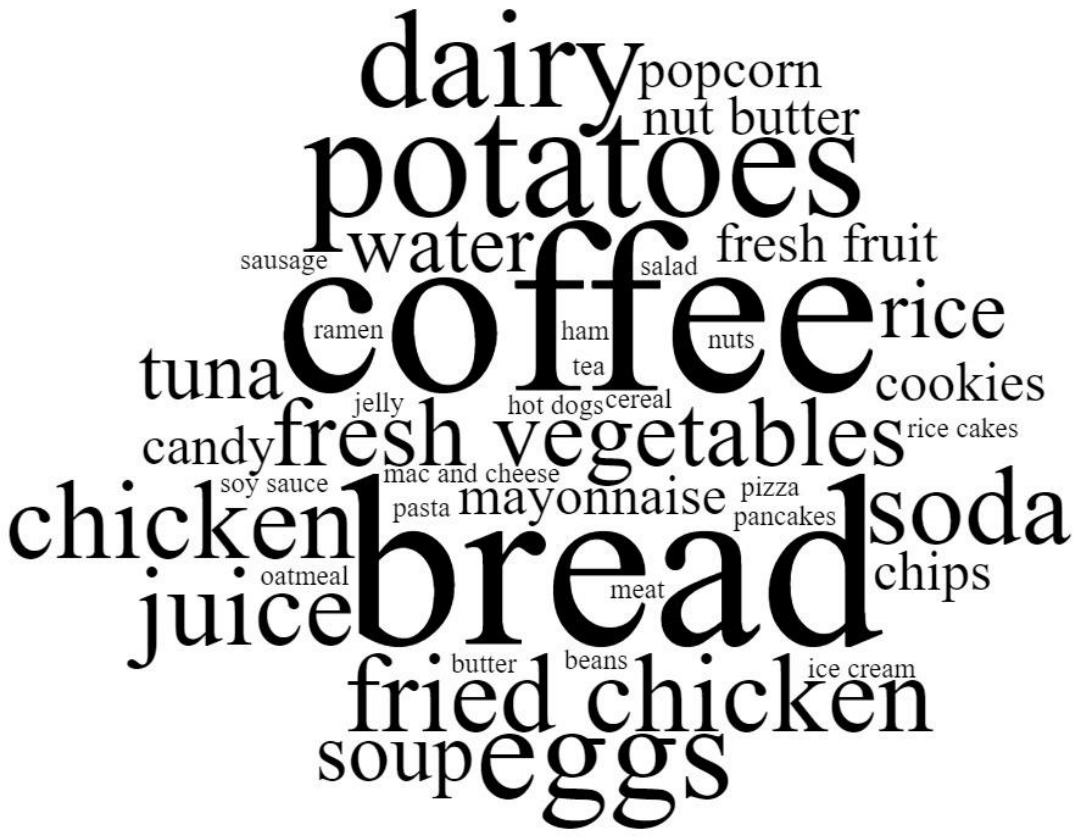


Figure 3. Word cloud illustrating the foods and beverages consumed by <u>participants who formerly smoked</u> during the previous day

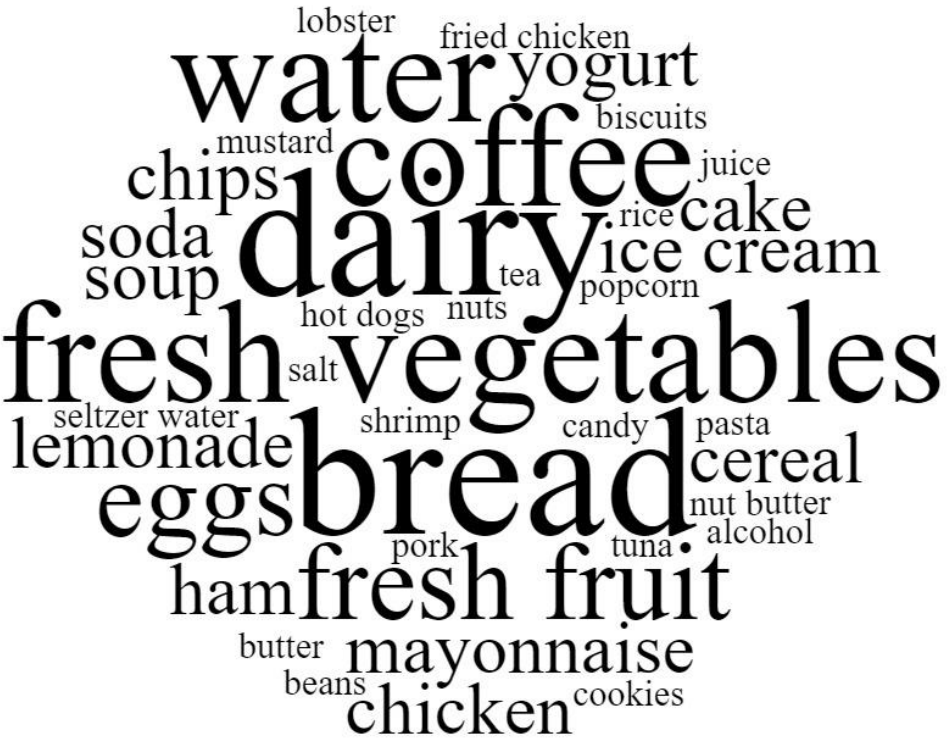


Figure 4. Word cloud illustrating the foods and beverages purchased or acquired at no cost by <u>participants who currently smoke</u>

Foods mentioned here were not always necessarily eaten by participants but were just mentioned as items they purchased or got for free.

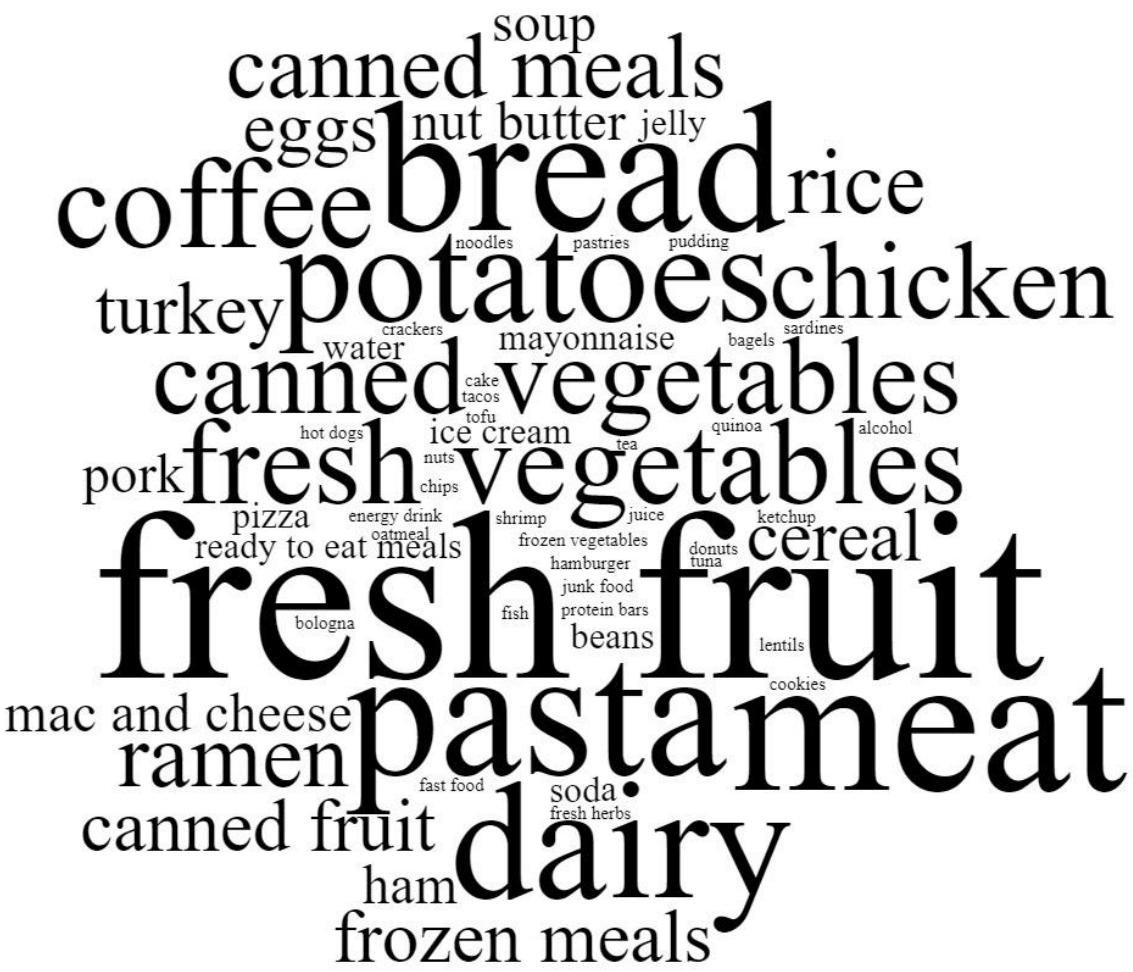
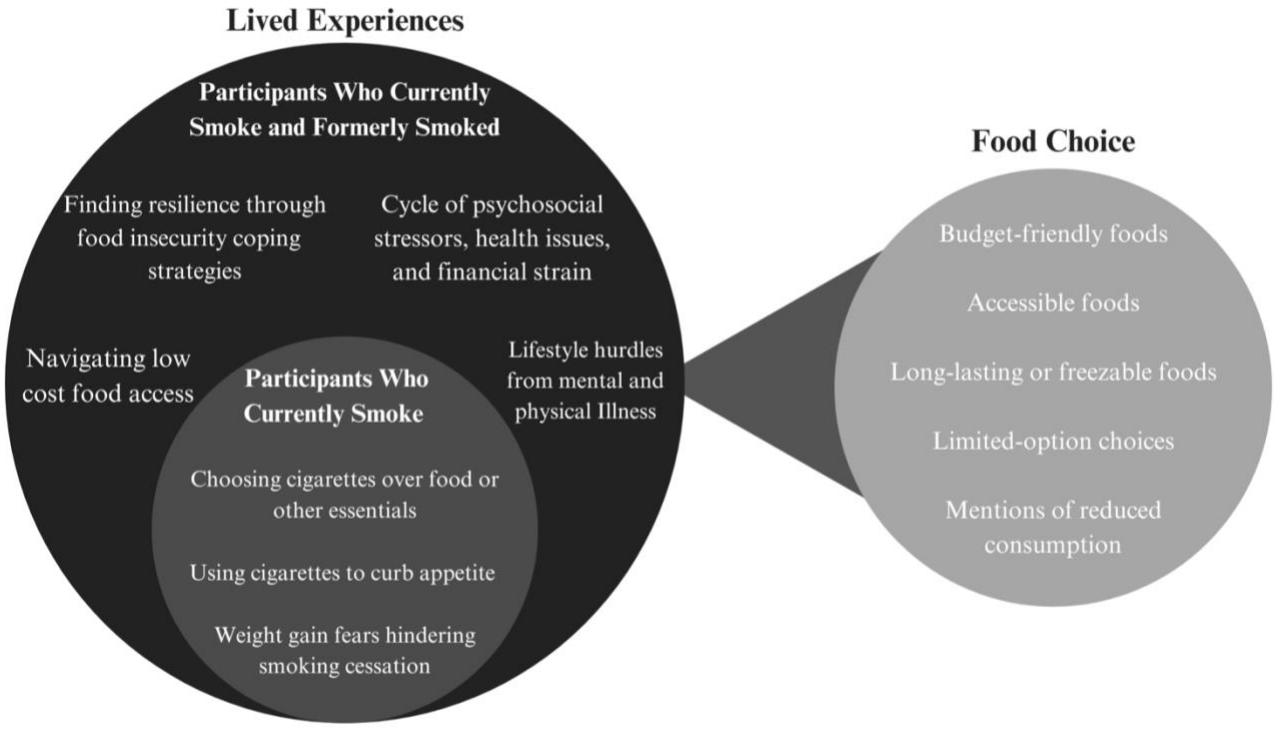


Figure 5. Word cloud illustrating the foods and beverages purchased or acquired at no cost by <u>participants who formerly smoked</u>

Foods mentioned here were not always necessarily eaten by participants but were just mentioned as items they purchased or got for free.

Figure 6. Themes Describing the Lived Experiences of Food Insecurity, Including Food Choice, Among <u>Participants Who Currently Smoke and Formerly Smoked</u>



Discussion

In this qualitative analysis, we described and compared the lived experiences of food insecurity, including the food choices, of people who currently smoke and those who formerly smoked in rural communities. The findings underscore the complexity and multi-faceted nature of the lived experiences of food insecurity among participants who currently smoke and those who formerly smoked.

Prior research from studies that used quantitative approaches showed the apprehension of weight gain as a barrier to smoking cessation, the appetite-suppressing effects of smoking, and the link between eating disorders and smoking[107-114]. Our research offered more nuanced insights using qualitative approaches to understand the lived experiences of food-insecure individuals who smoke versus those that formerly smoked. In our study, personal experiences

and familial anecdotes shaped their concerns about potential weight gain when considering smoking cessation. A different study used a qualitative approach through detailed assessments over the telephone to compare smoking behaviors, patterns, and beliefs among Chinese- and English-speaking adults living in Canada who smoke participating in a smoking cessation program. [115] Similar to our study, participants in this Canadian study also emphasized concerns with appetite and weight gain after smoking cessation. [115] However, our work includes the narratives of people experiencing food insecurity that not only currently smoke but also people who formerly smoked.

Previous research, both qualitative and quantitative, has found smoking status may influence spending habits. [27, 28, 116] A 2015 study found that socioeconomically disadvantaged people living in Australia who smoke often chose cigarettes over essential household expenses. [116] Similarly, our study found food insecure participants who smoke often viewed smoking expenses as non-negotiable, prioritizing them even over essentials. In the hypothetical spending scenario, most chose to spend $10 on food (a sandwich) over cigarettes, but the ease of accessing cigarettes elsewhere influenced the choice. Prior quantitative research has indicated that people who formerly smoked prioritize expenses like groceries and medical needs[27, 28], however, these studies looked at participants who smoke in China and Australia, and did not restrict to individuals experiencing food insecurity. In our study, some food insecure participants who formerly smoked found financial reprieve by transitioning to vaping or smoking cessation; they described how these practices helped them better manage their finances. However, the perceived improved financial management of food insecure participants who formerly smoked did not reflect improvements in overall life challenges experienced.

The narratives about the lived experiences of food insecure participants who currently smoke and formerly smoked in our study showed how they grappled with physical and mental illness-related setbacks. A 2015 longitudinal study among 7,946 U.S. adults found a cyclical relationship between psychological distress, food insecurity, and smoking, where each exacerbated the other. [103] The lived experiences of food insecure people who currently smoke and formerly smoked in our study provide insights into the mental health struggles of individuals experiencing food insecurity. Along with mental illness, we found participants experiencing food insecurity who currently smoke and formerly smoked also experienced challenges from chronic diseases such as diabetes and hypertension. Prior quantitative research found these health risks and more among those experiencing food insecurity and those who smoke. [117-119]

In previous work that focused on food insecurity among the participants who currently smoke, we found the same findings including complex adversities experienced among participants. [89] In this study, we compared the lived experiences of food insecurity among participants who currently smoke and formerly smoked and we found that participants who currently smoke and formerly smoked shared narratives of familial conflicts, substance misuse, and financial challenges, with some highlighting the deep-rooted intergenerational cycles of poverty and trauma within their families. These intertwined struggles, ranging from emotional family events to unexpected medical expenses, emphasized the broad spectrum of adversities and stressors faced by those experiencing food insecurity, regardless of their smoking status.

In our study, as expected, participants faced challenges accessing food given that they were experiencing food insecurity. Their narratives highlighted a continuous search for affordable food options, with many utilizing food pantries. Living in a rural area added to their difficulties as there were additional transportation barriers to reach a grocery or food store. These

narratives found food access challenges for individuals experiencing food insecurity independent of their smoking history. Previous research has found that challenges with accessing food are a recurring pattern among U.S. citizens of all ages experiencing food insecurity, but there has yet to be research that considered smoking status. [67, 69, 70]

We found that intertwined with food accessibility difficulties, stories of resilience among food insecure participants who currently smoke and formerly smoked showed up in the form of utilizing various coping strategies. Regardless of smoking status, food-insecure participants employed methods like freezing items, buying long-lasting foods, and tapping into community food banks, online groups, and personal networks for support. They leaned on traditional community supports, like food banks, and modern avenues, such as social media groups, to meet their nutritional needs. Food insecure participants who currently smoke often turned to cigarettes as a coping strategy to manage anxiety and curb hunger. One participant who formerly smoked transitioned to open dialogue as an alternative to cigarette use, illustrating there was a mix of both positive and negative coping strategies. Although another qualitative study echoes similar strategies among people experiencing food insecurity in rural communities, including counties across Montana, Arkansas, Oregon, Texas, North Carolina, and West Virginia [14], our study described the lived experiences of food-insecure adults who smoke and formerly smoked.

Our findings on the lived experiences of food-insecure people who smoke also included insights into their food choices. Through the analysis of word clouds, we found a pattern among food insecure participants who currently smoke and formerly smoke regarding the variety and diversity of food choices and consistently mentioning foods such as fresh fruits, fresh vegetables, meat, bread, dairy, and pasta. We did not see differences in the patterns of mentioned foods and beverages consumed based on smoking status. This implies that food choice is likely driven by

food insecurity, not smoking status. Studies using quantitative methods have found that people who smoke and those experiencing food insecurity consume more high-fat and processed foods while consuming fewer fruits, vegetables, and essential nutrients than their non-smoking or food-secure counterparts. [19-26] In contrast, we found food insecure participants, regardless of smoking status, mentioned consuming nutrient-dense items like fruits and vegetables (whether fresh, canned, or frozen), as well as high-fat and processed foods, including meat, hot dogs, and ramen. While studies have found that cultural preferences can impact food choice,[75, 120] participants in our study did not mention culture specific food choices. However, there were some mentions of social preferences. Some participants prioritized feeding their children these foods while not eating themselves. Participants also mentioned choosing foods recommended by their friends, family, and neighbors. Participant food choices did not always reflect their preferred choices. Some had to rely on food banks or free meal services, limiting their options, which once again relates to their challenges with food access. A 2019 qualitative study in Liverpool, UK, analyzed the food choices of food-insecure adults and found similar themes to our research, including that participants would prioritize their children's intake and opt for foods within their financial and physical reach rather than their personal preferences. [121] However, this study did not consider smoking status.

In previous work by my committee member Dr. Jin Kim-Mozeleskifound similar themes, such as smoking to alleviate hunger, prioritizing cigarettes, the influence of life stressors on lived experiences, and past adversities. [89] However, that study focused primarily on the lived experiences of food-insecure participants who currently smoke while in this study, we compared the lived experiences of food-insecure adults who currently smoke *and* formerly smoked and

provide an understanding of their food choices as a part of their lived experiences of food insecurity.

A strength of this study is that it addresses the gap in understanding the lived experiences and food choices of food-insecure people who either currently smoke or formerly smoked. A second strength is its rural setting, offering insights into the challenges individuals experiencing food insecurity and smoking living there face. Similar to our study, another study that also sampled participants from six rural regions in the U.S. and focus on the coping mechanisms with regards to experiencing food insecurity, in rural United States, found similar coping strategies such as using community support for transportation and food. [14] Previous research has shown that rural communities often lack access to fresh produce and supermarkets, and the use of convenience stores like the Dollar Store are common, which was a type of store seen in our study. [14, 50, 56] Our study was able to gain insight into the reasons that food insecure participants who currently smoke and formerly smoke chose convenience stores within a rural setting; accessibility and prioritizing budget friendly options found at convenience stores were found as the main reasons.

While this study has several strengths, it has certain limitations. Our participant pool was predominantly female and included a higher proportion of people who currently smoke (23) compared to people who formerly smoked (nine). An additional constraint in our study was the susceptibility to recall bias concerning participants' descriptions of their food choices and methods used to cook or prepare the food. For example, a participant could have mentioned “chicken” and not say it was instead “fried chicken”, as participants were not asked about how their food was cooked. Moreover, the extent of processing can differ markedly among food items, a subtlety that participants seldom conveyed, given they were not explicitly instructed to

specify such details. For example, certain varieties of cheese undergo more processing than others, leading to variations in their nutritional profiles.

While other studies have assessed the lived experiences of food insecurity[14, 40-43] and the lived experiences of people who smoke[44-47], this study looked at the lived experiences of food insecurity among people who smoke and people who formerly smoked and how these experiences influenced their food choices. The findings of this study can be used to inform and develop food insecurity community support programs. The findings from this study can also inform health care professionals by guiding them to offer more targeted interventions that acknowledge the lived experiences and adversities of food insecure people who smoke or formerly smoked.

Conclusions

This qualitative analysis compared and described the lived experiences of food insecurity, including the food choices, among people who currently smoke versus people who formerly smoked in a rural community. The findings underscore the complexity and multi-faceted nature of lived experiences of food insecurity among participants who currently smoke and those who formerly smoked. Food insecure adults, irrespective of their smoking status, encountered challenges such as mental and physical illnesses, limited access to food within a rural context, and various adversities encompassing substance abuse, family conflicts, and financial constraints and employed coping strategies to address both food insecurity and their various life challenges. The food choices of food insecure participants that were current versus former smokers were similar and included both nutrient-rich options such as fresh fruits and vegetables and dairy but also beverages such as coffee and soda, and high-fat and processed foods such as meat (hot dogs). There were some variations in the lived experiences of food insecurity between the two

groups. Participants who smoke shared practices of suppressing their appetite, prioritizing use of tobacco over food, and concerns regarding weight gain if they were to quit. Conversely, some participants who formerly smoked expressed some relief from the financial burden following smoking cessation; however, this relief did not mitigate their other life challenges or improve their food choices. Future research is needed to describe and compare the lived experiences of food insecurity among participants who currently smoke, formerly smoked, and never smoked. Additionally, future research should describe and compare the lived experiences of food insecurity and food choices among people who currently smoke and formerly smoke within an urban setting.

REFERENCES

1. Kim-Mozeleski, J.E. and R. Pandey, *The Intersection of Food Insecurity and Tobacco Use: A Scoping Review.* Health Promot Pract, 2020. **21**(1_suppl): p. 124s-138s.
2. *Food Insecurity: A Public Health Issue.* Public Health Rep, 2016. **131**(5): p. 655-657.
3. Rabbit, M.P., Hales, L.J., Burke, M.P., Coleman-Jensen, A., *Household Food Security in the United States in 2022.* USDA Economic Research Service, 2023. **Economic Research Report Number 325**.
4. United States Department of Agriculture. *Definitions of Food Security*. n.d.; Available from: https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/.
5. Cutler-Triggs, C., et al., *Increased rates and severity of child and adult food insecurity in households with adult smokers.* Arch Pediatr Adolesc Med, 2008. **162**(11): p. 1056-62.
6. Health, U.D.o. and H. Services, *The health consequences of smoking—50 years of progress: a report of the Surgeon General*. 2014, Atlanta, GA: US Department of Health and Human Services, Centers for Disease ….
7. Centers For Disease Control and Prevention. *Smoking & Tobacco Use: Adult Data*. March 8 2023]; Available from: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm.
8. Mayer, M., et al., *Tobacco use increases risk of food insecurity: An analysis of continuous NHANES data from 1999 to 2014.* Prev Med, 2019. **126**: p. 105765.
9. Bergmans, R.S., *Food insecurity transitions and smoking behavior among older adults who smoke.* Prev Med, 2019. **126**: p. 105784.
10. Drope, J., et al., *Who's still smoking? Disparities in adult cigarette smoking prevalence in the United States.* CA: A Cancer Journal for Clinicians, 2018. **68**(2): p. 106-115.
11. Busch, S.H., et al., *Burning a hole in the budget: tobacco spending and its crowd-out of other goods.* Appl Health Econ Health Policy, 2004. **3**(4): p. 263-72.
12. Doogan, N.J., et al., *A growing geographic disparity: Rural and urban cigarette smoking trends in the United States.* Prev Med, 2017. **104**: p. 79-85.
13. Parker, M.A., et al., *Trends in Rural and Urban Cigarette Smoking Quit Ratios in the US From 2010 to 2020.* JAMA Network Open, 2022. **5**(8): p. e2225326-e2225326.
14. Byker Shanks, C., et al., *Food Insecurity in the Rural United States: An Examination of Struggles and Coping Mechanisms to Feed a Family among Households with a Low-Income.* Nutrients, 2022. **14**(24).
15. Liese, A.D., et al., *Food Store Types, Availability, and Cost of Foods in a Rural Environment.* Journal of the American Dietetic Association, 2007. **107**(11): p. 1916-1923.
16. Morland, K., A.V. Diez Roux, and S. Wing, *Supermarkets, Other Food Stores, and Obesity: The Atherosclerosis Risk in Communities Study.* American Journal of Preventive Medicine, 2006. **30**(4): p. 333-339.
17. Srour, B., et al., *Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé).* BMJ, 2019. **365**: p. l1451.
18. Rico-Campà, A., et al., *Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study.* BMJ, 2019. **365**: p. l1949.
19. Chao, A.M., et al., *Examining the effects of cigarette smoking on food cravings and intake, depressive symptoms, and stress.* Eat Behav, 2017. **24**: p. 61-65.
20. Palaniappan, U., et al., *Fruit and vegetable consumption is lower and saturated fat intake is higher among Canadians reporting smoking.* J Nutr, 2001. **131**(7): p. 1952-8.

21. Dallongeville, J., et al., *Cigarette smoking is associated with unhealthy patterns of nutrient intake: a meta-analysis.* J Nutr, 1998. **128**(9): p. 1450-7.
22. McPhillips, J.B., et al., *Dietary differences in smokers and nonsmokers from two southeastern New England communities.* J Am Diet Assoc, 1994. **94**(3): p. 287-92.
23. Subar, A.F., L.C. Harlan, and M.E. Mattson, *Food and nutrient intake differences between smokers and non-smokers in the US.* Am J Public Health, 1990. **80**(11): p. 1323-9.
24. Kang, H.H., et al., *Relationship between diet quality and smoking status in Korean men: Findings from the cancer screening examination cohortφ and the tobacco control center€ in Korea.* Clinical Nutrition ESPEN, 2020. **40**: p. 492-493.
25. Leung, C.W., et al., *Food insecurity is inversely associated with diet quality of lower-income adults.* J Acad Nutr Diet, 2014. **114**(12): p. 1943-53.e2.
26. Mello, J.A., et al., *How is food insecurity associated with dietary behaviors? An analysis with low-income, ethnically diverse participants in a nutrition intervention study.* J Am Diet Assoc, 2010. **110**(12): p. 1906-11.
27. Lal, A., et al., *Household expenditure of smokers and ex-smokers across socioeconomic groups: results from a large nationwide Australian longitudinal survey.* BMC Public Health, 2022. **22**(1): p. 1706.
28. Xin, Y., et al., *The impact of smoking and quitting on household expenditure patterns and medical care costs in China.* Tobacco Control, 2009. **18**(2): p. 150-155.
29. West, R., *Tobacco smoking: Health impact, prevalence, correlates and interventions.* Psychol Health, 2017. **32**(8): p. 1018-1036.
30. Conway, T.L. and T.A. Cronan, *Smoking, exercise, and physical fitness.* Prev Med, 1992. **21**(6): p. 723-34.
31. Williamson, D.F., et al., *Smoking cessation and severity of weight gain in a national cohort.* New England Journal of Medicine, 1991. **324**(11): p. 739-745.
32. Klesges, R.C., et al., *Smoking, body weight, and their effects on smoking behavior: a comprehensive review of the literature.* Psychological bulletin, 1989. **106**(2): p. 204.
33. Health, U.D.o. and H. Services, *The Health and Human Services. The Health Benefits of Smoking Cessation.* A report of Surgeon General. US Department of Health and Human Services, 1990.
34. Swan, G.E. and D. Carmelli, *Characteristics associated with excessive weight gain after smoking cessation in men.* American Journal of Public Health, 1995. **85**(1): p. 73-77.
35. Pampel, F.C., P.M. Krueger, and J.T. Denney, *Socioeconomic Disparities in Health Behaviors.* Annu Rev Sociol, 2010. **36**: p. 349-370.
36. Armour, B.S., M.M. Pitts, and C.W. Lee, *Cigarette smoking and food insecurity among low-income families in the United States, 2001.* Am J Health Promot, 2008. **22**(6): p. 386-92.
37. Hosler, A.S. and I.H. Michaels, *Association Between Food Distress and Smoking Among Racially and Ethnically Diverse Adults, Schenectady, New York, 2013-2014.* Prev Chronic Dis, 2017. **14**: p. E71.
38. Castro, Y., et al., *Social and Environmental Factors Related to Smoking Cessation among Mothers: Findings from the Geographic Research on Wellbeing (GROW) Study.* Am J Health Behav, 2015. **39**(6): p. 809-22.
39. Kim, J.E. and J.Y. Tsoh, *Cigarette Smoking Among Socioeconomically Disadvantaged Young Adults in Association With Food Insecurity and Other Factors.* Prev Chronic Dis, 2016. **13**: p. E08.
40. Michaud, C., *Lived Experiences of Food Insecurity in a Northeastern Urban Setting: A Qualitative Study*. 2023, Research Square.

41. Anderson, A., J. Lazarus, and E. Anderson Steeves, *Navigating Hidden Hunger: An Exploratory Analysis of the Lived Experience of Food Insecurity among College Students.* Int J Environ Res Public Health, 2022. **19**(19).
42. Douglas, F., E. MacIver, and C. Yuill, *A qualitative investigation of lived experiences of long-term health condition management with people who are food insecure.* BMC Public Health, 2020. **20**(1): p. 1309.
43. Moraes, C., et al., *Understanding Lived Experiences of Food Insecurity through a Paraliminality Lens.* Sociology, 2021. **55**(6): p. 1169-1190.
44. Ebrahimi, H., et al., *Experiences of adult smokers from the concepts of smoking: A content analysis.* Iran J Nurs Midwifery Res, 2014. **19**(6): p. 550-7.
45. Habibi, Y., et al., *Etiology of Smoking Tendency: A Qualitative Examination of the Experiences of Young Smokers.* Depiction of Health, 2021. **12**(4): p. 404-416.
46. Guillaumier, A., B. Bonevski, and C. Paul, *'Cigarettes are priority': a qualitative study of how Australian socioeconomically disadvantaged smokers respond to rising cigarette prices.* Health Educ Res, 2015. **30**(4): p. 599-608.
47. Grogan, S., et al., *How has COVID-19 lockdown impacted smoking? A thematic analysis of written accounts from UK smokers.* Psychology & Health, 2022. **37**(1): p. 17-33.
48. Thomas, B.J., *Food deserts and the sociology of space: Distance to food retailers and food insecurity in an urban American neighborhood.* International Journal of Humanities and Social Sciences, 2010. **4**(7): p. 1545-1554.
49. Morton, L. and T. Blanchard, *Starved for access: Life in rural America's food deserts. Retrieved March 16, 2014*. 2007.
50. M, D., *Dollar Store Impacts: Fact Sheet. In: The Impact of Dollar Stores and How Communities Can Fight Back. Minneapolis, MN, Institute for Local Self-Reliance. .* 2018.
51. United States Department of Agriculture, *Food Insecurity for Households With Children Rose in 2020, Disrupting Decade-long Decline.* n.d.
52. United States Department of Agriculture. *Food Insecurity Decreased for U.S. Households With Children in 2021, but Increased for Households Without Children*. n.d.; Available from: https://www.ers.usda.gov/amber-waves/2022/november/food-insecurity-decreased-for-u-s-households-with-children-in-2021-but-increased-for-households-without-children/#:~:text=For%20households%20with%20children%2C%20food,from%2014.8%20percent%20in%202020.
53. Pereira, M.H.Q., et al., *Food insecurity and nutritional status among older adults: a systematic review.* Nutrition Reviews, 2021. **80**(4): p. 631-644.
54. United States Department of Agriculture. *Key Statistics & Graphics; Food Security Status of U.S. Households in 2021*

. Feb 25 2023]; Available from: https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/key-statistics-graphics/#householdtype.
55. Powell, L.M., et al., *Food store availability and neighborhood characteristics in the United States.* Prev Med, 2007. **44**(3): p. 189-95.
56. United States Department of Agriculture, *Go to the Atlas.* USDA Economic Research Service, 2023.
57. Setiono, F.J., N. Gangrade, and T.M. Leak, *U.S. Adolescents' Diet Consumption Patterns Differ between Grocery and Convenience Stores: National Health and Nutrition Examination Survey 2011-2018.* Int J Environ Res Public Health, 2021. **18**(16).
58. ERS, U., *Rural Poverty and Well-Being.* Last Updated November 29, 2022.
59. Heerman, W.J., et al., *Food insecurity is associated with diabetes self-care behaviours and glycaemic control.* Diabet Med, 2016. **33**(6): p. 844-50.
60. Seligman, H.K. and D. Schillinger, *Hunger and socioeconomic disparities in chronic disease.* N Engl J Med, 2010. **363**(1): p. 6-9.

61. Herman, D., et al., *Food Insecurity and Cost-Related Medication Underuse Among Nonelderly Adults in a Nationally Representative Sample.* Am J Public Health, 2015. **105**(10): p. e48-59.
62. Reeder, N., et al., *Food Insecurity and Depression among US Adults: NHANES 2005-2016.* Nutrients, 2022. **14**(15).
63. Ljungberg, T., E. Bondza, and C. Lethin, *Evidence of the Importance of Dietary Habits Regarding Depressive Symptoms and Depression.* Int J Environ Res Public Health, 2020. **17**(5).
64. Myers, C.A., *Food Insecurity and Psychological Distress: a Review of the Recent Literature.* Curr Nutr Rep, 2020. **9**(2): p. 107-118.
65. Haghighian Roudsari, A., et al., *Psycho-Socio-Cultural Determinants of Food Choice: A Qualitative Study on Adults in Social and Cultural Context of Iran.* Iran J Psychiatry, 2017. **12**(4): p. 241-250.
66. Azétsop, J. and T.R. Joy, *Access to nutritious food, socioeconomic individualism and public health ethics in the USA: a common good approach.* Philos Ethics Humanit Med, 2013. **8**: p. 16.
67. Drewnowski, A. and P. Eichelsdoerfer, *Can Low-Income Americans Afford a Healthy Diet?* Nutr Today, 2010. **44**(6): p. 246-249.
68. Johnson, F. and J. Wardle, *Variety, Palatability, and Obesity.* Advances in Nutrition, 2014. **5**(6): p. 851-859.
69. Rose, D., *Access to healthy food: a key focus for research on domestic food insecurity.* J Nutr, 2010. **140**(6): p. 1167-9.
70. Ziso, D., O.K. Chun, and M.J. Puglisi, *Increasing Access to Healthy Foods through Improving Food Environment: A Review of Mixed Methods Intervention Studies with Residents of Low-Income Communities.* Nutrients, 2022. **14**(11).
71. Kaji, A., et al., *Frequent Usage of Convenience Stores is Associated with Low Diet Quality.* Nutrients, 2019. **11**(6).
72. Bahadoran, Z., P. Mirmiran, and F. Azizi, *Fast Food Pattern and Cardiometabolic Disorders: A Review of Current Studies.* Health Promot Perspect, 2015. **5**(4): p. 231-40.
73. Perez, A.D. and C. Hirschman, *The Changing Racial and Ethnic Composition of the US Population: Emerging American Identities.* Popul Dev Rev, 2009. **35**(1): p. 1-51.
74. Dao, M.C., et al., *Cultural Influences on the Regulation of Energy Intake and Obesity: A Qualitative Study Comparing Food Customs and Attitudes to Eating in Adults from France and the United States.* Nutrients, 2020. **13**(1).
75. Chen, P.J. and M. Antonelli, *Conceptual Models of Food Choice: Influential Factors Related to Foods, Individual Differences, and Society.* Foods, 2020. **9**(12).
76. Cornelius, M.E., et al., *Tobacco Product Use Among Adults - United States, 2019.* MMWR Morb Mortal Wkly Rep, 2020. **69**(46): p. 1736-1742.
77. American Lung Association. *Overall Tobacco Trends*. Available from: https://www.lung.org/research/trends-in-lung-disease/tobacco-trends-brief/overall-tobacco-trends#:~:text=Trends%20in%20Cigarette%20Smoking%20Rates,-Created%20with%20Highcharts&text=Long%20term%2C%20cigarette%20smoking%20rates,to%2013.7%20percent%20in%202018.
78. Cornelius, M.E., et al., *Tobacco Product Use Among Adults - United States, 2021.* MMWR Morb Mortal Wkly Rep, 2023. **72**(18): p. 475-483.
79. Christiansen, B., et al., *Barriers to effective tobacco-dependence treatment for the very poor.* J Stud Alcohol Drugs, 2012. **73**(6): p. 874-84.
80. Hiscock, R., et al., *Socioeconomic status and smoking: a review.* Ann N Y Acad Sci, 2012. **1248**: p. 107-23.
81. Businelle, M.S., et al., *Mechanisms linking socioeconomic status to smoking cessation: a structural equation modeling approach.* Health Psychol, 2010. **29**(3): p. 262-73.

82. West, R., *The multiple facets of cigarette addiction and what they mean for encouraging and helping smokers to stop.* Copd, 2009. **6**(4): p. 277-83.
83. West, R., et al., *Smoking cessation and smoking patterns in the general population: a 1-year follow-up.* Addiction, 2001. **96**(6): p. 891-902.
84. Hjelm, L., et al., *Poverty and perceived stress: Evidence from two unconditional cash transfer programs in Zambia.* Soc Sci Med, 2017. **177**: p. 110-117.
85. Twyman, L., et al., *Perceived barriers to smoking cessation in selected vulnerable groups: a systematic review of the qualitative and quantitative literature.* BMJ Open, 2014. **4**(12): p. e006414.
86. Hughes, J.R., *Effects of abstinence from tobacco: etiology, animal models, epidemiology, and significance: a subjective review.* Nicotine Tob Res, 2007. **9**(3): p. 329-39.
87. Audrain-McGovern, J. and N.L. Benowitz, *Cigarette smoking, nicotine, and body weight.* Clin Pharmacol Ther, 2011. **90**(1): p. 164-8.
88. Jo, Y.H., D.A. Talmage, and L.W. Role, *Nicotinic receptor-mediated effects on appetite and food intake.* J Neurobiol, 2002. **53**(4): p. 618-32.
89. Kim-Mozeleski, J.E., et al., *A Qualitative Investigation of the Experiences of Tobacco Use among U.S. Adults with Food Insecurity.* Int J Environ Res Public Health, 2022. **19**(12).
90. Osler, M., *The Food Intake of Smokers and Nonsmokers: The Role of Partner's Smoking Behavior.* Preventive Medicine, 1998. **27**(3): p. 438-443.
91. Dardzińska, J.A., et al., *Inappropriate dietary habits in tobacco smokers as a potential risk factor for lung cancer: Pomeranian cohort study.* Nutrition, 2023. **108**: p. 111965.
92. Zizza, C.A., et al., *The Contribution of Beverages to Intakes of Energy and MyPlate Components by Current, Former, and Never Smokers in the United States.* Journal of the Academy of Nutrition and Dietetics, 2015. **115**(12): p. 1939-1949.
93. Poisson, T., et al., *Fruit and vegetable intake and smoking cessation.* Eur J Clin Nutr, 2012. **66**(11): p. 1247-53.
94. McPhillips, J.B., et al., *Dietary differences in smokers and nonsmokers from two southeastern New England communities.* Journal of the American Dietetic Association, 1994. **94**(3): p. 287-292.
95. McClure, J.B., et al., *A comparison of smokers' and nonsmokers' fruit and vegetable intake and relevant psychosocial factors.* Behav Med, 2009. **35**(1): p. 14-22.
96. Lawless, M.H., et al., *Perceived stress and smoking-related behaviors and symptomatology in male and female smokers.* Addict Behav, 2015. **51**: p. 80-3.
97. Kim-Mozeleski, J.E., R. Pandey, and J.Y. Tsoh, *Psychological distress and cigarette smoking among U.S. households by income: Considering the role of food insecurity.* Preventive Medicine Reports, 2019. **16**: p. 100983.
98. Kim-Mozeleski, J.E., et al., *Food insecurity, social needs, and smoking status among patients in a county hospital system.* Preventive Medicine Reports, 2022. **29**: p. 101963.
99. Veldheer, S., et al., *The Co-occurrence of Food Insecurity, Smoking and Obesity in U.S. Adults: National Health and Nutrition Examination Survey (NHANES), 2013–2014 (P04-088-19).* Current Developments in Nutrition, 2019. **3**: p. nzz051.P04-088-19.
100. Alkerwi, A., et al., *Smoking status is inversely associated with overall diet quality: Findings from the ORISCAV-LUX study.* Clin Nutr, 2017. **36**(5): p. 1275-1282.
101. Na, X., et al., *Association of dietary sodium, potassium, sodium/potassium, and salt with objective and subjective cognitive function among the elderly in China: A prospective cohort study.* Global Transitions, 2022. **4**: p. 28-39.
102. Weber, M. and D. Holben, *Food Insecurity, Smoking, Health, and Diet of Parents of School Children.* Journal of the Academy of Nutrition and Dietetics, 2018. **118**(9, Supplement): p. A73.

103. Kim-Mozeleski, J.E., K.C. Poudel, and J.Y. Tsoh, *Examining Reciprocal Effects of Cigarette Smoking, Food Insecurity, and Psychological Distress in the U.S.* J Psychoactive Drugs, 2021. **53**(2): p. 177-184.
104. Alisha Coleman-Jenson, M.P.R., Christian A. Gregory, Anita Singh, *Household Food Security in the United States in 2019.* USDA Economic Research Service, 2019.
105. Buettner-Schmidt, K., D.R. Miller, and B. Maack, *Disparities in Rural Tobacco Use, Smoke-Free Policies, and Tobacco Taxes.* West J Nurs Res, 2019. **41**(8): p. 1184-1202.
106. Braun, V. and V. Clarke, *What can "thematic analysis" offer health and wellbeing researchers?* Int J Qual Stud Health Well-being, 2014. **9**: p. 26152.
107. Pisinger, C. and T. Jorgensen, *Weight concerns and smoking in a general population: the Inter99 study.* Prev Med, 2007. **44**(4): p. 283-9.
108. Bush, T., et al., *Prevalence of Weight Concerns and Obesity Among Smokers Calling a Quitline.* J Smok Cessat, 2008. **4**(5): p. 74-78.
109. Borrelli, B. and R. Mermelstein, *The role of weight concern and self-efficacy in smoking cessation and weight gain among smokers in a clinic-based cessation program.* Addict Behav, 1998. **23**(5): p. 609-22.
110. Bush, T., et al., *Weight Gain After Quitting: Attitudes, Beliefs and Counselling Strategies of Cessation Counsellors.* J Smok Cessat, 2008. **3**(2): p. 124-132.
111. Collins, L.C., J. Walker, and B.A. Stamford, *Smoking multiple high- versus low-nicotine cigarettes: impact on resting energy expenditure.* Metabolism, 1996. **45**(8): p. 923-6.
112. Landrau-Cribbs, E., J.A. Cabriales, and T.V. Cooper, *General and smoking cessation weight concern in a Hispanic sample of light and intermittent smokers.* Addictive Behaviors, 2015. **41**: p. 29-33.
113. Anzengruber, D., et al., *Smoking in eating disorders.* Eat Behav, 2006. **7**(4): p. 291-9.
114. Solmi, M., et al., *The association between smoking prevalence and eating disorders: a systematic review and meta-analysis.* Addiction, 2016. **111**(11): p. 1914-1922.
115. Poureslami, I., et al., *Chinese- and English-speaking adult current smokers' perspectives on smoking and culturally and linguistically appropriate cessation: a qualitative analysis.* Addiction Science & Clinical Practice, 2020. **15**(1): p. 23.
116. Guillaumier, A., B. Bonevski, and C. Paul, *'Cigarettes are priority': a qualitative study of how Australian socioeconomically disadvantaged smokers respond to rising cigarette prices.* Health Education Research, 2015. **30**(4): p. 599-608.
117. Laraia, B.A., *Food insecurity and chronic disease.* Adv Nutr, 2013. **4**(2): p. 203-12.
118. Seligman, H.K., B.A. Laraia, and M.B. Kushel, *Food insecurity is associated with chronic disease among low-income NHANES participants.* J Nutr, 2010. **140**(2): p. 304-10.
119. Loretan, C.G., et al., *Cigarette Smoking Among US Adults With Selected Chronic Diseases Associated With Smoking, 2010-2019.* Prev Chronic Dis, 2022. **19**: p. E62.
120. Nemec, K., *Cultural Awareness of Eating Patterns in the Health Care Setting.* Clin Liver Dis (Hoboken), 2020. **16**(5): p. 204-207.
121. Puddephatt, J.A., et al., *'Eating to survive': A qualitative analysis of factors influencing food choice and eating behaviour in a food-insecure population.* Appetite, 2020. **147**: p. 104547.

APPENDICES

Appendix Table 1: Complete list of interview Questions and Probes from the qualitative interview guide

A. BACKGROUND QUESTIONS

Driving questions	Follow-up questions, probes, or rewording
To start us off, please take me through a day in your life, from the time you wake up to the time you go to sleep. As in, can you paint a mental picture for me of what a typical day is like for you?	
Tell me about your family situation right now, like whether you have kids, whether you have a partner and things like that	
What is your current living situation?	Who do you live with? How many adults and children are in your household? How long have you lived in your current home? What type of dwelling is it? (apartment or house) (if not apparent from responses) Do you own or rent?
How far did you go in school?	If completed high school, what was your favorite subject? If completed GED, what happened? What made you complete a GED? If completed college, what did you study?
What do you like to do for fun?	What are your hobbies and interest? How often do you get to do these things?
What kinds of things are life (everyday/chronic) stressors for you right now?	Are there chronic stressors that you deal with? Examples: For example, any chronic health conditions that you might deal with that you consider to be a stressor, or financial stress? If general answers are provided, ask what kids of ____?
What are your sources of income right now?	How do you pay your bills? How do you get by?

	Do you receive SNAP benefits, or food stamps? Do you receive in other government or federal support? If living with somebody else (like a significant other), who else contributes to your household or life expenses? How?

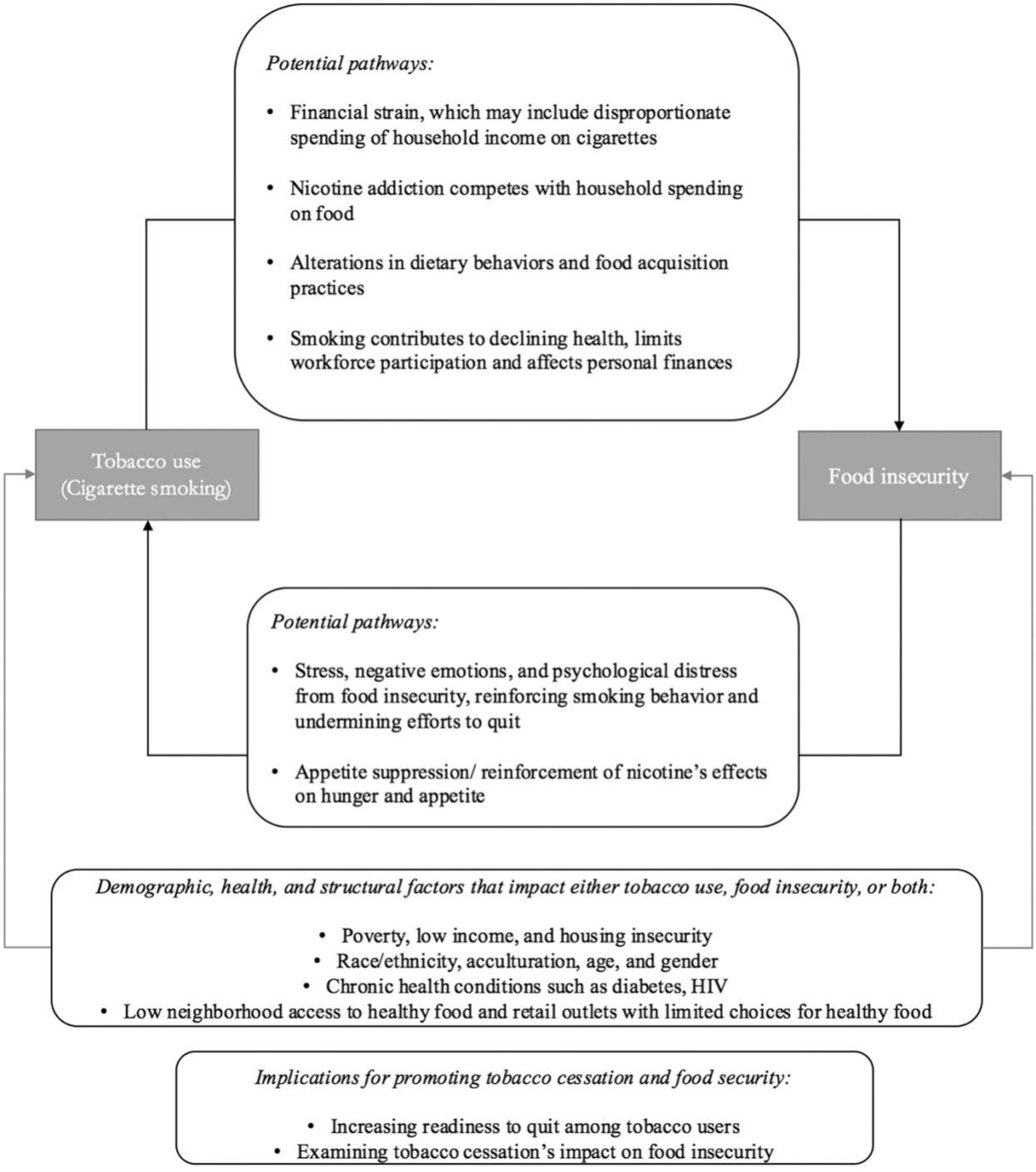
B. FOOD INSECURITY

Before we move on, again, please know that you can skip any of the questions that you do not want to discuss. May I continue with the interview? [PAUSE and wait for verbal confirmation]
In this last part of the interview, I will be asking a few questions about food access and food insecurity.

Driving questions	Follow-up questions, probes, or rewording
Once again, I will ask you to walk me through your day yesterday. This time, please tell me all the different foods you ate yesterday, including meals and snacks, in as much detail as you can recall.	(May follow-up to ask if yesterday was a typical day or somehow atypical)
Is there any sort of special diet that you follow?	E.g., vegetarian, vegan, has diabetes If so, how long have you been following that diet?
Where do you usually get your groceries?	How far do you live from a grocery store? How do you get there (e.g., drive/bus)? How often do you buy your groceries? Tell me more about your food shopping: frequency, location, what types of food do you frequently by? How do you make them last?
You mentioned during our phone screening that sometimes you worry about running out of food. Tell me about the first time you worried about having enough food, whatever you can remember, in as much detail as you can remember.	Most months, do you worry about running out of food? If mention of food pantry, where? How frequent have you visited those in the last 12 months? Did your family receive any food assistance (i.e., food stamps, food pantries, community meals) when you were growing up?
Nowadays, is there any pattern to running out of food, or worrying about food?	Does something else happen regularly that causes you to run out of food or worry about it? Such as medical emergencies, large bills, changes in jobs If the participant has kids in school, where do they get their meals? What about Summer? Are they always with you? If no, what's their

	food situation when they are not with you? How frequent are you by yourself? How do you manage your food situation when you are by yourself or when your kids are not with you?
[If on SNAP] How long do your SNAP benefits usually last you?	What do you do to make sure they don't run out? What do you when they run out?
I'm wondering about what you do if there isn't enough food. What helps you deal with your food concerns?	What kinds of supports do you receive? Does anybody else helps you deal with these concerns? Where do you go to?
Sometimes, people say that smoking helps to relieve stress. What are your thoughts about that?	
FOR PEOPLE WHO CURRENTLY SMOKE ONLY: As I'm sure you know, cigarettes can be expensive sometimes. Are there any changes to how much or how often you smoke based on how much money you have?	Do you typically budget for cigarettes? How does your smoking pattern or frequency change depending on how much money you have?
FOR PEOPLE WHO CURRENTLY SMOKE ONLY: Consider this hypothetical scenario. Say you had $10 to spend at the store **right now**, and your choices were to spend it on a pack of cigarettes or a sandwich. What would you spend it on right now?	What made you take that decision? If the participant mentions that smoking helps with their appetite, what does smoking do for you in those situations? (If participant asks why we asked this question: As part of this study, we are trying to understand how people make decisions around spending.)

Appendix Table 2: A Working Conceptual Model on the Intersection of Tobacco Use and Food Insecurity by Jin E Kim-Mozeleski, Susan J Shaw, Irene H Yen, and Janice Y Tsoh[1]


Potential pathways:
• Financial strain, which may include disproportionate spending of household income on cigarettes
• Nicotine addiction competes with household spending on food
• Alterations in dietary behaviors and food acquisition practices
• Smoking contributes to declining health, limits workforce participation and affects personal finances
Tobacco use (Cigarette smoking)
Food insecurity
Potential pathways:
• Stress, negative emotions, and psychological distress from food insecurity, reinforcing smoking behavior and undermining efforts to quit
• Appetite suppression/ reinforcement of nicotine's effects on hunger and appetite
Demographic, health, and structural factors that impact either tobacco use, food insecurity, or both:
• Poverty, low income, and housing insecurity
• Race/ethnicity, acculturation, age, and gender
• Chronic health conditions such as diabetes, HIV
• Low neighborhood access to healthy food and retail outlets with limited choices for healthy food
Implications for promoting tobacco cessation and food security:
• Increasing readiness to quit among tobacco users
• Examining tobacco cessation's impact on food insecurity